Seat	Sat	D
No.	Set	

# B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024

		ENGLISH (Compulsory) Communication Skill (22221101	)
-		te: Friday, 05-04-2024 00 PM To 02:00 PM	Max. Marks: 40
Instr	uctior	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.	
Q.1	Rewi	write the following by choosing the correct options go The chairman wanted Mahatma Gandhi to give a special politics by religion cy sports dy business	
	2)	was the nickname of Jadav Payeng. a) Majoli b) Molai c) Masala d) Malaya	
	3)	The grandmother of Khushwant Singh used to give state a) chapatis b) parottas c) puris d) dhoklas	ale to dogs.
	4)	Rabindranath Tagore wanted in his life. a) luxuries b) temptation c) dangers d) victories	าร
	5)	Lotus is made of the qualities of the lily and thea) jasmine b) rose c) marigold d) geranium	·
	6)	The father punished his son after he disobeyed him for a) first b) third c) seventh d) tenth	or the time.
	7)	In the word 'shamelessness', '-less' is an example of a a) prefix b) suffix c) fix d) fixture	a
	8)	'He was craving <u>for</u> success.' The underlined word in a) noun b) adjective c) preposition d) verb	this sentence is
Q.2	a) b) c) d) e)	Why did the father punish his son?  Why did the father punish his son?	12

Q.3 a) Bring out the process of communication by illuminating different constituents 10 of communication.

OR

**b)** Elaborate different channels of communication.

**Q.4** Write a detailed note on the intrapersonal skills.

	_	
Seat	Set	D
No.	Set	

### B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 CHEMISTRY (Paper - I) Physical Chemistry (22221106)

			Physical Chemist	•	•
•			nday, 12-05-2024 To 02:00 PM		Max. Marks: 40
Instr	uctio	2) 3)	All questions are compulsory. Draw neat diagrams and give equation Figures to the right indicate full rules of logarithmic tables and ca (At. Wts. H = 1, C = 12, O = 16,	narks lculat	or is allowed.
Q.1		-	hoice questions. mposition of nitrogen pentoxide is unimolecular bimolecular	s an ∈ b) d)	example ofreaction.  pseudo unimolecular  termolecular
	2)	,	slope of straight line	b) d)	always negative zero
	3)	The r a) c)	ate constant k= 2.303/t .log a/a-x third zero	, this b) d)	represents order reaction. second first
	4)		unit for van der Waal's constant 'a L mol <sup>-1</sup> N m <sup>4</sup> mol <sup>-2</sup>	_	N m <sup>-2</sup> m <sup>3</sup>
	5)	All sp a) c)	oontaneous processes are irrever _ law of thermodynamics. _ zeroth _ second	sible. b) d)	This statement represents  first third
	6)		Il gas will approach the behavior of low temperature and low pressur low temperature and high pressur high temperature and low pressur high temperature and high press	re ire ire	al gas at
	7)		of the exponent terms of the condical reaction is referred as order rate constant		ntion terms in rate law of a molecularity velocity of a reaction
	8)	Exclumole a) c)	ided volume of a gas molecule is cule. twice four times	b) d)	_ the actual volume of a gas three times double

Q.2	Ans	swer any four of the following.	80
	a)	For a straight line equation y = mx - C, sketch the nature of the graph.	
	b)	Give the mechanism of the reaction between K <sub>2</sub> S <sub>2</sub> O <sub>8</sub> and KI.	
	c)	Define efficiency of heat engine.	
	ď)	What do you mean by pseudo-unimolecular reaction? Give one example of this type.	
	e)	State Joule-Thomson effect.	
Q.3	Wri	te short notes on any two of the following.	08

- Rules of integration a)
- Spontaneous and non spontaneous processes b)
- Factors affecting rate of reaction

#### Answer any Two of the following.

80

- Calculate the critical constants Pc and of Vc of a given gas if van der Waals constants a and b are 5.4 x 10<sup>5</sup> Nm<sup>2</sup>lit<sup>2</sup>mol<sup>-2</sup> and 0.04596 lit mol<sup>-1</sup> respectively.
- A second order reaction, where initial concentrations of the reactants are same, is 40% completed in 480 secs. How long will it take for the reaction to go to 70% completion?
- What is a slope? Explain the characteristics of slope. C)

#### Q.5 Answer any one of the following

- What is an isotherm? Discuss Andrew's isotherm for carbon dioxide gas.
- By using Carnot's cycle, derive the expression for efficiency of the process.

	_	
Seat	Sat	D
No.	Set	

# B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024

		•		UTÈR SCIÉN ntal of Comp		• • •		
			iday, 12-05-2024 To 05:00 PM				Max. Marks:	40
Instr	uctior	2)	All questions are or Draw neat diagrar Figures to the righ	ns and give equ		ns wherever necessary	'.	
Q.1	<b>Choo</b> 1)	a)	orrect Alternative _ is the volatile me RAM Both a and B		b)	ROM None of the above		80
	2)	Defa a) c)	ult extension of po .txt .docx	wer point file is	b) d)	 .pptx all of these		
	3)	To s a) c)	ave a new text file Ctrl + Z Ctrl + V	short cut		is used. Ctrl + 0 Ctrl + S		
	4)	The a) c)	bar at the bottom o title bar menu bar	of a window that	hold b) d)	ls no. of applications is status bar task bar	known as?	
	5)	Plott a) c)	er is type of Input Pointing	device.	b) d)	Scanning Output		
	6)		puter is free from t Accuracy Diligence	ire some We ca	ll it _ b) d)	Reliability Versatility		
	7)		is equal to 1024 bytes 1024 Mb		b) d)	1024 Kb 1024 Tb		
	8)	Whica) c)	ch of the following i GB MB	s the smallest u	nit o b) d)	f storage? KB TB		
Q.2	a) b) c) d) e)	What Defin Defin List o What	ny four of the follo is computer? e Application Softw e hardware. ut all input devices is Mail-merge? e output Device.	vare.				08

Q.3	Write a) b) c)	e short notes on any two of the following. Mainframe computer Primary memory Algorithm	80
Q.4	Ansv a) b) c)	wer any Two of the following. Write the features of MS-Word. Explain different applications of computer. Write any four excel functions with example.	80
Q.5	Ansv a) b)	ver any One of the following Write the steps of mail merge. Explain mouse and its types.	80

			SLR-GA	<b>\-4</b>
Seat No.	İ		Set	P
	B.S	c. (Semester - I) (New) (CBCS) Examination: March/A CHEMISTRY (Paper - II) Inorganic Chemistry (22221107)	pril-2024	
_		te: Wednesday, 10-04-2024 00 PM To 02:00 PM	Max. Marks	: 40
Instru	uctio	<ul> <li>2) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessa</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> <li>(At. Wts.: H=1, C=12, O=16, N=14, Na=23, Cl=35.5)</li> </ul>	ry.	
Q.1	Cho	ose the correct alternative from given option.  bond are non-directional.		80
	.,	a) Coordinate b) Co-ordinate covalent c) Covalent d) Ionic		
	2)	The co-ordination number of ion in CsCl is a) 7 b) 6 c) 5 d) 4		
	3)	On heating, PCI <sub>5</sub> molecule is converted into  a) PCI <sub>3</sub> b) CI  c) PCI <sub>4</sub> d) PCI <sub>2</sub>		
	4)	In H <sub>2</sub> O molecule hybridization is present.  a) sp b) sp <sup>2</sup> c) sp <sup>3</sup> d) none of these		
	5)	O <sub>2</sub> molecule contains unpaired electrons. a) one b) two c) three d) four		
	6)	N-N bond length in $N_2$ molecule is, $A^0$ . a) 1.09 b) 1.12 c) 1.13 d) 1.18		
	7)	Azimuthal quantum number has the values  a) 0 b) 2n  c) from 0 to n-1 d) 2n <sup>2</sup>		
	8)	Protons are charged particle. a) positively b) negatively c) neutral d) all the above		
Q.2	Ans a) b) c) d) e)	wer any four of the following. Give conditions of successful overlap of atomic orbital. What is non bonding molecular orbital? Draw Mo diagram of Li <sub>2</sub> molecule. Draw orbital diagram of BF <sub>3</sub> . Define:  1) Unit cell 2) Ionic bond Define quantum number.		08

SLR-GA-4
----------

Q.3	Wri a) b) c)	te short notes on any two of the following. Shapes of p orbitals. What is radius ratio? Calculate radius ration for octahedral geometry. Valance bond theory	08
Q.4	Ans a) b) c)	wer any two of the following. Pauli's exclusion principle Explain the formation of SiCl <sub>4</sub> molecule Distinguish between bonding and anti-bonding molecular orbital.	08
Q.5	Ans a) b)	swer any one of the following. Explain in brief sp hybridization with example. Discuss Born-Haber cycle for NaCl.	08

			SLK-GF	1-5
Sea No.	t		Set	P
	B.S	Sc. (Semester - I) (New) (CBCS) Examination: March/Ap COMPUTER SCIENCE (Paper - II) Programming Using C (22221121)	oril-2024	
•		te: Wednesday, 10-04-2024 00 PM To 05:00 PM	Max. Marks	: 40
Instr	uctio	<ul><li>2) All questions are compulsory.</li><li>2) Draw neat diagrams and give equations wherever necessary</li><li>3) Figures to the right indicate full marks.</li></ul>		
Q.1	1)	Itiple choice questions.  is the multi-way decision making statement.  a) goto b) switch c) if d) for		80
	2)	<ul> <li>operator returns the number of bytes that the operand occasion</li> <li>sizeof</li> <li>byte</li> <li>d) address</li> </ul>	upies.	
	3)	The range of char data type varies from to a) -128 to 127 b) -32768 to 32767 c) 3.4e-38 to 3.4e+38 d) None of these		
	4)	function is essential to compile and execute 'C' program.  a) clrscr() b) printf() c) main() d) getch()		
	5)	Which of the following statement is/are correct?  I) int a = 55;  II) char b = 65;  a) Only I is correct  b) Only II is correct  c) Both are correct  d) Both are wrong		
	6)	operator not operates on floating type data.  a) sizeof b) && c) % d) ++		
	7)	format code is used to read array of character.  a) %char b) %string c) %s d) %arr		
	8)	file is created after compilation of "Good.c" program.  a) Good.doc b) Good.obj c) Good.exe d) Good.apk		
Q.2	Ans a) b) c) d) e)	Swer any four of the following.  Define Structure.  How to declare union?  Use of Sizeof operator  Need of array  What is string?  What are the use of break statement?		08

			SLR-GA-5
Q.3	Wri a) b) c)	te short notes on any two of the following. Table of string Storage Classes Nested Structure	08
Q.4	Ans a) b) c)	wer any two of the following.  Write a program to check give number is prime or not using functio  How to pass structure to function? Explain with example.  What is self-referential structure? Explain with example.	<b>08</b> n.
Q.5	Ans a) b)	swer any one of the following.  What is command line argument? Explain with example.  Write a program to read & write data from or into text file.	08

Seat No.							Set	Р
	В.	Sc. (S	Semester -		-	mination: March/ <i>A</i>	April-2024	
			Mechani	PHYSICS cs and Prope		er - I) Matter (22221104)		
			iday, 12-04-2 1 To 02:00 PI	024		(	Max. Marks	: 40
Instru	ıctio	3	2) Figures to t 3) Draw neat	ns are compulsory the right indicate & well labelled dia arithm tables and	full mark agram w	herever necessary.		
Q.1	Mu 1)	Vento	Choice Quesurimeter work Hooke's law Poiseuille's	ks on the basis of v	b)	Bernoulli's principle Surface tension		08
	2)	than a)	n the liquid so that on the co little more extremely la	oncave side.	·	ure on the convex side two times less	e is	
	3)	a)	time period of $l = 2k$ $l = 0$	f compound pend	b)	minimum when $l = k$ $l = k^2$		
	4)	a)	ent of inertia scalar dimensionle	is a quant ess		vector negative		
	5)	of a)	stance of an o  mass Young's mo		b)	can be understood fro elastic limit bulk modulus	m its value	
	6)		on pendulum Young's mo modulus of	dulus		e of the materia bulk modulus nature	l of a wire.	
	7)		-	ne liquid layer cha er then the velocit			of 25 cm	
	8)	mom its pla	ent of inertia			diameter is timough its centre and performance 1/3		

		SLK-G	A-t
Q.2	An	swer any four of the following.	0
	a)	Define Poisson's ratio and give its limiting values.	
	b)	What do mean by streamline flow and turbulent flow of liquid?	
	c)	Define surface tension and angle of contact.	
	ď)	State Hooke's law and define coefficient of elasticity.	
	e)	Calculate the excess of inside a soap bubble of radius 0.1 mm if the surface tension of the soap solution is 0.05 N/m.	

#### Q.3 Answer any two of the following.

08

- a) Obtain an expression for M.I. of a fly Wheel.
- **b)** Obtain the relation between surface tension, excess pressure and radius of Curvature.
- c) When a load applied to the lower end of the rubber tube of inner radius 2.5 cm, there is an increase in length of 1.4 cm and change in the volume of 2.1 cc. Calculate the Poisson's ratio of the rubber.

#### Q.4 Answer any two of the following.

80

- a) Show that shear strain is equivalent to compression and extension strains.
- b) Describe Jaeger's method to determine surface tension of a liquid.
- c) Moment of inertia of a rectangular lamina about an axis passing through its centre and parallel to breadth is  $2.5 \times 10^3$  gm. cm<sup>2</sup>.
  - i) Mass of the lamina
  - ii) M.I. about the breadth of lamina. (length of the lamina = 10 cm)

#### Q.5 Answer any one of the following.

- a) Obtain Poiseuille's equation to determine the coefficient of viscosity of liquid.
- **b)** From the theory of bifilar pendulum, obtain an expression for its time period.

				` '
Seat No.	•		Set	P
		. (Semester - I) (New) (CBCS) Examination: March/A MICROBIOLOGY (Paper - I) oduction to Microbiology and Microbial Diversity (22	_	
•	& Date	: Friday, 12-04-2024 ) PM To 05:00 PM	Max. Marks	s: 40
Instr	uction	<ul><li>1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li><li>3) Draw neat diagrams and give equations whenever necessa</li><li>4) Use of a logarithmic table and calculator is allowed.</li></ul>	ıry.	
Q.1	Choo 1)	The cells were first discovered by which of the following scientist  a) Robert Hook  b) Robert Brown  c) Sir Alexander Fleming  d) None of the above	:s?	80
	2)	Who is known as the father of microbiology?  a) Louis Pasteur b) Robert Koch c) Antony Van Leeuwenhoek d) Robert Hook		
	3)	Which of the following scientists experimented with a specially d box to prove dust carried the germs?  a) H. Schroder and T. Von Dusch b) John Tyndall c) Lazaro Spallanzani d) Louis Pasteur	esigned	
	4)	A virus is made up of  a) Protein coat and nucleic acid b) Protein coat and mitochondria c) Nucleic acid and cell membrane d) Nucleic acid, cell wall, and cell membrane		
	5)	<ul> <li>Which of the following statements are true about a virion?</li> <li>a) Lytic phage</li> <li>b) Lysogenic phage</li> <li>c) The viral capsid</li> <li>d) An infectious and fully formed viral particle</li> </ul>		
	6)	NCCS stands for  a) National Centre for Cell Science b) National Cadet for Cell Science c) Nutritional Centre for Cell Science d) None of the above		
	7)	What is the approximate size of the bacterial cell?  a) 1 mm in diameter  b) 0.5 to 1.0 micrometers in diameter  c) 2 mm in diameter  d) 2 micrometers in diameter		
	8)	In prokaryotic cells, ribosomes are a) 70 S b) 80 S c) 60S + 40S d) 50S + 40S		

		SLR-GA-7
Q.2	<ul> <li>Answer Any Four of the Following.</li> <li>a) Write the names of various branches of Microbiology.</li> <li>b) Define Bacterial Taxonomy.</li> <li>c) What is the full form of NIV?</li> <li>d) Define Bacteriophage.</li> <li>e) Enlist the various National Institutes related to microbiology in India</li> </ul>	<b>08</b> a.
Q.3	<ul> <li>Write Short Notes on Any Two of the following.</li> <li>a) Contributions of Antony Van Leuwenhoek in Microbiology</li> <li>b) Theory of Spontaneous generation</li> <li>c) Basic principles of nomenclature</li> </ul>	08
Q.4	<ul><li>Answer Any Two of the following.</li><li>a) Explain the general characteristics of viruses.</li><li>b) Write the four Koch's Postulates.</li></ul>	08

# Q.5 Answer Any One of the Following. a) Write the differences between prokaryotic and eukaryotic cell. b) Explain the general characteristics of Actinomycetes and Archaebacteria.

c) Give the economic importance of Algae and fungi.

$\sim$ 1		$\sim$		$\mathbf{\alpha}$
<u> </u>		1 -	/\	×
IJL	$\mathbb{R}$	-	—	-0

						SLR-GA	<b>\-8</b>
Seat No.						Set	P
E	B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 PHYSICS (Paper - II) Optics (22221105)						
-		turday, 13-04 1 To 02:00 PN				Max. Marks	: 40
Instru	2	<ul><li>figures to t</li><li>Use of log t</li></ul>	s are compulsory he right indicate f able or calculator diagrams and giv	ull mark is allow	red.	ver necessary.	
	1) In ca best	ase of a lens   possible ima	ge.	al aberi	ration	_ gives position of east confusion	80
	c)	focus of ma	rginal rays	d)	axial rays	ast comusion	
2	is a)	amsden's eye $\frac{1}{f}$ . $\frac{2}{3}f$	e-piece the distan	b)	ween two place $2f$ None of the second sec	ano-convex lenses	
;	<b>3)</b> The	fringes obser equally spa of equal thic localized		edge sha	aped thin fil	lm are	
4	<b>4)</b> A <sub>21</sub> , a) c)	B <sub>12</sub> , B <sub>21</sub> are _ Einstein's c Newton's co		,	Huygen's Bohr's coe	coefficients efficients	
ţ	<b>5)</b> The a) c)	positive	erration of convex well as negative	b)		ese	
(	•	•	e piece, two planc e position of the o	cross wi b)		e separated from each 	
7	-	ase of paralle reflected ligh				nstructive interference	
	a)	$2\mu t \cos r = \frac{1}{2}$	$n\lambda$	b)	$2\mu t \cos r +$	$+\frac{\lambda}{2} = n\lambda$	
	c)	$2\mu t \cos r + \frac{r}{2}$	$\frac{\lambda}{2} = (2n+1)\frac{\lambda}{2}$	d)	$2\sin\theta=r$	ιλ	
8	<b>8)</b> In He a) c)	e - Ne Laser, t 3.39 μm 6328 Α <sup>0</sup>	transition from E6	b)	ives rise to 1.15 μm 2.15 μm	lasers of wavelength	

		SLR-GA	<b>V-</b> 8
Q.2	Ans	swer any Four of the following.	80
	a)	Distinguish between Fresnel and Fraunhoffer diffraction.	
	b)	Explain in short three quantum processes in Laser.	
	c)	Explain any two methods of minimize spherical aberrations for lenses.	
	d)	A soap film $2.5 \times 10^{-5}$ thick with the angle of refraction is $30^{\circ}$ . Find the maximum wavelength of the incident light for which the film appears dark due to the reflected light (given $\mu = 1.33$ ).	
	e)	A convex lens has a mean focal length of 20 cm. Its material has $\mu v = 1.65$ and $\mu r = 1.63$ . Find the axial chromatic aberration of the lens.	
Q.3	Ans	swer any Two of the following.	08
	a)	Two thin plano-convex lenses in Ramsden's eyepiece are separated from each other by 2 cm. calculate i) the focal length of each lens ii) the equivalent focal length iii) the position of the cross wires	
	b)	What is Fermat's principal of least time? Derive the law of reflection on the basis of Fermat's principal.	
	c)	Write a note on Schuster's method.	
Q.4	Ans	swer any Two of the following.	80
-	a)	What is chromatic aberration? Obtain an expression for axial longitudinal chromatic aberration of convex lens?	
	b)	With a neat ray diagram explain the construction, working and use of Huygen's eyepiece. Why cross wires cannot be used in this eye piece.	
	c)	Explain construction and working of Ruby Laser.	
Q.5	Ans	swer any One of the following.	80
	a)	Describe Newton's rings experiment for the determination of the wavelength of a monochromatic light.	
	b)	What is plane diffraction grating? Describe experimental determination of wavelength of light by using a plane diffraction grating and a spectrometer. A parallel beam of monochromatic light having wavelength 6250A <sup>0</sup> is incident normally on a plane transmission grating. If second order spectral line is observed at an angle of 30 <sup>0</sup> , calculate the grating element.	

Seat					S	et	P
No.	L R Sa	(Somostor I)	(Now) (CBCS) F	Evai	mination: March/Anril 201	_ D/I	
	D.30	•	IICROBIOLOGY		mination: March/April-202 aper - II)	.4	
		Cell Cytology	and Microbial	Tec	chniques (22221115)		
		e: Saturday, 13-04-2 0 PM To 05:00 PM	2024		Max. Ma	arks:	: 40
Instru	ıctioı	<b>ns:</b> 1) All questions 2) Draw a neat I	are compulsory. abeled diagram wh	erev	/er necessarv		
		•	right indicate full r				
Q.1	Cho	ose the correct alte	ernative and rewri	te th	ne following sentences.		08
	1)		vhen treated with ly		yme are liberated		
		<ul><li>a) Spheroplasts</li><li>c) L- forms</li></ul>		d)	Protoplasts All of above		
	2)	take part in	protein synthesis.	,			
		a) Ribosomes		b)	Mesosomes		
	2)	c) Endospore	of microscopo io r	d)	Capsule		
	3)	Numerical aperture <ul><li>a) separate cells</li></ul>	e of filicroscope is i		magnify cells		
		c) gather light		d)	None of above		
	4)	In Maneval's capsi a) Iodine	ule staining	-			
		c) Nigrosine			Congo red saffranine		
	5)	is not an an	•				
		<ul><li>a) Hydrogen perc</li><li>c) Dettol</li></ul>	oxide	b) d)	Ethyl alcohol Chlorine		
	6)	,	ı vapour phase disi	,	tant in enclosed spaces		
	-,	a) lodine		b)	Copper		
	<b>-</b> \	c) Beta propiolac		d)	Dettol		
	7)	<ul><li>a) Gram positive</li></ul>	•	oıys b)	accharide is present in L forms		
		c) Gram negative		,	None of above		
	8)	<del></del>	osmetics and perfu				
		<ul><li>a) Chlorine</li><li>c) Copper</li></ul>		b) d)	Ethyl alcohol Ethylene oxide		
0.2	Λ	,	following	,	•		00
Q.2		<b>wer any four of the</b> Define protoplasts.	ionowing:				80
	<b>b</b> ) \	What is resolving po					
	-	What is monochrom Define microbiostasi					
	,			re of	bacterial Endospore.		

		SLR-GA-9
Q.3	Write short notes on any two of the following.	08
	<ul> <li>a) Explain the detail structure of flagella.</li> </ul>	
	<b>b)</b> Write an account on Gram positive cell wall of bacteria.	
	c) Describe the use of chlorine and iodine used for sterilization.	
Q.4	Answer any two of the following.	08
	a) Write an account on cell wall staining by chance's method.	
	b) Give the difference between capsule and slime layer.	

# Q.5 Answer any one of the following.

80

- a) Describe the fluid mosaic model of cell membrane and give the functions of cell membrane
- **b)** Explain the principle, working and application of compound microscope.

c) Explain the use of heavy metals to control the growth of microorganisms.

				SLR-GA-1	0
Seat No.				Set	P
	В.	S1	v) (CBCS) Exa [ATISTIC (Pap ve Statistics -	•	
•		ite: Monday, 15-04-2024 00 PM To 02:00 PM		Max. Marks:	40
Instr	ucti	ons: 1) All questions are co 2) Figures to the right 3) Use of calculator is	indicate full mar	KS.	
Q.1		Itiple choice questions:	l <b>.</b>		80
	1)	<ul><li>Colors of flowers is an exa</li><li>a) Quantitative variable</li><li>c) Skewed variable</li></ul>	e b)	Qualitative variable Symmetric variable	
	2)	The exact point of intersect curve is at  a) 5 <sup>th</sup> Decile c) Median	b)	ogive curve and more than ogive  50th Percentile All of these	
	3)	With two attributes one ca  a) Two class frequence c) Eight class frequence	n have in all: es b)	Four class frequencies Nine class frequencies	
	4)	The mean of 1, 3, 4, 5, 7 a  a) 3 c) 5	and 4 is n, then tl b) d)	ne value of n is 4 6	
	5)	$20^{th}$ percentile is equal to a) $Q_2$ c) $D_3$	 b) d)	D <sub>2</sub> None of these	
	6)	The standard deviation of a) 5.5 c) 2.97	first 10 natural n b) d)		
	7)	The first moment about <i>X</i> a) 10.80 c) 12.08	= 0 of a distribut b) d)	ion is 12.08. The mean is 10.08 12.88	
	8)	The relation between $\mu_4$ a is	$\operatorname{nd}\mu_2 \text{ is } \mu_4 > 3\mu_2^2$	then the curve of the distribution	

#### Q.2 Answer any four of the following.

a) Leptokurtic

c) Mesokurtic

80

- Define continuous variable and give one example of continuous variable.
- If the median of the distribution 10, 12, 13, 16, x, 20, 25, 30 is 18, then find b) the value of x.

b) Platykurtic

d) Platykurtic and positively skewed

- Define Range and coefficient of Range. c)
- Define positive attribute. d)
- Prove that second central moment is variance. e)

Q.3	Write short notes on any two of the following.				
	a)	Explain the construction of ogive curves.			
	b)	What is the effect of change of origin and scale on arithmetic mean?			
	c)	Define Bowley's coefficient of skewness. Prove that it lies between - 1 and + 1.			

#### Q.4 Answer any two of the following.

08

- **a)** Prove for any discrete frequency distribution standard deviation is not less than mean deviation from mean.
- **b)** If  $\bar{X}_1$  and  $\bar{X}_2$  are the means of two groups of sizes  $n_1$  and  $n_2$  respectively, derive the formula to obtain mean of  $(n_1 + n_2)$  values pooled together.
- c) Find the conditions of consistency of data related to two attributes A and B.

#### Q.5 Answer any one of the following

- **a)** Define median and derive the formula for median in case of continuous frequency distribution.
- **b)** Define Yule's coefficient of association (*Q*) and coefficient of colligation (*Y*) and show that

$$Q=\frac{2Y}{1+Y^2}$$

Seat No.						Set	P
	B.Sc. (\$	Semester -		GY (Pap	,	pril-2024	
		onday, 15-04 // To 05:00 P				Max. Marks	: 40
Instru	Instructions: 1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary. 3) Figures to the right indicate full marks.						
	Q.1 Multiple choice questions:  1) Habitat of phylum Echinodermata is				80		
	a)	Exclusively Estuarine		b)	Fresh water All of these		
	a)			b)	oda jointed appendages partial appendages		
	a)	a belongs to aplacophora cephalopod		b)	n Mollusca. gastropoda pelecpoda		
	a)	ımerically seç Protozoa Platyhelmin	-	b)	r of phylum Porifera Annelida		
		ries lubricoid		b)	accolomic		

7) In sycon body leave water through \_\_\_\_\_

6) Tanea solium belongs to phylum \_\_\_\_\_

a) ostia

c) spongocoel

a) Arthropoda c) Platyhelminthes

c) coelomic

b) osculum d) prosopyle

b) Annelida

b) acoelomic

d) coelom absent

d) Echinodermata

8) Nutrition in amoeba \_\_\_\_\_.

a) psedocoelomic

a) hemizoic

b) heterozoic

c) parazoic

d) holozoic

#### Q.2 Answer any four of the following.

- a) Saprozoic nutrition
- b) Tube footc) General characters of protozoa
- d) Polymorphism in coelentera
- e) Pseudopodium

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Explain economic importance of earthworm.</li> <li>b) Describe general characters of Arthropoda.</li> <li>c) Explain locomotion in paramecium.</li> </ul>	80
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Describe life cycle of tapeworm.</li> <li>b) Explain sycon canal system.</li> <li>c) Describe nutrition in amoeba.</li> </ul>	80
Q.5	<ul><li>Answer any one of the following.</li><li>a) Explain water vascular system in sea- star.</li><li>b) Parasitic adaptation in Ascaries lubricoids.</li></ul>	80

Seat No.	t						Set	Р
	В.	Sc. (\$		STATIS	TICS (Pa	amination: March per - II) leory (22221109)	/April-2024	
_			iesday, 16-04 /I To 02:00 Pl	l-2024	•	,	Max. Mark	s: 40
Instr	uctio	2	) Figures to	ns are compul the right indica culator is allow	ate full mar	ks.		
Q.1		Let A	the correct at $A \cup B = \{2, 4, 6\}$ ar $A \cup B = \{2, 3, 6\}$ $A \cap B = \varphi$	$A = \{3, 6\} $ t		events, then $A \cap B = \{6\}$ Both a and b		08
	2)	Spac a)	-	appearing for		ation till passing is countably infinite none of these	sample	
	3)	If a p a) c)	erfect coin is Zero 1	tossed twice	the probab b) d)	0	ds is	
	4)	then	probability of 0.4					
	5)			ted at randon lected numbe		et is $\{1,2,3,45$ he digit 5. $\frac{\frac{2}{50}}{\frac{6}{50}}$	0} What is the	
	6)	a)	and $B$ be tw $B \subset A$ $A \subset B$	o events defir	b)	and $P(B) > 0$ then $P(A A) = 0$ $A \cap B = \varphi$ None of these	$B) = \frac{P(A)}{P(B)}$	
	7)	If A <sub>1</sub> , a) c)	$A_2$ , $A_3$ form p pairwise ind mutually exc	ependent	nple space b) d)	then they are mutually independe None of these	nt	
	8)	If P(A a) c)	4 B) is same Independen elementary		A and <i>B</i> and <i>b</i> )	re mutually exclusive on None of these	events	

Q.2	a) b) c) d)	Swer any Four of the following. Define Sample space. Define sure event and impossible event. Given $P(\bar{A} \cap B) = 0.1$ , $P(A \cap \bar{B}) = 0.4$ , $P(\bar{A} \cup \bar{B}) = 0.6$ compute $P(A)$ . For any two events $A$ and $B$ . Define conditional probability $P(A/B)$ . If $B \subset A$ then find $P(\bar{A} \cap B)$ .	80
Q.3	a)	<ul> <li>te short notes on any Two of the following.</li> <li>Two unbiased dice are thrown simultaneously. What is the probability that</li> <li>1) The sum (X + Y) is greater than 9 where X: Number on first die</li> <li>2) The product (XY) is less than 4 Y: Number on second die.</li> <li>A committee of 3 persons is to be formed from 5 persons A, B, C, D, E. Write down the events corresponding to the following:</li> <li>1) E<sub>1</sub> = A is not selected in the committee</li> </ul>	08
	c)	2) $E_2 = B$ and $C$ are not selected in the committee For any three events $A, B$ and $C$ . Prove that $P(A \cap B \cap C) = P(A).P(B/A).P(C/A \cap B)$	
Q.4	a) b)	If $A$ and $B$ are any two events, then prove that $P(A \cup B) \leq P(A) + P(B)$ If a fair coin and a fair die are tossed together. Let $A$ be the event that there is a head on a coin and even number on a die and $B$ be the event that the number on a die is greater than $A$ . Obtain  1) Sample Space 2) Events $A$ and $B$	08
	c)	Show that if $A$ and $B$ are independent events, then $\overline{A}$ and $\overline{B}$ are also independent events.	
Q.5	Ans a)	Swer any One of the following. State and prove addition theorem of probability of two events. Write the expression for $P(A \cup B \cup C)$	80
	b)	Show that conditional probability satisfies all the axioms of unconditional probability.	

Seat	Set	D
No.	Set	

# B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024

			Anir	ZOOLOGY (F - nal Diversity	-	•	
•	Day & Date: Tuesday, 16-04-2024 Fime: 03:00 PM To 05:00 PM						Max. Marks: 40
Instru	ıctio	2	) All questions ar ) Draw neat diag ) Figures to the r	ram and give whe			
		- a)	choice question _ belongs to Uroo Scoliodon Amphioxus		b) d)	Herdmania Labeo	08
	2)		ostome are withou Gills Jaws	ut	b) d)	Dorsalfin Tailfin	
	3)	a)	n is characterized Dermalscale Pharyngeal gills	by the presence	b)_	Pariedfins All the above	
	4)	a)	belongs to the cla Aves Pisces	ass	•	Amphibia Mammalia	
	5)	a)	on gland of snake Sebaceous glan Salivary gland		b) d)	Mucous gland Endocrine gland	
	6)	a)	en age of reptiles Coenozoic era Mesozoic era	was	b) d)	Paleozoic era Proterozoic era	
	7)	a)	matic bone is the Flying fish Flying bird	e feature of	 b) d)	Flying lizard Flying mammal	
	8)	Exter a) c)	nal ears are char Birds Reptiles	acteristic of	 b) d)	Mammals Pisces	
	a) b) c) d)	Fund Agna Petro Cartil	myzon aginous fishes neleon	_			08

	SL	R-GA-13
Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Cephalochordata</li> <li>b) Naja naja</li> <li>c) Morphological adaptation in birds</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Economic importance of fishes</li> <li>b) Give general characters of Reptilia.</li> <li>c) Aerial habitat in mammal</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Describe Poisonous-nonpoisonous snake with suitable examples.</li> <li>b) Give an account of the general characters of the class mammals.</li> </ul>	08

		<u> </u>				
Seat	t		Set	Р		
	B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 MATHEMATICS (Paper - I) Algebra (22221116)					
•		e: Thursday, 18-04-2024 0 PM To 02:00 PM	Max. Marks	s: 40		
Instr	uctio	<ul><li>ns: 1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li><li>3) Use of logarithmic table and calculator is allowed.</li></ul>				
Q.1	Cho	ose the correct alternatives each of the following.		80		
	1)	Characteristic equation of a matrix $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$ is				
		a) $\lambda^2 - 3\lambda - 4 = 0$ b) $\lambda^2 - 3\lambda + 8 = 0$				
		c) $\lambda^2 - 2\lambda - 4 = 0$ d) $\lambda^2 + 3\lambda + 4 = 0$				
	2)	The rank of the matrix $\begin{bmatrix} 1 & 2 & 5 & 7 \\ 2 & 3 & 4 & 2 \\ 0 & 0 & 0 \end{bmatrix}$ is				
		a) 0 b) 1 c) 2 d) 3				
	3)	If $A$ is square matrix then the matrix $A - A'$ is matrix. a) symmetric b) skew-symmetric c) elementary d) unitary				
	4)	If $r(A) \neq r[A:B]$ then the system $AX = B$ is  a) consistent b) inconsistent c) homogeneous d) possess a solution				
	5)	The product of eigen values of matrix A is				
		a) 1 b) 0				
	٥)	c)  A  d) -1				
	6)	If $\alpha$ and $\beta$ are roots of $x^2 - 2x + 2 = 0$ then $\alpha^3 + \beta^3 = $ a) 4 b) 2				
		c) 1 d) 0				
	7)	Modulus and argument of a complex number $1+i$ area) $\sqrt{2}, \frac{\pi}{2}$				
		c) $\sqrt{2}, \frac{\pi}{4}$ d) $2, \frac{\pi}{4}$				
	8)	If $G = \{1, -1, i, -i\}$ is a multiplicative group then order of $-i$ is	<u> </u>			
		a) 1 b) 0				
		c) 2 d) 4				

#### Q.2 Attempt any four of the following.

80

- a) Define the term characteristic matrix and characteristic equation of a matrix.
- **b)** Find the characteristic equation of a matrix  $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$
- c) Find the eigen vector for the matrix  $\begin{bmatrix} 1 & 4 \\ 3 & 2 \end{bmatrix}$
- **d)** Express the complex number  $1 + \sqrt{3}i$  in a polar form.
- e) Prove that,  $e^z$  is a periodic function with period  $2\pi i$ .
- f) In a group G, prove that  $(ab)^{-1} = b^{-1} \cdot a^{-1}$  for all  $a, b \in G$

#### Q.3 Attempt any two of the following.

08

- Verify that, the matrix  $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$  satisfies its characteristic equation. Also find  $A^{-1}$ .
- **b)** Find all the 5<sup>th</sup> roots of unity.
- c) Let  $\mathbb{Z}$  be a set of integers then show that  $(\mathbb{Z}, +)$  is a group. Is it an abelian group?

#### Q.4 Attempt any two of the following.

08

- a) Prove that,  $\cos z = \frac{e^{iz} + e^{-iz}}{2}z$ ,  $\sin z = \frac{e^{iz} e^{-iz}}{2i}$
- **b)** Investigate for what values of  $\lambda$  and  $\mu$ , the following system of equations. 2x + 3y + 5z = 9, 7x + 3y 2z = 8,  $2x + 3y + \lambda z = \mu$  will have
  - i) no solution
  - ii) a unique solution
  - iii) infinite number of solutions
- Find rank of the matrix  $\begin{bmatrix} 1 & 3 & 4 & 5 \\ 1 & 2 & 6 & 7 \\ 1 & 5 & 0 & 10 \end{bmatrix}$

### Q.5 Attempt any one of the following questions.

- a) State and prove Cayley-Hamilton's theorem and verify it for  $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$
- State and prove De Moivre's theorem and hence show that if  $2\cos\theta = x + \frac{1}{x}$  then  $x^n + \frac{1}{x^n} = 2\cos n\,\theta$

Seat	Sat	D
No.	Set	

	B.Sc	c. (Se	emester - I) (New) (CBCS) I BOTANY (P		_	pril-2024
			Microbiology and Phys	-	•	
-			rsday, 18-04-2024 To 05:00 PM		,	Max. Marks: 40
Instr	uctio	2) 3)	All questions are compulsory.  Draw neat labeled diagram whe Figures to right indicate full mar  Use of logarithm table and calcu	ks.	·	
Q.1	Rew 1)	Sarga a)	ne following sentences choosing assum reproduces sexually byisogamous oogamous	b)		08
	2)	Oogo a) c)		b)	ed wall. three four	
	3)	a)	<i>gyra</i> reproduces sexually by isogamous oogamous	b)	_method. anisogamous all the above	
	4)	a)	<i>irogyra,</i> the scalriform conjugatio dioecious homothallic	b)		
	5)	a)	sex organ of Vaucheris is antheridium oogonium	b) d)	ascogonium archegonium	
	6)	a)	heria belongs to the class Chlorophyceae Cyanophyceae	b) d)	Rhodophyceae Euglenophyceae	
	7)	a)	nodules are formed inside the _ heterocyst resting spores	b) d)	akinietes all of these	
	8)	a)	nogones in <i>Nostoc</i> play an import sexual asexual	tant r b) d)		ion
Q.2	Anso a) b) c) d) e) f)	What Defin What Write Give	ny four of the following.  is virus?  e mycoplasma.  is basillus?  the class and family of spirogyra  the division and class name of sa  the definition of phycology.		ssum.	08

Q.3	Wri a) b) c)	ite short notes on any two of the following.  General character of Vaucheria  Significance of mycoplasma  Classification of plant virus	08
Q.4	Ans a) b) c)	swer any two of the following.  Explain the economic importance of bacteria.  Give the structure of mycoplasma.  Describe the lateral conjugation method in <i>Spirogyra</i> .	08
Q.5	Ans a) b)	swer any one of the following.  Describe the thallus structure of Nostoc.  Explain economic importance of algae.	08

Seat	
No.	

### B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS (Paper - II) Calculus (22221117)**

Day & Date: Friday, 19-04-2024

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

**Q.1** Choose the correct alternative for each of the following.

08

1) 
$$\lim_{x \to 0} \frac{3^x - 2^x}{x} = \underline{\hspace{1cm}}.$$

a)

c) log 3

- The expansion of  $\log (1 + x)$  is \_\_\_\_\_. 2)

a) 
$$x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \frac{x^6}{6} + \cdots$$

b) 
$$x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \frac{x^5}{5} + \frac{x^6}{6} + \cdots$$

c) 
$$x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} - \frac{x^5}{5} - \frac{x^6}{6} - \cdots$$

d) 
$$\frac{x^2}{2} - \frac{x^4}{12} + \frac{x^6}{45} - \cdots$$

- The degree of the homogenous function  $u = \frac{x^{\frac{1}{3}} + y^{\frac{1}{3}}}{x^{\frac{1}{5}} y^{\frac{1}{5}}}$  is \_\_\_\_\_. 3)

- b)  $\frac{2}{15}$  d)  $\frac{3}{5}$
- If  $f(x,y) = 2x^2 xy + 2y^2$  then  $\frac{\partial f}{\partial x}$  at (1,2) =\_\_\_\_\_. 4)
  - a) 2

b)

c) 0

d) 10

$$\int_{0}^{\frac{\pi}{6}} \sin^{6} 3x \, dx = \underline{\qquad}$$

6) 
$$\int_{0}^{\infty} \frac{x^2}{(1+x^6)} dx = \underline{\qquad}$$

b)

- d)
- $\operatorname{curl}(\operatorname{grad} \phi) = \underline{\hspace{1cm}}.$ 7)
  - a)  $\nabla^2 \Phi$

∇ф b)

c) 0

- d) 1
- if  $\bar{r} = x\bar{\iota} + y\bar{\jmath} + z\bar{k}$  then curl  $\bar{r} =$ 8)

b) 1

c) -1

2 d)

# Attempt any four of the following. a) Solve $\lim_{x\to 1} \frac{1+\log x-x}{1-2x+x^2}$

08

- Expand  $\cos x$  in power of x by using Maclaurines series. b)

Examine for continuity of

c) 
$$f(x,y) = \frac{xy}{x^2 + y^2} , \quad x^2 + y^2 \neq 0$$
$$= 0 , \quad \text{otherwise}$$

- Evaluate  $\int_{0}^{\pi/2} \sin^7 x \, dx$
- If  $\phi(x, y, z) = 3x^2y y^3z^2$  find gradient of  $\phi$  at point (1, -2, -1)

#### **Q.3** Attempt any two of the following.

08

a) Evaluate 
$$\int_{0}^{2\pi} \sin^4 x \cos^2 x \, dx$$

- Find the  $n^{th}$  derivative of  $x^3 \cos x$ b)
- Show that  $\nabla r^n = nr^{n-2}\bar{r}$ C)

#### Attempt any two of the following.

If 
$$z = f(x, y)$$
 is homogeneous function of  $x, y$  of degree  $n$  then show that  $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = nz$  for all  $x, y$  in the domain of the function.

- **b)** Find the directional derivative of  $\phi(x, y, z) = x^2yz + 4xz^2$  at (1, -2, 1) in the direction of  $2\bar{\iota} - \bar{\iota} - 2\bar{k}$
- **c)** Evaluate  $\int_0^1 x^2 (1-x^2)^{\frac{7}{2}} dx$

- Q.5 Attempt any one of the following questions.a) State and prove the Leibnitz's theorem.

  - b) If  $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ ,  $x \neq y$  then show that

i) 
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$$

ii) 
$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = (1 - 4\sin^2 u)\sin 2u$$

	-	
Seat	Sot	D
No.	Set	

# B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024

	٥.٠	. (OOII			Y (Paper	– II)	.p.	
Fungi and Archegoniate (22221103)								
Day & Date: Friday, 19-04-2024 Time: 03:00 PM To 05:00 PM						Max. Marks: 40		
Instr	uctio			s are compuls he right indicat		S.		
Q.1		Albugo (	oice ques causes the ed rust ack rust	tions. disease whicl	b)	as Yellow rust White rust	08	
	2)	In cycas a) Su c) Di	unken	wer epidermis	is interrupt b) d)	ed by stomata. Monocot None of these		
	3)	a) Az		d as biofertilize	er. b) d)	Nephrolepsis Pteris		
	4)	a) Al	•	ians of plant K	ingdom. b) d)	Fungi Pteridophytes		
	5)	a) Le	ella belong epidophyta alamophyt		b) d)	Pterophyta Psilophyta		
	6)	G.M. Sn a) Th c) Fi	rree	assified bryoph	-	Four Six		
	7)	a) As	s used exte spergillus lavicepa	ensively in biod	b)	nd genetic work? Neurospora Puccinia		
	8)	a) G	s common um atex	secretion in gy	/mnospern b) d)	ns, Tanin Resin		
Q.2	a) b) c) d)	Define of What is Define so Give is to Define of the Defin	Gymnospe the function the funct	on of the ligule' ence of albugo			08	

SLR-GA-17
-----------

Q.3	Wri a) b) c)	ite short notes on any two of the following. Thallus structure of mucor. Economic importance of bryophytes. T. S. of Selaginella stem.	08		
Q.4	Ans a) b) c)	swer any two of the following. Give the general characters of Basidiomycotina. Explain T. S. of cycas leaflets. Explain asexual reproduction in yeast.	08		
Q.5	Answer any one of the following.				
	a)	Describe the structure of antheridium and archegonium in Riccia and add a note on fertilization.			
	b)	Describe in brief with respect to occurrence, thallus organisation and asexual method of reproduction in agaricus.			

Seat No.						Set	P
I	B.Sc	•	r - I) (New) (CBCS) I ELECTRONICS uit Theory and Netw	(Pap	oer – I)		
-	Day & Date: Saturday, 20-04-2024 Max. Marks: 40 Time: 12:00 PM To 02:00 PM						
Instru	ıction	2) Draw n 3) Figures	stions are compulsory. eat diagrams and give ed to the right indicate full i logarithmic table and cal	narks			
Q.1	Multi 1)	ple choice q is use a) Capacit c) Fuse	d as an electromechanio	b)	itch? Relay Transformer		80
	2)	In a pure cap a) In Phas c) Leading		b) _	with voltage. Out of Phase Lagging		
	3)	a) Accepto	nance circuit is also calle or Magnifier	ed a _ b) d)	circuit. Current Magnifier None of these		
	4)	Norton's equivalent resistance (R <sub>N</sub> ) is found by  a) Removing the load resistance and open the output terminal b) Replacing the voltage sources with their internal resistances c) Replacing the current sources with their internal resistance d) Both (b) and (c)					
	5)	The Y paran a) Admitta c) Hybrid	neters are called nce				
	6)	<ul><li>a) Brown,</li><li>b) Brown,</li><li>c) Brown,</li></ul>	ode for a 10 K $\Omega$ $\pm$ 10 % Black, Red and Sliver. Black, Brown and Sliver. Black, Orange and Slive Black, Black and Sliver.		or is		
	7)			um va b) d)	alue of 100 Amp then its 141.44 amps 100 amps	RMS	
	8)	The hybrid p a) Output	arameter h <sub>11</sub> is called Conductance npedance	b) d)	Reverse voltage gain Forward current gain		

#### Q.2 Answer any four of the following.

- a) What is resistance? State its unit.
- **b)** A series resonance circuit has a resonating frequency of 160 KHz and a quality factor of 4. Calculate its bandwidth.
- c) Define the term "In Phase" and "Out of Phase".
- d) State Maximum Power Transfer Theorem.
- e) Enlist impedance parameters with their units.
- f) State Superposition Theorem.

#### Q.3 Write short notes on any two of the following.

08

80

- a) Phase relationship between current and voltage in pure resistive circuit.
- b) Series resonance circuit.
- c) Voltage sources.

#### Q.4 Answer any two of the following.

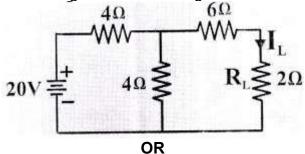
80

- a) What is capacitance? State its unit. Give the classification of capacitor.
- **b)** A series LCR circuit has an inductor of 100 mH, capacitor of 100  $\mu$ f and resistance of 100  $\Omega$  is operated with 230 V, 50 Hz AC supply. Calculate the resonating frequency.
- c) Compare series and parallel resonance circuit

#### Q.5 Answer any one of the following questions.

80

a) State Thevenin's theorem. Calculate the current flowing through load resistance R<sub>L</sub> of a following dc network using Thevenin's theorem.



**b)** Give construction and working of step-up and step-down transformer.

Seat No.	t	Set	P
	B.S	Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 GEOGRAPHY (Paper – I) Geomorphology – I (22221124)	
		nte: Saturday, 20-04-2024 Max. Mark 00 PM To 02:00 PM	s: 40
Instr	ucti	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.	
Q.1	1)	cet the proper alternative from the following and fill in blanks.  Geomorphology is a branch of Geography.  a) Economic b) Physical c) Political d) Human  The layer situated between crust and core is known as  a) Sial b) Sima c) Nife d) Conrad	08
	3)	The average density of the earth is gram <sup>3</sup> c.m. a) 5.5 b) 4.5 c) 7.5 d) 6.5	
	4)	Igneous rock are called as rocks.  a) Sedimentary b) Primary  c) Quaterrary d) Tertiary	
	5)	The continental drift thory is presented by  a) Blache b) Ratzel c) Semple d) Wegner	
	6)	Earthquakes are measured with a  a) Thermometer  b) Seismograph  c) Barograph  d) Thermograph	
	7)	Volcano and are called as sudden forces.  a) Fold b) Earthquake c) Fault d) Landside	
	8)	Stromboli is an example of type of volcano.  a) Active b) Positive c) Dormant d) Extint	
Q.2	a) b) c)	swer any Four of the following.  Definition of Geomorphology.  Types of Rocks.  Block Mountain.  Definition of Fold.  Materials ejected by Volcanoes.	08
Q.3	Wr a) b) c)	ite short notes on any Two of the following.  Nature of Geomorphology.  Interior structure of the Earth.  Describe the types of sedimentary rock.	80

<b>SLR-GA-2</b>	0
-----------------	---

Q.4	Answer any Two of the following.	

- a) Explain the importance of Geomorphology.
  b) Describe the types of Faults.
  c) Describes the concept Wegener's continental drift theory.

80

- Q.5 Answer any One of the following.a) What is Earthquake? Explain its causes and effects.
  - b) Define the Igneous tocks? Describe types of Igneous tocks.

Seat No.	1	Set	P
	B.S	Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 GEOLOGY (Paper – I) Physical Geology (22221110)	
		nte: Saturday, 20-04-2024 Max. Marks: 4 00 PM To 05:00 PM	40
Instru	uctio	ons: 1) All questions are compulsory. 2) Draw net diagram wherever necessary. 3) Figures to the right indicates full marks.	
Q.1		Itiple choice question.  Rate of weathering is dependent on the  a) temperature b) tectonism  c) altitude d) All of these	80
	2)	Earth is Originate from the  a) gas b) dust c) both gas and dust d) None of these	
	3)	The tidal theory put forward by  a) Chamberlin  b) Jean and Jeffry  c) Kant and Lapels  d) Chamberlin and Moulton	
	4)	discontinuity separate sial from sima.  a) Movorovisic b) Conrad c) Moho d) Gutenberg	
	5)	Secondary wave only passes through a) solids b) gasess c) liquids d) All of these	
	6)	Second most abundant gas relies from volcano is  a) CO <sub>2</sub> b) Water vapour c) Sulfer d) None of these	
	7)	The highest density of atmosphere occurs at  a) troposphere b) thermosphere c) stratosphere d) mesosphere	
	8)	Average density of the earth is gm/cm <sup>3</sup> .  a) 1	
Q.2	a) b) c)	swer any four of the following. Shape of the earth. What is low velocity layer? Define focus and epicenter. What is soil profile? What is Moho discontinuity?	80

		SLR-GA-21
Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Prapogesion of Seismic waves.</li> <li>b) Product of volcano</li> <li>c) Seismograph and seismogram.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain the tidal theory of earth origin.</li> <li>b) Describe rock cycle.</li> <li>c) Describe classification of earthquake.</li> </ul>	08
Q.5	<ul><li>Answer any one of the following.</li><li>a) Describe scale of earthquake.</li><li>b) Describe the earth interior.</li></ul>	08

Seat No.					Set	P
Ī	B.Sc. (Sen		(New) (CBCS) E ELECTRONICS ital Fundamenta	(Pa	•	
•	Date: Mond 12:00 PM To	ay, 22-04-2	2024	, 0.1	Max. Mark	s: 40
Instru	2) D 3) F	raw neat di igures to th	are compulsory. iagrams and give ed e right indicate full r e is strictly prohibite	nark	ons wherever necessary. s.	
	a) 10	ary equivale	ons ent of decimal 43 is		 110011 101011	80
	2) The dec a) 24 c) 27	78	llent of hexadecima	b)	C is 2874 2847	
	a) 01	ess-3 code 010100100 0100001010		b) d)	 100001111011 101010001111	
	4) Applying get a) A = c) Ā	 + B	n's theorem to the B	b)	an equation $\overline{\overline{(A+B)}}\cdot\overline{\overline{(A\cdot B)}}$ we $A+\bar{B}$ $\bar{A}+\bar{B}$	
	,	olean relatio	on $(A+B)\cdot (A+\bar{B})$	,		
	product a) De	s a visual di solution. eMorgan's t arnaugh ma	heorem		I products needed for sum-of- Truth-table Boolean Equation	
	a) Pa	arity checke	used as er y converter	b) d)	controlled inverter All of these	
	8) The resu a) 10 c) 10	)	cting binary numbe	101 b) d)	11 from 11010 is 11 110	

Q.2	Ans	swer any four of the following.	08
	a)	In signed binary numbers, the number 10010000 represents what decimal? Justify.	
	b)	The binary number 10110111 produces even or odd parity? Justify.	
	c)	Draw the logic diagram and truth table for Ex-NOR gate.	
	d)	Write the equation to represent associative and distributive laws of Boolean algebra.	
	e)	Explain any two Boolean rules.	
Q.3	Wri a) b) c)	ite short notes on any two of the following.  DeMorgan's theorems.  Gray Code  Binary to Gray conversion.	80
Q.4	Ans	swer any two of the following.	08
	a)	Draw the block diagram of digital computer and explain.	
	b)	Discuss the universality of NAND gate.	
	c)	The given Boolean expression is $\bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + AB\bar{C}$ . Reduce the equation using Karnaugh map method.	
Q.5	Ans	swer any one of the following.	08
	a)	Discuss in detail, the full-subtractor.	
	b)	Explain NAND and Ex-OR gates. Draw the pin diagrams of the corresponding IC's.	

Seat No.		Set I	P
	B.S	c. (Semester - I) (New) (CBCS) Examination: March/April-2024 GEOGRAPHY (Paper – II) Geomorphology – II (22221125)	
		te: Monday, 22-04-2024 Max. Marks: 4	10
Instru	ıctic	ons: 1) All questions are compulsory. 2) Figures to the right indicates full marks.	
Q.1		tiple choice questions.  According to the cycle of erosion, the landforms have changes through time.  a) Sudden b) Abrupt c) Sequential d) Random	80
	2)	The evolution of surface features of the earth are studied in  a) Hydrology b) Pedology c) Geomorphology d) Climatology	
	3)	Delta is formed due to the depositional work of  a) Wind b) Glacier c) River d) Underground water	
	4)	Sea cliff is formed due to the work of sea water.  a) Depositional b) Erosional c) Transportation d) Mass wasting	
	5)	landform is formed due to the depositional work of glacier.  a) Mushroom rock b) Drumline c) Delta d) Fiord	
	6)	landform is formed due to erosional work of wind. a) Mushroom rock b) Delta c) Plains d) Waterfall	
	7)	Which type of mass movement occurs on precipitous to vertical slope?  a) Creep b) Rapid flowage c) Sliding d) Toppling	
	8)	is not an agent of biological weathering.  a) Rainfall b) Human c) Vegetation d) Animals	
	Wri a) b) c) d) e) f)	te Short Answer. (Any Four)  Define weathering.  Explain the types of mass wasting.  Define the karst topography.  State the erosional landforms of river.  Define the Sand Dunes.  State the depositional landforms of sea waves.	08

		SLR-GA-24
Q.3	<ul> <li>Write Short notes on any Two of the following.</li> <li>a) Explain the depositional landforms of glacial.</li> <li>b) Describe the causes of mass wasting.</li> <li>c) Describe the Cycle of Erosion.</li> <li>d) Describe the chemical weathering.</li> </ul>	08
Q.4	<ul> <li>Write answer any Two of the following.</li> <li>a) Explain the biological weathering.</li> <li>b) Describe the depositional landforms of river.</li> <li>c) Describe the erosional landforms of karst.</li> </ul>	08
Q.5	<ul><li>Write answer any one of the following.</li><li>a) Define physical weathering and state its types with examples.</li><li>b) Describe the erosional landforms formed by wind.</li></ul>	08

Seat No.		Set	P
1	B.S	c. (Semester - I) (New) (CBCS) Examination: March/April-2024 GEOLOGY (Paper - II) Palaeontology (22221111)	
•		te: Monday, 22-04-2024 Max. Marks: 00 PM To 05:00 PM	40
Instru	ıctio	ons: 1) All questions are compulsory. 2) Draw net diagram wherever necessary. 3) Figures to the right indicates full marks.	
Q.1	Sele 1)	ect correct one. In trilobite glabella is placed in the Part of the shell. a) head shield b) Thorax c) Pygidium d) None of these	80
	2)	Fossil trinucleus is belongs to the phylum.  a) Gastropod b) Echinodermata c) Brachiopod d) Arthropod	
	3)	In echinoderm one of the genital plate provide with number of pore like opening is described as  a) ocular plate b) Corona c) mederporic plate d) None of these	
	4)	The central lobes of trilobite is described as  a) anterior lobe b) pleural lobe c) axil lobe d) All of these	
	5)	Which process of formation of fossils involves molecule by molecule replacement?  a) Petrification b) mould & casts c) Carbonization d) Imprints	
	6)	In physa coiling is observed.  a) Sinistral b) Spire c) Dextral d) none of these	
	7)	Remains of ancient organisms preserved in the rocks are called as  a) Minerals b) Dyke c) Fossils d) Crystals	
	8)	Species cardita belongs to Class. a) Gastropod b) Cephalopoda c) Lamellibranches d) none of these	
	Ans a) b) c) d) e)	wer any four of the following.  Define paleontology.  Name the fossils of gastopods.  What is aperture in fossil?  Write two conditions of fossilization.  Describe goniatite.	80

Q.3	Wri a) b) c)	te short notes on any two of the following. Carbonation Cardium Mould and cast	80
Q.4	Ans a) b) c)	Swer any two of the following.  Describe the Glossopteris and gangamopeteris.  Describe the lamellibranches.  Describe the tubipora.	08
Q.5	Ans a) b)	swer any one of the following.  Describe uses of fossils  Describe trilobits of fossil.	08

Seat	Sat	D
No.	Set	

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024

			SH (Com	- ·	
-		<b>Communicatio</b> e: Friday, 10-05-2024 00 AM To 11:00 AM	ni Skili (	•	larks: 40
Instr	uctio	<ul><li>ns: 1) All questions are compulsor</li><li>2) Figures to the right indicate</li></ul>	-	S.	
Q.1	Rew 1)	rrite the following by choosing the Francis Bacon's "Of Discourse" of a writing c playing	deals with		08
	2)	Bertrand Russell was against the ways of learning. a) bookish c) practical	e educatio b) d)	n that emphasizes the modern live	
	3)	Rabindranath Tagore wrote a let conception of freedom.  a) England c) America		on his ideas and Australia Papua New Guinea	
	4)	Niyi Osundare is poet. a) an Indian c) a Canadian	b) d)	a Nigerian a Greek	
	5)	"Ode on Solitude" celebrates the a) luxuries c) simplicity	importand b) d)	ce of and loneliness. indulgence wickedness	
	6)	Christina Rossetti's "Remember" a) an elegy c) a ballad	b) d)	a sonnet an ode	
	7)	His attitude was <u>threatening</u> . The a) lovely c) fearful	e synonym b) d)	n for the underlined word is welcome interesting	
	8)	She has to America twice a) be c) been	e. b) d)	being bees	

Q.2	Ans a) b) c)	wer the following question briefly. (Any Four) What are the important qualities of the best discourse? What biographies Bertrand Russell refers to in the beginning of his essay? Why did Rabindranath Tagore consider that America couldn't understand 'freedom'?	12
	d) e) f)	How has Niyi Osundare described the destruction of water and soil?  Describe any two qualities of a simple life by Alexander Pope.  How did Christina Rossetti want her partner to remember her?	
Q.3	a)	Write a letter applying for the job of a teacher of Mathematics at a school in Pune. Address the letter to the Head Master of the school.  OR	10
	b)	Write a letter addressing the editor of The Times of Nation on the recent editorial which you liked the most.	
Q.4	Wha	it is interpersonal intelligence? Write a detailed note on it.	10

Sea No.	t	Set	Р
	B.Sc. (Semester -	II) (New) (CBCS) Examination: March/April-2024	

CHEMISTRY (Paper-III) Organic Chemistry (22221208) Day & Date: Saturday, 11-05-2024 Max. Marks: 40 Time: 09:00 AM To 11:00 AM Instructions: 1) All questions are compulsory. 2) Draw neat diagrams and give equations wherever necessary. 3) Figures to the right indicate full marks. 4) Use of logarithmic tables and scientific calculator is allowed. (At. Wts. H=1, C=12, O=16, N=14, Na=23, CI=35.5) **Q.1** Multiple choice questions. 80 The general formula of cycloalkane is 1) a)  $C_nH_{2n+2}$ b)  $C_nH_{2n}$ C<sub>n</sub>H<sub>2n-2</sub> c) d) C<sub>n</sub>H<sub>3n</sub> 2) Hyperconjugation effect involves the delocalization of ... a)  $\sigma$  electrons b)  $\pi$  electrons  $\sigma$  and  $\pi$  electrons d) lone pair of electrons c) 1, 4-Pentadiene is an example of \_\_\_\_ diene. 3) a) isolated b) conjugated cumulated d) none of these c) The distance between two nuclei in covalently bonded atoms is called as \_\_\_\_\_. 4) bond angle b) bond energy electron affinity bond length d) c) Geometrical isomerism can be shown by compounds having \_\_\_\_\_. 5) C=N C=C b) a) all of these c) ring d) The nature of pyridine is \_\_\_\_\_ 6) b) a) acidic basic c) amphoteric d) neutral The % of s character in sp2 hybrid orbital is \_\_\_\_\_ %. 7) a) 25 33 b)

#### 60 c) 50 d) Acidic hydrogens are present in 8) a) Ethane ethene b) ethyne benzene c) d)

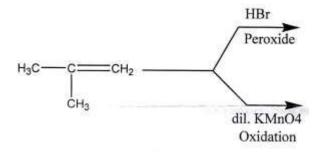
### Answer any four of the following.

Define terms:

Bond angle i)

- Bond energy ii)
- What are the limitations of Kekule's structure of benzene? b)
- Write the structures of the following C)
  - 1,2-Dimethyl cyclopentane i)
  - 3-Chloro cyclohexane ii)

- d) Why are meso compounds optically inactive?
- e) Predict the products for the following reaction.



#### Q.3 Write short notes on any Two of the following.

80

- a) What is the effect of,
  - i) Cl<sub>2</sub>/light,
  - ii) HBr,
  - iii) Conc.H<sub>2</sub>SO<sub>4</sub>,
  - iv) H<sub>2</sub>, Ni, 80°C on cyclopropane
- b) What is steric effect? Explain steric effect with respect to Mesitoic acid
- c) Discuss the optical isomerism of 2,3-dihydroxy butanoic acid.

#### Q.4 Answer any two of the following.

80

- a) Define hybridization. Explain the formation of C<sub>2</sub>H<sub>2</sub> molecule on the basis of hybridization.
- b) What is optical activity? Explain the elements of symmetry with examples.
- **c)** Explain the different types of reagents with suitable examples.

#### Q.5 Answer any one of the following.

- a) What are dienes? Discuss their classification by giving suitable example. Give methods of preparation of 1,3-butadiene.
- b) Discuss the mechanism involved in
  - i) Nitration of benzene
  - ii) Friedel-Crafts alkylation

Seat No.		Set	P
Е	B.Sc. (Semester -	II) (New) (CBCS) Examination: March/April-2024	

		`		PUTER SCIÉN		` • '	•	
			Introducti	on to Web De	sigr	ning (22221229)		
			iturday, 11-05-20 1 To 02:00 PM	24			Max.	Marks: 40
Instr	uctio	2		right indicate full r		s. ons wherever necessa	ry.	
Q.1	Cho 1)		ch built-in method	natives from the	th of	ions. f the string in JavaScrip size() none of the above	ot?	08
	2)	a)		ITML tag for the s	smal b) d)	lest heading <h2> <h6></h6></h2>		
	3)	a) c)	keyword is use date var	ed to declare vari	able b) d)	s in JavaScript. Dim none of these		
	4)	Whie	ch of the following src cellpadding	g is an attribute c	of <t b) d)</t 	able> tag? link bold		
	5)	Web a) c)	pages starts wit <head> <html></html></head>	th which of the fol	lowii b) d)			
	6)	a) c)	tag does not h paired double	nave a closing tag	J. b) d)	singular none of these		
	7)	a)		g CSS property s				
	8)	Wha a) c)	at does alink attril actual link active link	bute mean?	b) d)	adjust link action link		
Q.2	Ans	wers	any four of the	following.				08
	a) b) c) d) e)	Stru Mult Expl Write	cture of HTML. iple column in CS ain br> tag. e any two string bat is Anchor tag?	SS.				

		SLR-GA-28
Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) List tag in HTML</li> <li>b) CSS Display</li> <li>c) JavaScript - Dialog Boxes</li> </ul>	08
Q.4	<ul> <li>Answers any two of the following.</li> <li>a) Explain CSS Position properties with example.</li> <li>b) Explain features of JavaScript.</li> <li>c) Explain different selectors in CSS.</li> </ul>	08
Q.5	<ul><li>Answers any one of the following.</li><li>a) Explain graphics tag with example.</li><li>b) Explain History object in JavaScript.</li></ul>	08

Seat No.	Set	P
-------------	-----	---

	B.50	c. (Semester - II) (New) (CBCS) Examination: March/Api CHEMISTRY (Paper - IV)	rii-2024
		Analytical Chemistry (22221209)	
_		e: Monday, 13-05-2024 0 AM To 11:00 AM	Max. Marks: 40
Instr	uctior	<ul> <li>1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>4) Figures to the right indicate full marks.</li> <li>3) Use of logarithmic table and calculator is allowed.</li> <li>(At. Wts.: H-1, C-12, 0-16, N- 14, Na-23, Cl-35.5)</li> </ul>	
Q.1	Multi 1)	iple choice questions.  Molarity is expressed as  a) gm/Litre b) Litre/mole c) moles/Litre d) moles/1000 gm	08
	2)	The molarity of pure water is a) 18	
	3)	The parachor is property. a) additive b) constitutive c) Both additive and constitutive d) None of these	
	4)	The reciprocal of viscosity is called  a) surface tension b) frictional resistance c) fluidity d) none of these	
	5)	The fusion of sodium with aniline gives mainly  a) NaX b) NaCN  c) NaCNS d) Na <sub>2</sub> S	
	6)	Carius method is used for estimation of  a) carbon b) nitrogen c) hydrogen d) halogen	
	7)	Paper chromatography is form of chromatography. a) liquid-liquid b) liquid-solid c) liquid-gas d) all of these	
	8)	Pulses are adulterated by colouring with  a) dyes b) pigment c) water d) alcohol	
Q.2	a)	wer any four of following. Give any two methods of food processing. Explain advantages of thin layer chromatography over Paper chrom	<b>08</b> atography.

- c)
- How are carbon and hydrogen defected ?.
  What do you mean by Viscosity and coefficient of viscosity?
  Define normality and molarity. ď)
- e)

Q.3	Writ	e short notes on Any Two of the following.	80
	a)	Describe Kjeldabl's method for the estimation of Nitrogen in an organic compound.	
	b)	Give the experimental determination of surface tension.	
	c)	Discuss with example different types of titrimetric analysis.	
Q.4	Ans	wer Any Two of the following.	08
	a)	What is adulteration of milk? Discuss adulterants used in milk.	
	b)	What is chromatography Discuss in detail with respect to technique and methodology of paper chromatography?	
	c)	Explain the procedure for preparation of 250 ml of 1N oxalic and (molecular wt. 126g)	
Q.5	Ans	wer Any One of the following.	08
	a)	How Sulphur is estimated by Carius method? Explain with reactions.	
	b)	Short Notes on	
		Additive and constitutive properties	
		2) Polar and non-polar molecules	
		3) Application of dipole moment	

			_	
Seat No.			Set	Р
	B.Sc	c. (Semester - II) (New) (CBCS) Examination: Marc COMPUTER SCIENCE (Paper - IV) Operating System (22221230)	h/April-2024	
		te: Monday, 13-05-2024 00 PM To 02:00 PM	Max. Marks:	40
Instru	ıctior	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.		
	Multi 1)	tiple choice questions:  Bankers Algorithm is used to Deadlock in OS.  a) prevent b) detect c) avoid d) recover		80
	2)	Inter process communication can be done through  a) Mails b) Texts c) System calls d) Traps		
	3)	Which one of the following is the address generated by CPU'a) Physical address b) absolute address c) Logical address d) none of the menti		
	4)	CPU can only execute Programs which are stored in  a) Hard disk b) Floppy drive c) Job queue d) Main memory		
	5)	The total time spent by process in the ready queue is called a a) Turnaround time b) Response time c) Waiting time d) None	as	
	6)	Which is not the state of a process of the following? a) Ready b) Old c) Waiting d) Running		
	7)	FIFO scheduling is  a) preemptive scheduling b) Non- preemptive scheduling d) None of these	scheduling	
	8)	Using Overlays, we can execute big programs into small mer a) TRUE b) FALSE	nory.	

#### Q.2 Solve Any FOUR questions.

80

- a) What is process?
  b) Define Multiprogramming.
  c) What is thread?
  d) What is swapping?
  e) State the term Context Switching.
- **f)** What is deadlock?

#### **Solve Any TWO questions.** Q.3

- a) Define Fragmentation with its types.
- b) Explain Process State Life Cycle.c) Explain dinning philosopher problem.

$\cap$ 4	Salva	A my	TWO	augotions
<b>Q.4</b>	Solve	Anv	IWO	questions.

80

- a) List out differences between User Thread and Kernel Thread.
- **b)** Explain Paging in brief.
- c) Explain FCFS Scheduling algorithm with Example.

#### Q.5 Solve Any ONE question.

- a) What is Operating System? Explain Services provided by Operating System.
- **b)** Explain PCB with Diagram.

Seat No.			Set	P
	B.Sc	c. (Semester - II) (New) (CBCS) Examination: March/A <sub> </sub> PHYSICS (Paper – III) Heat and Thermodynamics (22221205)	oril-2024	
•		e: Tuesday, 14-05-2024 0 AM To 11:00 AM	Max. Marks	: 40
Instru	iction	<ul><li>ns: 1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li><li>3) Neat diagrams must be drawn wherever necessary.</li><li>4) Use of log table or calculator is allowed.</li></ul>		
Q.1	<b>Choo</b> 1)	ose correct alternative. The relation of the coefficient of viscosity and coefficient of thermal conductivity is given by  a) $K = 2\eta C_v$	al	80
	2)	The mean free path of a gas molecule is inversely proportional to a) square of diameter of a gas molecule b) square root of diameter of a gas molecule c) diameter of a gas molecule d) fourth power of molecular diameter		
	3)	Cooling by adiabatic demagnetization of paramagnetic salt is called a) fountain effect b) magnetic effect c) second sound d) magneto-caloric effect	∍d	
	4)	Third law of thermodynamic is related to  a) Absolute zero temperature b) zero-point entropy c) zero point energy d) all a, b, c		
	5)	In adiabatic expansion, internal energy  a) remains constant b) increases c) becomes equal to zero d) decreases		
	6)	A heat engine with 100% efficiency is practically  a) possible b) impossible  c) some time possible d) some time impossible		
	7)	The action of refrigerator is opposite to  a) air conditioning machine b) heat engine c) thermocouple d) Thermostat		
	8)	The art of controlling weather within limited space is calleda) refrigerator b) heat engine		

d) air conditioning

c) weather detector

			SLR-GA-31
Q.2	Ans a) b) c) d) e)	Define heat engine and give its types.  Define coefficient of performance of refrigerator.  Define reversible and irreversible processes with examples.  What are the properties of liquid helium-II  State Joule-Thomson effect	08
Q.3	Wri a) b) c)	ite short notes on Any Two of the following. Linde's air liquefier. Isothermal and adiabatic process. Vapour compression refrigerator	08

#### Q.4 Answer Any Two of the following.

80

- State and prove zeroth law of thermodynamics.
- b) Define cooling by adiabatic demagnetization. Describe experimental set up for adiabatic demagnetization of paramagnetic substance.
- c) Derive adiabatic relations.

#### **Q.5** Answer any One of the following.

- Define coefficient of viscosity and obtain an expression for it on the basis of transport phenomena. Determine coefficient of viscosity of nitrogen at N.T. P. [Given Density=  $1.2 \frac{kg}{m^3}$ , mean free path=  $8.5 \times 10^{-8} m$ , average velocity= 453.3m/s.
- b) Describe diesel cycle and deduce an expression for its efficiency. A engine performs 2200J of mechanical work and rejects 4200J of heat at every cycle. Calculate
  - 1) How much heat supplied to engine in each cycle?
  - 2) What is the efficiency of engine.

		SLR-GA-3A
Seat No.		Set F
E	3.Sc.	(Semester - II) (New) (CBCS) Examination: March/April-2024 MICROBIOLOGY (Paper–III) Microbial Metabolism and Cultivation (22221220)
		Tuesday, 14-05-2024 Max. Marks: 4 PM To 02:00 PM
Instru	ictions	<ul><li>: 1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li><li>3) Draw neat diagram and give equations wherever necessary.</li></ul>
	1)	le choice questions.  Hydrolysis of phosphate groups in ATP is an process.  a) exergonic b) endergonic  c) reduction d) oxidation
	·	Anticodons are present on  a) m-RNA b) t-RNA c) r-RNA d) DNA
		DNA contains sugar a) ribose b) deoxyribose c) hexose d) triose
		3- pleated sheets are the examples of structure of protein. a) Primary b) Secondary c) Tertiary d) Quaternary
	·	The color of Andrade's indicator in alkaline condition is  a) pink b) yellow  c) blue d) green
	•	Amylase is a) intracellular enzyme b) extracellular enzyme c) apoenzyme d) coenzyme
	•	nduced fit hypothesis was proposed by a) Fischer b) Koshland c) Crick d) Watson
		Nitrogen source for growth is provided by in culture media a) starch b) NaCl c) blood d) peptone
		er any Four of following.  lention two functions of lipids.

**b)** What is active site of enzyme?

c) d) e) f) Name any two monosaccharides.
What are apoenzymes?
What are autotrophs?
What is living media?

		SLR-GA-32
Q.3	<ul> <li>Write short note on any Two of the following.</li> <li>a) EMP pathway</li> <li>b) Lock and Key hypothesis</li> <li>c) Primary structure of proteins</li> </ul>	08
Q.4	<ul> <li>Answer any Two of following.</li> <li>a) Write a note on "Nitrogen bases of DNA"</li> <li>b) Discuss about "Differential, and Selective media"</li> <li>c) Write a note on "Extracellular enzymes"</li> </ul>	08
Q.5	<ul> <li>Answer any One of following.</li> <li>a) Describe in detail about "High energy compounds</li> <li>b) Describe the structure and function of t RNA</li> </ul>	08

		OLIN-OA-33
Seat No.		Set P
E	B.Sc. (Semester - II) (New) (CBCS) PHYSICS (Pa Electricity, Magnetism and Ba	aper – IV)
	Date: Wednesday, 15-05-2024 09:00 AM To 11:00 AM	Max. Marks: 40
Instru	actions: 1) All questions are compulsory. 2) Figures to the right indicate full 3) Use of logarithmic table or nonp 4) Draw neat diagrams and give e	programmable calculator is allowed.
	Multiple Choice questions.  1) The charging of a capacitor through in a) Exponential c) Oscillatory	08 ductor is b) Linear d) Sinusoidal
:	<ul> <li>The time constant of LR circuit contain series with the resister of 20Ω is</li> <li>a) 2 Sec.</li> <li>c) 200 Sec.</li> </ul>	ing inductor of 10H connected in
	<ul><li>3) The operator j on multiplication turns a</li><li>a) 180°</li><li>c) 45°</li></ul>	,
,	<ul><li>At series resonance power factor of LC</li><li>a) Infinite</li><li>c) cos θ = XL - XC/R</li></ul>	b) One
	5) Log decrement of B.G.is given by $\lambda = \frac{1}{2}$ .  a) $2.303/n \log_{10}(\frac{\theta^1}{\theta^{n+1}})$ c) $\log_{e}(\frac{\theta^1}{\theta^{n+1}})$	b) $2.303/n \log_{10}(\theta n + 1/\theta 1)$ d) $n/2.303 \log_{10}(\frac{\theta 1}{\theta n + 1})$
	6) The figure of merit of ballistic galvanor a) mm/ $\mu A$ c) mm/ $\mu V$	onii
	<ul><li>7) Transistor is terminal semicond</li><li>a) one</li><li>c) three</li></ul>	uctor device. b) two d) four
	<ul> <li>8) In a CE amplifier base current is 20 μA amplification factor β</li> <li>a) 50</li> <li>c) 150</li> </ul>	and collector current is 2mA then b) 100 d) 200

### Q.2 Answer any Four of the following.

- a) Define self inductance of a coil.
  b) State Biot-Savarts law.
  c) Define Figure of merit and Current sensitivity.
  d) Define ripple factor.
  e) Find the value of current amplification factor β if α = 0.95.

Q.3	Wri a) b)	,				
	c)	Series L-C-R circuit is connected to a variable frequency 230 V ac.L=5 H,C=80 $\mu$ f,R=:40 $\Omega$ .				
		Find: 1) Resonant frequency				
		2) Quality factor				
Q.4	Ans	swer any Two of the following.	80			
	a)	Derive an expression for growth of charge containing a resistance, a capacitor and source of constant e.m.f.E in series.				
	b)	Explain working of Common Emitter transistor amplifier.				
	c)	Explain the working of positive and negative clippers.				
Q.5	Ans	swer any One of the following.	08			
	a)	Draw neat labeled diagram of Bridge rectifier and explain its operation with ripple factor and rectification efficiency.				
	b)	Discuss parallel resonant circuit. Show that at resonance the impedance is				

maximum and hence the current in the circuit is minimum. Explain why the

circuit is called rejector circuit.

				OLIK-O/	<b>1-0</b>
Sea No.	t			Set	P
	B.S	c. (Semester - II) (New) (CBCS) MICROBIOLOG Applied Microbiol	Y (Pa	aper - IV)	4
-		te: Wednesday, 15-05-2024 00 PM To 02:00 PM		Max. Mai	ks: 40
Instr	uctio	ons: 1) All questions are compulsory. 2) Draw neat labelled diagrams w 3) Figures to the right indicate ful			
Q.1		vrite the sentences by choosing co	rrect	alternatives.	80
	1)	<ul><li>is waterborne disease.</li><li>a) Typhoid</li><li>c) Tuberculosis</li></ul>	,	Rabies AIDS	
	2)	Identification of fecal and nonfecal of a) MBRT c) MPN	colifori b) d)	m is carried out by IMViC MR	
	3)	Living objects involved transmission <ul><li>a) carriers</li><li>c) fomites</li></ul>		seases are called vectors parasites	
	4)	When the disease occurs in very lar	rge pc	pulation throughout the world	
		is a) epidemic c) endemic	,	sporadic pandemic	
	5)	is a typical coliform. a) Enterobacter erogenes c) Salmonella	,	E coli Shigella	
	6)	a) E coli c) Streptococcus pneumoniae	b) d)	<i>Mycobaterium tuberculosis</i> AIDS Virus	
	7)	<ul><li>is used in indole test.</li><li>a) Nutrient broth</li><li>c) Peptone water</li></ul>	b) d)	Milk broth Starch broth	
	8)	is air borne disease. a) Cholera c) Tick fever	b) d)	Rabies Tuberculosis	
Q.2	Ans a) b) c) d)	Fecal pollution Chronic infection Pathogenecity COD			08

e)

Epidemic disease

Q.3	Ans a) b) c)	swer any Two of the following. Sources of microorganisms in water. Mixed and reinfection. What is food borne disease, list different food borne diseases.	08
Q.4	Ans	wer any Two of the following.	08
	a)	Define sewage, which are the different types of sewage.	
	b)	Mortality and Morbidity rate.	
	ςĺ	Write on air horne diseases	

## Q.5 Answer any One of the following. a) Explain in detail mode of transmission of diseases. b) Write about municipal water purification process.

SLR-GA-34

Seat No.		Set P					
E	B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024 STATISTICS (Paper – III) Descriptive Statistics - II (22221211)						
	Day & Date: Thursday, 16-05-2024 Max. Marks: 40 Time: 09:00 AM To 11:00 AM						
Instru	Instructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Use of Calculator is allowed.						
	Choo 1)	If the variables X and Y are changes in opposite direction then the corr.  coefficient is  a) Zero  b) One  c) Positive  d) Negative					
	2)	If $X$ and $Y$ are two variables with mean $10$ each and variance $1$ and $9$ respectively and correlation coefficient equal to $\frac{1}{4}$ , then the covariance of $3X$ and $5Y$ is  a) $34$ b) $15.75$ c) $11.25$ d) $0$					
	3)	If the sum of squares of the difference between 10 ranks of two series is 33, then the rank correlation coefficient is  a) $0.80$					
	4)	The angle between two regression lines is $0^0$ when correlation coefficient is a) 1					
	5)	If the regression coefficient of $X$ on $Y$ , the correlation coefficient between $X$ and $Y$ and variance of $Y$ are $\frac{9}{20}$ , $\frac{3}{5}$ and $16$ respectively. What is the variance of $X$ ?  a) 16  b) 9  c) 4  d) 3					
	6)	If a constant $60$ is subtracted from each of the values of $X$ and $Y$ , then the regression coefficient is  a) reduced by $60$ b) increased by $60$ c) $\frac{1}{60}th$ of the original regression coefficient  d) not changed					
	7)	Most commonly used index number is:  a) Volume index number b) Value index number  c) Price index number d) Simple index number					
	8)	Which of the following formula satisfy the time reversal test?  a) Lasperys b) Paasches c) Fishers d) None of the above					

Q.2	Ans a) b) c) d) e)	wer any four of the following. Define negative correlation with suitable example If Karl Pearson's coefficient of correlation between $X$ and $Y$ is 0.85, standard deviation of $Y$ is 5 and variance of $X$ is 64. Find covariance between $X$ and $Y$ . State the expression for the acute angle between two regression lines and discuss the case when $r=\pm 1$ If the $V(X)=25$ , $r_{xy}=0.25$ and $b_{xy}=0.5$ . Find the covariance between $X$ and Define Fisher's quantity numbers.	<b>08</b> Y.
Q.3	Writ a) b) c)	what is the effect of change of origin and scale on regression coefficient? State any two properties of regression coefficient. Prove any one of them. Write a note on Cost of living index number.	08
Q.4	Ans a) b)	wer any two of the following  Explain scatter diagram  The equations of two regression lines are $3X + 2Y + 26$ and $6X + Y = 31$ Find  i) Means of $X$ and $Y$ ii) Coefficient of correlation between $X$ and $Y$ .  Explain the weighted aggregate method of calculating index number.	80
Q.5	Ans a)	wer any One of the following.  With usual notation, prove that $6\sum_{i=1}^{n}d_{i}^{2}$	80

Seat	Sat	D
No.	Set	<u> </u>

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024

	<b>D</b> .00	. (50	ZOOLOGY (F			pm 202-
	(	COM	PARATIVE ANATOMY OF		•	1232)
•			ırsday, 16-05-2024 To 02:00 PM			Max. Marks: 40
Instr	uction	2)	All questions are compulsory. Draw neat labelled diagram. Figures to the right indicate full m	narks.		
Q.1	<b>M</b> ulti 1)	•	choice Questions. exoskeleton of mammals is covered Scales	ed by b)	 Feathers	08
		c)	Hairs	ď)	Nails	
	2)	The	skin of frog is externally covered	with _	secretion.	
		a) c)	Rough Mucous	b) d)	Hairy Boney	
	3)	The a) c)	cavity of pelivc girdle is known as Condyle Olecron	b) d)	 Acetabulum Coelon	
	4)	An o a) c)	esophagus is absent in Scoliodon Frog	b) d)	Rat Donkey	
	5)		gills are the only respiratory orga Amphibians Birds	ns of b) d)	Reptiles Pisces	
	6)	Nucl a) c)	eated RBCs are only found in Humans Cat	b) d)	Camel Tiger	
	7)	Well a) c)	developed olfactory lobes are fo Bat Scoliodon	und ir b) d)	r Frog Turtle	
	8)	An a a) c)	rchinephric kidney is found in Cyclostomes Reptiles	b) d)	Mammals Birds	
Q.2	1) 2) 3) 4) 5)	Defin Draw How What Give	e the term an integument. neat labeled diagram of reptile L many heart chambers are preser are types of gills in Pisces? name of different chambers of stees.	nt in cr	ocodiles.	08

SL	R-G	A-36
----	-----	------

O 2	\A/#:	to Short Notes on Any Two of the following	00
Q.3	VVI	te Short Notes on Any Two of the following.	08
	1)	Describe structure of alimentary canal of mammal.	
	2)	Describe structure and functions of swim bladder in fish.	
	3)	Describe V.S. of skin of mammals.	
	-		

# Q.4 Answer Any Two of the following. 1) Describe pectoral girdle of amphibians. 2) Describe air sacs in birds. 3) Describe metanephric kidney.

80

- Attempt Any One of the following.1) Describe structure and functions of brain of Pisces.
- 2) Describe in detail the structure and function of appendicular skeleton in frog.

						\$	SLR-GA-	<b>37</b>
Seat No.							Set	P
E	3.Sc. (S		STATIS	TICS (P	ape	mination: March/A er – IV) ution (22221212)	April-2024	
•		iday, 17-05-2 // To 11:00 Al	024	my Dist			Max. Marks	: 40
Instru	2	1) All Question 2) Figures to t 3) Use of calc	he right ind	icate full n	nark	S.		
-	<b>1)</b> Whic a)	the correct a ch of the follow (0.2, 0.2, 0.3 (0.2, 0.1, 0.9	wing is a pro 7)	obability di	b)	oution? (0.7, 0.2, 0.1) (0.1, 0.6, 0.2)		08
	X: P(x): then a) c)	the mean and (1/3, 0) (0, 1/3)	1 1/3 d variance o	of X is		(1/3, 1/3) (0, 2/3)		
	then a)	$x) = \frac{1}{5} \qquad x$ $= 0$ the distribution Discrete uni Hyper-geom	otherwise on of r.v. X i form		_	Distribution. Binomial Two point		
	<b>4)</b> If <i>X</i> h a) c)	8	metric distr	ibution wit	th (2 b) d)		S	
	a)	p. g. f. of Bind $q + ps$ $p + qs^n$	omial distrib	ution with	b)	ameters $(n, p)$ is $q + ps^n$ $(q + ps)^n$		
(	, a)	which distribu Uniform dist Poisson dist	ribution	nd variand		re same. Binomial distribution Geometric distributio	n	
	7) If X is	s a geometric	r.v. then P	$X \ge 6/X$	≥ 3	is equal to		
	a)	$P[X \ge 6]$ $P[X \ge 6]/P[$			b)	$P[X \ge 3]$ $P[X \ge 2]$		

8) If  $X \sim NB(k, p)$  such that E(X) = 9 and V(X) = 36, then a)  $k = 9, p = \frac{1}{3}$  b)  $k = 3, p = \frac{1}{4}$ 

c)  $k = 36, p = \frac{1}{4}$ 

d)  $k = 3, p = \frac{1}{3}$ 

08

#### Define expectation of function of random variable *X*. b) State mean and variance of uniform distribution. c) Define Hyper-geometric distribution. d) Show that geometric distribution is particular case of negative binomial e) distribution. **Q.3** Write short note on any Two of the following. 80 A discrete r. v. X has the following probability distribution X: -2 0 1 2 3 P(x): 0.1 0.2 2k 0.3 3k k Find 1) k 2) P(-2 < X < 2)If X is a random variable X is P(x) = kxx = 1.2.3= 0otherwise Find k and E(X) Find mean and variance of one point distribution. Answer any Two of the following. 80 Find mean and variance of geometric distribution. State and prove additive property of binomial distribution State and prove recurrence relation for probability of Poisson distribution. c) Answer any One of the following questions. 80 Given the following probability function of discrete r. v. X 1 7 X: 2 3 6 $7c^2+c$ $c^2$ $2c^2$ P(x): 0 С 2c 2c 3c Find 1) c 2) $P(X \ge 5)$ 3) Distribution function of X **b)** Let X be a discrete r.v. having probability distribution $P(x) = k \binom{5}{x} x = 0,1,2$ Find 1) k 2) mean of X 3) variance of X

Answer any Four of the following.

Define Median and Mode of discrete random variable X.

Q.2

Seat No.					Set	P
E	3.Sc.	(Semester - II)	(New) (CBCS) I ZOOLOGY (Pa		mination: March/April-2024 r – IV)	
		Developmen	ital Biology of \	/ert	ebrates (22221233)	
		: Friday, 17-05-202 PM To 02:00 PM	24		Max. Marks	: 40
Instru	iction		are compulsory. e right indicate full r pelled diagram whe			
	Multi 1)	ple choice Question A single primary specification numbers of spermates a) 2	oermatocyte in spe atozoa.	rmat	ogenesis finally produced	80
		c) 6		d)	8	
	2)	The process of formatogeneral ovulation	esis	pmeı b) d)	nt of female gamete is called menstruation oogenesis	·
	3)	In multicellular organical Metastasis c) Necrosis			ocess of programmed cell death. Apoptosis Sclerosis	
	4)		ohol		for increase the risk of miscarriage Reading a book Viral infections	?
	5)	The process of spea) TSH c) MSH			ed by FSH ACTH	
	6)	is a diagnos body structures. a) ultra myopath c) X-ray	ny	que ι b) d)	used to visualize subcutaneous ultrasonography Tachometer	
	7)	During pregnancy oxygen to the fetus a) placenta c) endometrium	S.	ey rol b) d)	le in nourishing and providing eustechian cord myometrium	
	8)	Each successive d a) polymorphism c) ecdysis	livision after format า	•	of zygote is called as cleavage mutation	
	1)   2)   3)   4)	ver any FOUR of the Define Apoptosis Write significance of Define fertilization Write functions of purite any two application	of gametogenesis	nd te	chnique	08

		SLR-GA-38
Q.3	Write short notes on any TWO of the following.	08

- 1) Write on radial holoblastic cleavage patterns on cleavage
- 2) Discuss types of fertilization
- 3) Write on implantation of human embryo

#### Q.4 Answer any TWO of the following.

08

- 1) Explain oogenesis in mammals
- 2) What is cellular differentiation? Discuss mechanism of cellular differentiation
- 3) Explain types of twins in human

#### Q.5 Answer any ONE of the following.

- 1) Describe in detail mechanism of fertilization in human.
- 2) Describe spermatogenesis in mammals.

						JLN-GA-	JJ
Seat No.						Set	P
I	B.S	sc. (Se	emester - I	I) (New) (CBC MATHEMAT Geometry	ICS		
-			turday, 18-05 To 11:00 Al	5-2024	, (-	Max. Marks:	: 40
Instru	ıcti			s are compulsor he right indicate		marks.	
Q.1		The p a)	correct alter olar form of $r = 3a \cos \theta$ $r = a \sin \theta$	Cartesian equati	b)	$x^{2} + y^{2} = 2ax$ is $r = 2a\cos\theta$ $r = 2a\sin\theta$	80
	2)	a)	represent _ Line Circle			Parabola Ellipse	
	3)	a)	quation $\theta =$ the initial line Ellipse		b) d)	a Circle Parabola	
	4)	The n a) c)	4	oitrary constant i	n th b) d)	e equation $ax + by + cz + d = 0$ is3 1	
	5)	Angle a) c)	0	e planes $x + y +$	b)	$1 \text{ and } x - y = z \text{ is } \underline{\qquad}.$ $\frac{\pi}{4}$	
	6)	The d	istance of th	e plane 2 <i>x</i> – 3 <i>y</i>	+ 6	z + 14 = 0 from the origin is  11 13	
	7)	a)	enter of the $(3, 2, 4)$ $(3, -2, 4)$	sphere $x^2 + y^2 +$	b)	+6x + 4y + 8z + 25 = 0 is (-3, -2, -4) (-3, 2, 4)	
	8)	a)	adius of spho $\frac{4}{5}$	ere $2(x^2 + y^2 + z^2)$	b)	+2x - 3y + 2z - 1 = 0 is	

### Q.2 Attempt any Four of the following:

- a) Find the centre and radius of the sphere  $x^2 + y^2 + z^2 + 2x 4y 6z + 5 = 0$
- b) Write the formula for relation between Direction cosine and Direction Ratio.
- c) Find the equation of sphere whose centre (2, 3, 5) and radius r = 2.
- d) Find the polar coordinate whose Cartesian coordinate is (-1,1)
- e) Find the Cartesian coordinate whose polar coordinate is  $(-3,45^{\circ})$

Q.3	Att	empt any Two of the following.	08
	a)	Transform the equation $x^2 + 4xy + y^2 = a^2$ when axes are rotated through an angle $\theta = \pi/4$	
	b)	Find the angle between two planes $2x - y + z = 6$ and $x + y + 2z = 3$	
	c)	Identify the conic $16x^2 - 24xy + 9y^2 - 104x - 172y + 44 = 0$	
Q.4	Att	empt any Two of the following.	08
	a)	Explain two types of family of spheres, $S + \lambda P = 0$ , $S_1 + \lambda S_2 = 0$	
	b)	Find the equation of plane in intercept from with figure.	
	c)	Find the equation of tangent plane to the sphere	
		$x^2 + y^2 + z^2 - 6x - 4y + 10z + 12 = 0$ at point $(2, -1, -1)$	
Q.5	Att	empt any One of the following.	08
	a)	If the axes are rotated through an angle $\theta$ , the equation $ax^2 + 2hxy + by^2$	
		transform into $a'x'^2 + b'y'^2$ then $\theta = \frac{1}{2} \tan^{-1} \left(\frac{2h}{a-b}\right)$	
	b)	Find the condition of tangency the given plane touches to the given sphere.	
		Also show that the plane $2x - 2y + z = -16$ touches to the sphere	
		$x^2 + y^2 + z^2 + 2x - 4y + 2z - 3 = 0$	

Seat	Sat	D
No.	Set	

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024

	٥.٥	BOTANY (P			
		Plant Ecology	(22	221202)	
•		ate: Saturday, 18-05-2024 :00 PM To 02:00 PM		Max. Marks	s: 40
Instr	uctio	<ul><li>ons: 1) All questions are compulsory.</li><li>2) Figures to the right indicate ful</li><li>3) Draw neat and labeled diagrar</li></ul>			
Q.1	Mu	Itiple Choice Questions.			08
	1)	are the shade loving plants.			
		a) Lithophytes	•	Saprophytes	
		c) Heliophytes	a)	Sciophytes	
	2)	A plants grows in desert is called	<del></del> ;		
		a) xerophytes	p)	, ,	
		c) mesophytes	,	nanophytes	
	3)	Floristic composition is charac			
		a) quantitative c) a&b	,	qualitative None of these	
	4	,	,	None of these	
	4)	<ul><li>a) are the producers of ecosyster</li><li>a) Plants</li></ul>		Animals	
		c) Birds	d)		
	<b>5</b> \	,	۵,	William Color	
	5)	Food chain is always starts from a) decomposers	 b)	producers	
		c) consumers	d)	•	
	6)	Multilayered epidermis is characterist	,	•	
	Ο,	a) hydrophytic	-	mesophytic	
		c) xerophytic	,	plasmophytic	
	7)	is pioneer stage of xerosere.	,		
	٠,	a) Crustose lichen stage	b)	Shrub stage	
		c) Herb stage	,	Moss stage	
	8)	is the ecological interaction be	twee	n two or more species where each	
	-,	species has a net benefit.		•	
		a) Mutualism	b)	Commensalism	
		c) Parasitism	d)	All of these	
Q.2	Δn	swer any Four of the following.			08
<b>W.</b> Z	a)	Define ecosystem.			UU
	b)	What is adaptation?			
	c)	Parasitism. <sup>'</sup>			
	d)	Define plant community.			
	e)	What are xerophytes?			

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Stratification</li> <li>b) Submerged hydrophytes</li> <li>c) Wind as ecological factor.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Pyramids of biomass.</li> <li>b) Xerophytic succession.</li> <li>c) Commensalism</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Explain biotic components of ecosystem.</li> <li>b) Describe quantitative characters of plant community.</li> </ul>	08



Set P

# B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024 MATHEMATICS (Paper-IV) Differential Equations (22221224)

Day & Date: Monday, 20-05-2024

Max. Marks: 40

Time: 09:00 AM To 11:00 AM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of Logarithmic table and scientific calculator are allowed.
- Q.1 Choose the correct alternatives from the options.

08

- 1) The solution of  $\tan x \, dx + \cot y \, dy = 0$  is \_\_\_\_\_.
  - a)  $\sec x \cdot \cos y = c$

b)  $\cos x \cdot \sin y = 0$ 

c)  $\sec x \cdot \sin y = c$ 

- d)  $\cos x \cdot \cos y = 0$
- 2) A differential equation  $\frac{dy}{dx} = \frac{x-y}{x+y}$  is \_\_\_\_\_ type.
  - a) variable separable
- b) homogeneous

c) linear

- d) non homogeneous
- 3) The differential equation Mdx + Ndy = 0 is exact if \_\_\_\_\_.

a) 
$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$$

b) 
$$\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$$

c) 
$$\frac{\partial^2 M}{\partial x^2} = \frac{\partial^2 N}{\partial y^2}$$

d) 
$$\frac{\partial^2 M}{\partial y^2} = \frac{\partial^2 N}{\partial x^2}$$

4) The integrating factor for the differential equation  $(1 + x^2) \frac{dy}{dx} + 2xy = \frac{1}{1+x^2}$  is \_\_\_\_\_.

a) 
$$x^2$$

b) 
$$e^{x^2}$$

c) 
$$(1 + x^2)$$

$$d) \quad \frac{1}{1+x^2}$$

 $\frac{\sin ax}{D^2 + a^2} = \underline{\hspace{1cm}}.$ 

a) 
$$-\frac{x^2}{2a}\sin ax$$

b) 
$$-\frac{x}{2a}\cos ax$$

c) 
$$\frac{x}{2a}\sin ax$$

d) 
$$-\frac{x}{2a}\sin ax$$

6)  $\frac{e^{2x}}{(D-1)(D-3)} =$ \_\_\_\_\_.

a) 
$$e^{x} + e^{3x}$$

b) 
$$e^x - e^{3x}$$

c) 
$$-e^{2x}$$

d) 
$$e^{2x}$$

7) The solution of  $(D^2 - 1)y = 0$  is \_\_\_\_\_.

a) 
$$(c_1 + c_2 x)e^x$$

b) 
$$(c_1 + c_2 x)e^{-x}$$

c) 
$$c_1 e^x + c_2 e^{-x}$$

d) None of these

8) 
$$\frac{1}{D-a}X =$$
\_\_\_\_\_.

a) 
$$e^{-ax} \int Xe^{ax} dx$$

b) 
$$e^{ax} \int Xe^{-ax} dx$$

c) 
$$\int e^{ax} X \, dx$$

d) 
$$\int e^{-ax} X \, dx$$

### Q.2 Attempt any four of the following.

08

**a)** Solve: 
$$\frac{d^3y}{dx^3} + y = 0$$

**b)** Solve 
$$\frac{d^2y}{dx^2} + y = \cos 2x$$

- c) Define linear differential equations of first order and first degree.
- **d)** Solve  $\sqrt{1-x^2} \, dy + \sqrt{1-y^2} \, dx = 0$
- e) Solve the differential equation  $(x^2 y)dx + (y^2 x)dy = 0$ , if it is an exact.

#### Q.3 Attempt any two of the following.

08

a) Show that 
$$(D - \alpha)(D - \beta)y = (D - \beta)(D - \alpha)y$$
 where  $D = \frac{d}{dx}$ 

- b) Define homogeneous differential equation and explain how they can be solved.
- **c)** Solve  $(D^2 + D + 1)y = \sin 2x + e^x$

#### Q.4 Attempt any two of the following.

08

a) With usual notation prove that, 
$$\frac{e^{ax}}{f(D)} = \frac{e^{ax}}{f(a)}, \text{ if } f(a) \neq 0 \text{ and hence solve.}$$
$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 2.e^{4x}$$

- **b)** Explain the method of solving linear differential equation of the type  $\frac{dy}{dx} + Py = Q$ , where P and Q are functions of x only and hence solve.  $(1 + x^2)\frac{dy}{dx} + 2xy = \cos x$
- **c)** Solve  $(D^3 3D^2 + 4D 2)y = e^x + \cos x$

### Q.5 Attempt any one of the following.

- a) Define exact differential equation & state and prove the necessary and sufficient condition for exactness of Mdx + Ndy = 0 and hence solve  $(\sin x \cos y + e^{2x})dx + (\cos x \sin y + \tan y)dy = 0$
- b) With usual notations prove that

$$\frac{1}{f(D)} \{e^{ax} \cdot V\} = e^{ax} \cdot \frac{1}{f(D+a)} \cdot \{V\} \text{ and hence solve}$$

$$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = x^2 \cdot e^{2x}$$

Seat	Set	D
No.	Set	

	B.S	Sc. (S	emester - II) (New) (CBCS) BOTANY (P		mination: March/April-2024 - IV)	
			Taxonomy of Angios	•	•	
			nday, 20-05-2024 To 02:00 PM	•	Max. Marks:	40
Instr	uctio	2)	All questions are compulsory. Draw neat diagrams and give e Figures to the right indicate full	•	•	
Q.1	Mu 1)	The te	Choice Questions.  erm Taxonomy was first introduct H. J. Lamark	b)	Cronquist	80
	2)	c) There a) c)	A. P. de candolle are cohorts in Bentham a 25 08	d) and Ho b) d)	Ross ookers system of classification. 21 03	
	3)	The _ a) c)	systems are based on evo Artificial Phyllogenetic	lutiona b) d)	nry characters. Natural all of these	
	4)	An art a) c)	of naming the object is known a Identification Binomial nomenclature	b) d)	 Nomenclature Botanical nomenclature	
	5)	Indian a) c)	Botanical Garden is situated at Calcutta Kolhapur	b) d)	.· Mumbai Lucknow	
	6)	The fa a) c)	amous decoction of bark called 'A Cassia Fistula Senna Tora	Ashoka b) d)		
	7)	Gynoe a) c)	ecium in the family Liliaceae is _ Monocarpellary Tricarpellary	b) d)	Bicarpellary Pentacarpellary	
	8)	Boerh a) c)	aavia diffusa belongs to the fam Caesalpinaceae Nyctaginaceae	ily b) d)	Solanaceae Liliaceae	
Q.2	Ans a) b) c) d) e) f)	Write Write What Expla Defin	any Four of the following.  The systematic position of family botanical names of any two plact is Taxonomy?  The in the significance of Herbarium are artificial systems of classification are the aims of Taxonomy?	nts of		80

SI	_R-	GA	<b>\-4</b> 2
SI	_R-	GA	<b>\-4</b> 2

Q.3	<ul> <li>Write Short Notes on Any Two of the following.</li> <li>a) Economic importance of family Solanaceae.</li> <li>b) Binomial nomenclature.</li> <li>c) Importance of botanical gardens.</li> </ul>	08
Q.4	<ul> <li>Answer Any Two of the following.</li> <li>a) Write distinguishing characters of the family Nyctaginaceae.</li> <li>b) Write the principles of ICBN</li> <li>c) Write the merits of Bentham and Hooker's system of classification.</li> </ul>	08
Q.5	<ul> <li>Answer Any One of the following.</li> <li>a) Explain the key features of Lead Botanical Garden.</li> <li>b) Describe Bentham and Hooker's system of classification.</li> </ul>	08

		SLR-GA-43
Seat No.		Set P
	ELECT	(CBCS) Examination: March/April-2024 RONICS (Paper – III) actor Devices (22221226)
•	& Date: Tuesday, 21-05-2024 : 09:00 AM To 11:00 AM	Max. Marks: 40
Instr	uctions: 1) All questions are cor 2) Draw neat diagrams 3) Figures to the right in 4) Use of logarithmic ta	wherever necessary.
Q.1	Select the correct alternative  1) In n-type semiconductor a) second c) fourth	08 group element is doped in pure semiconductor. b) third d) fifth
	<ul><li>2) In p-type semiconductor</li><li>a) protons</li><li>c) electrons</li></ul>	are the majority charge carriers. b) holes d) None
	<ul><li>a) The cut-in voltage of silicon</li><li>a) 0</li><li>c) 0.7</li></ul>	pn junction diode is volt. b) 0.3 d) 1
	<ul><li>4) In diode the junction</li><li>a) zener</li><li>c) tunnel</li></ul>	capacitance changes with applied reverse voltage. b) varactor d) photo
	<ul><li>5) JFET is a controlled</li><li>a) voltage</li><li>c) power</li></ul>	device. b) current d) None
	<ul><li>SCR has semicondu</li><li>a) two</li><li>c) four</li></ul>	ctor layers. b) three d) five
	7) Triac is a switch. a) Unidirectional c) Mechanical	b) Bidirectional d) None

#### Q.2 Answer any Four of the following.

a) many gate

80

- a) What is static and dynamic resistance of diode?
- **b)** What is intrinsic semiconductor?

c) insulated gate

8) MOSFET is also known as \_\_\_\_\_ FET.

c) Draw the symbols of: a) Tunnel diode, b) Varactor diode, c) Triac, d) UJT.

b) open gate d) shorted gate

- d) Define ac drain resistance and amplification factor in JFET.
- e) Draw the construction and symbol of enhancement type MOSFET.

Q.3	<ul><li>Write short notes on any Two of the following.</li><li>a) Extrinsic semiconductors</li><li>b) Photodiode</li><li>c) DIAC</li></ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Define α and β. Derive relation between them.</li> <li>b) Explain the I-V characteristics of zener diode.</li> <li>c) Explain the construction and working of SCR.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Explain input and output characteristics of a transistor in CE configuration.</li> <li>b) What is JFET? Explain the construction and working of n-channel JFET.</li> </ul>	08

				3	LK-GA-	44
Seat No.					Set	P
	B.S	c. (Semester - II) (New) (CBCS)   PHYSICAL GEOGRA Human Geography	PH'	Y (Paper – III)	pril-2024	
•		te: Tuesday, 21-05-2024 00 AM To 11:00 AM			Max. Marks	: 40
Instru	uctic	<ul><li>2) All questions are compulsory.</li><li>2) Figures to the right indicate full r</li><li>3) Draw neat diagrams wherever n</li><li>4) Use of maps stencil is allowed.</li></ul>				
Q.1	Cho	oose the correct alternatives from the is known as the father of Huma a) Miss. Semple c) Ratzel	ın Ġ b)			08
	2)	Secondary activities are called as a) Black c) Red		collar workers. White Blue		
	3)	Shiahs and sunnis are the two broad (a) Buddha c) Christian		ion of religion. Islam Hindu		
	4)	Buddha Gaya and Sarnath are the impa) Hindu c) Buddha		ant holy places of Christian Islam	_ religion.	
	5)	Skin of mangolian is Colour. a) Yellow c) Black	,	Blue Red		
	6)	The book 'The Origin of Species is wri a) Ratzel c) W.M.Davis	itten b) d)	by Jems Hutton Charles Darwin		
	7)	The Combine living of boys and girl is a) Gotul c) Bada	kno b) d)	wn as Lonu Morung		
	8)	Dharma, Karma, Moksha and Moral va a) Hindusim c) Jaudaism	alue b) d)	s are plays important ro Christian Buddha	ole in	
Q.2	Ans a) b) c) d) e)	wer any Four of the following. Physical characteristics of Eskimo. Write the types of economic activities. State the types of race on the basis of State the languages of Indo-Europear Branches of Human Geography.	col			08

Q.3	Wr a) b) c)	ite short notes on any Two of the following.  Explain the region and characteristics of Naga.  Importance of human geography.  Economy of Bushmen.	08
Q.4	An: a) b) c)	swer any Two of the following.  Explain Language group in the World.  Write the characteristics of Jainism.  Racial Classification.	08
Q.5	Ansa) a) b)	swer any One of the following.  Explain the various language families in the world.  Explain Nature and Scope of human geography.	08

Seat No.	Set	P
B.Sc. (Semester -	II) (New) (CBCS) Examination: March/April-2024	

	B.Sc	:. (S		ew) (CBCS) E EOLOGY (Pa		nination: March/A <sub>l</sub> <i>–</i> III)	oril-2024
			Struct	ural Geology	y (2	2221214)	
_			esday, 21-05-2024 To 02:00 PM				Max. Marks: 40
Instr	uctior	2) 3)	All questions are concept of the concept of the concept of the right Use of logarithmic	is and give equal indicate full ma	arks.	s wherever necessary is allowed.	
Q.1	Selection 1)		rrect one  ds that have paralle  Plunging fold  Asymmetrical	ŀ	d b) d)	fold. Symmetrical fold Isoclinal	08
	2)	a) c)	separates young Joints Fold		ck fo b) d)	rmations. Unconformity Fault	
	3)	The a) c)	true dip is defined Minimum Moderate		ngle b) d)	of dip on a rock bed. Maximum Any	
	4)	Exp a) c)	osures of the rocks Outcrop Trench		rface b) d)	e is called Inlier Outlier	
	5)	The a) c)	major break in sed Fold Joints	ŀ	alled b) d)	as Fault Unconformity	
	6)	a)	total displacement Heave Net slip	ŀ	g the b) d)	fault plane is called _ Hade Throw	·
	7)	Up f a) c)	folds of layered rock Anticlines Synclines	ŀ	b) d)	 Faults Unconformities	
	8)	Ten a) c)	sion joints are seen Mud stone Sandstone	ŀ	b) d)	Conglomerate Granite	
Q.2	1) 2) 3) 4) 5)	Defir Wha Defir Diffe Defir	iny four of the follone fold. It is apparent dip? The fault. The fault is joints The Joints The Unconformities.	-			08

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>1) Use of Clinometer and Brunton compass.</li> <li>2) Explain horst and Graben.</li> <li>3) Nomenclature of faults.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>1) Nomenclature of folds.</li> <li>2) Explain normal and reverse fault.</li> <li>3) Describe significance of Unconformities.</li> </ul>	08
Q.5	<ul><li>Answer any one of the following</li><li>1) Explain any four types of fold.</li><li>2) Explain Geometric classification of Joints.</li></ul>	80

Seat	Sat	D
No.	Set	

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024

-	J.JC.	(Sei	Electronics (Pa			KPI 11-2024
			Digital Electronics	-	-	
			dnesday, 22-05-2024 To 11:00 AM			Max. Marks: 40
Instr	uction	2) 3)	All questions are compulsory. Draw neat diagrams and give ed Figures to the right indicate full r Use of logarithmic table and calc	marks	<b>5.</b>	ary.
Q.1	Select 1)		e correct alternative from the for O in shift register stands for shift in shift out serial in shift out	ollowi  b) d)	ng shift in serial out serial in serial out	08
	2)	a)	lip flop output remains same whe R=0 S=0 R=0 S=1	en b) d)	R=1 S=1 R=1 S=0	
	3)	IC 7- a) c)	476 is a flip flop. D RS	b) d)	JK decoder	
	4)	Serio a) c)	es counter is also called as synchronous ring	_ b)	nter. asynchronous johnsons	
	5)		iplexer is device which has many inputs one output many inputs many outputs	b) d)	one input many out	put
	6)	A cir a) c)	culating shift register is also know Decade counter Johnson's counter	wn as b) d)	Ring counter None of these	
	7)	TTL a) b) c) d)	stands for Transistor Transistor Logic Transistor Transformer Logic Transformer Transformer Logic Transformer Transistor Logic			
	8)	a) c)	_ is priority encoder. IC 7447 IC 7490	b) d)	IC 74147 IC 7495	
Q.2	a) b) c) d)	What What What Defin	ny four of the following. is truth table? Give truth table of is combination of counter? is demultiplexer? e fan in and fan out for TTL NAN the timing diagram of left shift re	D gat	e.	08

SL	R-G	3A-4	1
<b>5</b> L	K-C	JΑ-4	1

Q.3	Writ a) b) c)	e short notes on any two of the following  1:4 demultiplexer  Explain MOD 5 counter  TTL NAND gate	80
Q.4	Ans	wer any Two of the following.	08
	a)	Define the term 1) Noise margin 2) Propagation delay time 3) Power dissipation 4) sourcing current	
	b)	What is flip flop? What are its types? Explain RS flip flop using NAND gate.	
	c)	Explain Common anode seven segment display along with decoder driver.	
Q.5	Ans	wer any one of the following	08
	a)	Explain 4-bit binary Johnsons counter with its truth table and timing diagram.	
	b)	Explain construction and working of decade counter using IC 7490 with its necessary truth table and timing diagram.	

Seat No.	Set P
-------------	-------

# B Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024

	Ь.З	PHYSICAL GEOGRAF			Артп-2024
		Human Geography	<b>–</b> II	(22221236)	
-		ate: Wednesday, 22-05-2024 :00 AM To 11:00 AM			Max. Marks: 40
Instr	uctio	ons: 1) All questions are compulsory. 2) Figures to the right indicate full r 3) Draw diagrams where necessary 4) Use of Stencils is permitted.		S.	
Q.1	Mu	Itiple choice questions			08
	1)	The world population day celebrated or a) 10 July c) 11 June	b) d)	 11 July 10 June	
	2)	UNO declared the year as World a) 1973 c) 1975		pulation year. 1974 1976	
	3)	The concept of demographic transition <ul><li>a) Notestein</li><li>c) Humboldt</li></ul>	is fii b) d)	rst used by Ratzel Blache	
	4)	<ul><li>is the main occupation of rural s</li><li>a) Transport</li><li>b) Industry</li></ul>		ment. Trade Agriculture	
	5)	is main cause of slums growth. a) Transport c) Poverty	b) d)	Trade Richness	
	6)	is a industrial centre. a) Oxford c) Mecca	b) d)	Manchester Varanasi	
	7)	The term Agriculture is derived from the a) Latin c) Roman	b) d)	language. Greek Spain	
	8)	Macca and Madina are centers. a) Religious c) Defense	b) d)	Administrative Trade	
Q.2	An: a) b) c) d) e) f)	wers any Four of the following. What is population density? What is Age-Sex composition? State the densely populated regions in What is Agriculture? What is Trade town? What is dairy farming?	the	world?	08

		SLR-GA-48
Q.3	<ul> <li>Write short notes any Two of following.</li> <li>a) Low density population region of the world.</li> <li>b) Age and Sex Ratio.</li> <li>c) Characteristics of Plantation Agriculture.</li> </ul>	08
Q.4	<ul> <li>Answers any Two of the following.</li> <li>a) Explain any four functions of urban settlement.</li> <li>b) Merits of demographic transition theory.</li> <li>c) Explain the physical problems of Indian Agriculture.</li> </ul>	08
Q.5	Answers any One of the following.	08

a) Explain the economic factors affecting on population distribution of the world.b) Explain the pattern of rural settlement.

Seat No.	Set	Р	
<u> </u>	•		3

## B.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024

		`		LOGY (Pa	_	-	
_			_	llography (	22	•	
•			ednesday, 22-05-2024 I To 02:00 PM	ŀ		Max.	Marks: 40
Instr	uctio		) All questions are cor 2) Figures to the right i	•	ark	S	
Q.1	Cho 1)	lmag calle		hich divides a	cry	otion ystal in to two equal parts is Centre of symmetry	08
		•	Plane of symmetry		•		
	2)	a)	sum, augite, hornblenc Monoclinic Cubic		b)	nerals crystallize in sy T Hexagonal Triclinic	rstem.
	3)	other				es make angle with e 120°	ach
		c)	90°	(	d)	60°	
	4)	calle	d as		•	, occurrence and characters	is
		,	Mineralogy Cryptography		•	Petrology Crystallography	
	5)		orhombic system has _				
		,	baryte beryl		-	gypsum galena	
	6)		c crystal system show				
		a) c)			b) d)	2	
	7)	a)	nal prism has in (111) (110)		,	(101) (001)	
	8)	a)	ll pinacoid cuts vertical inclined		b) d)	horizontal All the above	

		SLR-GA-50
Q.2	<ul> <li>Answer any Four of the following.</li> <li>a) Define crystal</li> <li>b) What is plane of symmetry?</li> <li>c) What are crystallographic axes?</li> <li>d) What is interfacial angle?</li> <li>e) Basal pinacoid in tetragonal system.</li> <li>f) Symmetry element of beryl type.</li> </ul>	08
Q.3	<ul> <li>Write Short notes on any Two of the following.</li> <li>a) Prism and pyramid in tetragonal system.</li> <li>b) Index system of miller.</li> <li>c) Tetragonal System.</li> </ul>	08
Q.4	<ul> <li>Answers any Two of the following.</li> <li>a) Explain hexagonal crystal system with beryl type class.</li> <li>b) Explain rhombohedron.</li> <li>c) Macrodomes and brachydomes.</li> </ul>	
Q.5	<ul><li>Answers any One of the following.</li><li>a) Describe the isometric system with galena type class.</li><li>b) Describe the monoclinic crystal system.</li></ul>	08

Seat No.	t					Set	P
I	B.S	c. (Sen		ll) (New) (CBC CHEMISTR Organic Chem	Y (F	• ,	
-			nesday, 24 o 02:00 PN			Max. Marks	: 40
Instr	uctio	2) F	Figures to t	ns are compulsory the right indicate in the same of the same of th	full n	narks. 14, Na=23, Cl=s 35.5)	
Q.1		Aldol co a) H		<b>tions.</b> n will not take pla		CH <sub>3</sub> COCH <sub>3</sub>	80
	2)		ihydroxy di			Monohydroxy tribasic acid monohydroxy dibasic acid	
	3)	A typica a) -( c) -(	HC	of chromophore	b)	-NH <sub>2</sub> >C = O	
	4)	a) Is	sopropyl iod	varmed with exce dide loride	b)	of HI, it yields Glyceraldehyde Glyceric acid	
	5)	a) s	odium acet	ate	b)	sed in Knoevenagel reaction? Pyridine Sodium hydroxide	
	6)	a) e	acids easil limination r ddition read	eaction	 b) d)	electrophilic substitution reaction nucleophilic substitution reaction	
	7)	a) N		sformation, one c	of the b) d)	e catalyst used is H <sub>2</sub> SO <sub>4</sub> NH <sub>2</sub> OH	
	8)	a) Z	etric estima eisel's met jeldahl's me		grou b) d)	·	
Q.2	An: a)		-	the following. the following die	ne a	nd enone by using Woodward-Fieser	08
		1)	\\	2	2)		

b) Assign the 'R' and 'S' configuration to the following.

1) 
$$NH_2$$
 2) CHO  $H$   $C$   $CH_3$   $H$   $C$   $CH_5$   $COOH$   $NH_2$ 

- c) What is the action of following on ethylene glycol?
  - 1) Lead tetra acetate
  - 2) Periodic acid
- **d)** Give the general mechanism of nucleophilic addition to carbonyl compound.
- e) What is the action of following on ethylene oxide?
  - 1)  $C_2H_5MgBr/H_2O,H^+$
  - 2) H<sub>2</sub>O/H<sup>+</sup>

#### Q.3 Write short notes on any Two of the following.

Exactly 2.63 × 10<sup>-5</sup> kg of an organic compound having the formula C<sub>7</sub>H<sub>9</sub>NO is subjected to Zeisel's method and the methyl iodide released precipitated 5.025 × 10<sup>-5</sup> kg of Agl. Calculate percentage and number of methoxy groups

80

- 5.025 × 10<sup>-5</sup> kg of AgI. Calculate percentage and number of methoxy groups per molecule.
   b) How will you prepare succinic acid from a) ethylene bromide and maleic
- b) How will you prepare succinic acid from a) ethylene bromide and maleic acid? What happens when it reacts with.
  - 1) Action of heat
  - 2) Action of NaHCO<sub>3</sub>
- c) Discuss in details the effect of conjugation on the position of UV bands in dienes.

#### Q.4 Answer any Two of the following.

08

a) Predict the products of following:

1) 
$$Br - C - COOH + AgOH$$
  $Heat$  ?

2)  $HO - C - COOH + 2HI$  ?

3)  $2HC - COOH + H_3C  

- **b)** Define the terms with example:
  - 1) Bathochromic shift
  - 2) Hypsochromic shift
  - 3) Hyperchromic shift
  - 4) Hypochromic shift
- c) Explain in detail Benzoin condensation reaction with mechanism.

#### Q.5 Answer any One of the following.

- **a)** What is meant by conformational isomerism? Discuss conformational isomers in n-butane. Draw the various conformers.
- **b)** Explain Reimer-Tiemann reaction with mechanism? What is the action of following reagents on Phenol:
  - 1) HCN and HCI in presence of anhydrous AICI<sub>3</sub>
  - 2) Allyl bromide in presence of aq. NaOH
  - 3) Acetyl chloride in the presence of acid

40

Seat No.				Set					
В	-	- - III) (New) (CBC COMPUTER SC Data Structu	IENCE (	· ·					
•	ay & Date: Wednesday, 24-04-2024 Max. Marks: me: 03:00 PM To 05:00 PM								
Instruc	3) Use of log	ns are compulsory the right indicate fo tables and calcula at labelled diagram	ull marks. tors allow	ved.					
Q.1 C	thoose the correct  The Data structua  Stack  c) Linked Lis	re used in standar		entation of Breadth First Search is? Queue Tree					
2	,	e below specified o	condition i	is applicable if the Queue is non rear < front Unpredictable					
3	) Identify the data insertion at only	structure which allone end. icted deque	ows delet b)	ions at both ends of the list but  Output-restricted deque  None of above					
4		all other nodes in a	weighted b)	o find the shortest path from a graph? Djikstra's Algorithm Kruskal's Algorithm					
5	<ul><li>What is the best</li><li>a) O(nlogn)</li><li>c) O(n)</li></ul>	case for linear sea	b)	O(logn) O(1)					
6	<ul><li>Which one of the implementation?</li><li>a) AVL tree</li><li>c) B+ -tree</li></ul>	•	b)	re preferred in database system B-tree Splay tree					
7)	) While evaluating a) left to right c) center to r		n, the stri b) d)	ng is read from? right to left center to left to right					
8	The complexity of a) O(n) c) O(n2)	of merge sort algor	ithm is b) d)	O(log n) O(n log n)					

			OLIN-OA-OZ
Q.2	An	swer any Four of the following.	08
	a)	List out the advantages of using linked list.	
	b)	Define abstract data type.	
	c)	State the difference between stack and queue.	
	d)	Define priority queue.	
	e)	Define complete binary tree.	
	f)	What do you mean by breadth first search.	
Q.3	Wr	ite short notes of any Two of the following.	08
	a)	Explain adjacency list with example.	
	b)	Explain circular queue in detail.	

#### Q.4 Answer any Two of the following.

80

- a) Write an algorithm to convert infix expression to postfix expression with example.
- **b)** Write a program to implement merge sort.
- c) Write a program to create binary search tree.

c) Explain singly linked list with create operation.

#### Q.5 Answer any One of the following.

- a) Write a program to implement Linear search.
- **b)** Evaluate the following Postfix Expression by using an algorithm.
  - 4, 10, 5, +, \*, 15, 3, /, -

Seat No.	Set	Р
110.	J L	

## B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024

		`		CHE	EMÌSTRY (I	Рар	er–VI)	•
				Inorgan	ic Chemist	ry (	22221331)	
			oursday, 2: // To 02:00	5-04-2024 ) PM				Max. Marks: 40
Instr	uctio	3	2) Figures 3) Draw ne 4) Use of le	eat labelled ogarithmic	indicate full r	give culat	equations wherevor is allowed.	ver necessary.
Q.1				ct alternati irst transitio	ves from the	opt	ions.	08
	1)	a)		iist transitio	in element.	b) d)	Fe Ni	
	2)	a)	nganese a MnO <sub>2</sub> K <sub>2</sub> MnO <sup>4</sup>	chieve the	highest oxida	tion : b) d)	state in its o Mn <sub>3</sub> O <sub>4</sub> KMnO <sup>4</sup>	compound.
	3)	a)	EAN of F 35 37	e in K₄ [Fe(	CN) <sub>6</sub> ] is	 b) d)	36 34	
	4)	a)			olexes by	b) d)	Werner S. M. Jorjensun	
	5)	a)		n of hard ac te covalent		base b) d)	can form b ionic nonpolar	oond.
	6)	a)	is most AgF <sub>2</sub> - AgI <sub>2</sub> -	stable con	npound.		AgCl2 <sup>-</sup> AgBr2 <sup>-</sup>	
	7)		hexa	_ dentate c	chelating ager	b)	bi tetra	
	8)		chelating three one	agent mus	t have atleast	b) d)	donor groups. two zero	

			SLR-GA-53
Q.2	An	swers any four of the following.	08
	a) b) c) d) e)	Define - i) Geometrical isomerism ii) Optical isomerism Define degeneracy. State the Pearson's principle What is symbiosis? Define the terms i) Chelating agent ii) Complexing agent	
Q.3	An a) b) c)	swers any two of the following. Distinguish between double salt & complex salt Why transition elements show colour? Explain the structural requirements for chelate formation.	08
Q.4	An a) b)	swers any two of the following.  On the basis of VBT, Explain the formation of [N <sub>i</sub> Cl <sub>4</sub> ] <sup>-2</sup> complex in Explain the magnetic behaviour of transition elements.	<b>08</b> on.

Define Lewis acids and bases. Give their types with suitable examples.

Answers any one of the following.
a) Explain Werner's theory applied to cobalt amine complexes.
b) What are transition elements? Give name, atomic symbol and electronic

configuration of 3d transition elements.

	_	
Seat	Cot	D
No.	Set	F

	B.SC.	(Se	COMPUTER SCIEN Software Engineeri	ICE	(Paper-VI)	rii-2024
_			ırsday, 25-04-2024 To 05:00 PM		M	ax. Marks: 40
Instr	uction		All questions are compulsory. Figures to the right indicate full r	nark	S.	
Q.1	Choo 1)	Whi	ne correct alternative.  ch of the following life cycle mode  n has less experience on similar p  Spiral  RAD	oroje b)		
	2)	Wha a) b) c) d)	at is Software? Software is set of programs Software is documentation and of Software is set of programs, doc None of the mentioned		•	<sup>f</sup> data
	3)	The a) c)	longest method of conversion is Direct Pilot		 Parallel Phased	
	4)	If so a) c)	ftware can run in different enviror Reliable Portable	b)	nts then it is User-friendly Visible	
	5)	Whica)	ch of the following is/are White bo Statement Testing Condition Coverage	b)		
	6)	a)	olem identification is done during System design System testing	b)	_ phase. System analysis All of the above	
	7)	Whica)	ch of the following is not a fact-fin Interview Third party enquiry	ding b) d)	technique? Record review Questionnaire	
	8)	HIP( a) b) c) d)	O Charts basically shows? Which are the input modules? How the processing is done? Which are the output modules? All of the above			

Q.2	Answer any four of the following.						
·	a)	What are the types of decision table?					
	b)	What is CLD?					
	c)	Define Deterministic and Probabilistic system.					
	ď)	What is Data Dictionary?					
	e)	What is Software Testing?					
	f)	Define the term:					
	-	i) Entity					

### Q.3 Write short notes on any two of the following.

08

a) Explain prototyping model.

Attribute

ii)

- b) What is system maintenance? State the importance of maintenance.
- c) What is structure chart? How is it better than flowchart?

#### Q.4 Answer any Two of the following.

80

- a) Who is system analyst? Explain the various roles played by the system analyst.
- **b)** State the advantages and disadvantages of HIPO.
- c) Explain the various elements of the system.

#### Q.5 Answer any one of the following.

- **a)** Explain top-down incremental implementation. State its advantages and disadvantages.
- **b)** Draw a CLD and First Level DFD for College Admission System.

Seat	Set P
No.	Set P

## B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024

		`	PHÝSICS (Pa		
			General Physics and S lay, 26-04-2024 To 02:00 PM	ooui	Max. Marks: 40
Instr	uctio	2) 3)	All questions are compulsory. Figures to the right indicate full r Neat diagrams must be drawn w Use of log tables and calculator	here	ver necessary.
Q.1	Sele 1)		e correct alternative from the form the form the form the form $\Phi$ and $\Phi$ are constant $\Phi$ . The constant $\Phi$	b) d)	i <b>ng. 0</b> 8 1 minimum
	2)	Gyro: a) c)	scopic motion is the precessional centripetal torque gyrostatic torque	moti b) d)	gravitational torque
	3)	In pu a) c)	re precessional motion, nutation i Absent Large	b) d)	Very small Infinite
	4)	Bend a) c)	ling moment of beam is directly p Modulus of rigidity Young's modulus		tional to radius of curvature Moment of inertia
	5)	In be called a) c)	nding beam, the surface which is d neutral surface Cantilever	neith b) d)	ner elongated nor compressed is plane of bending bending moment
	6)	The v a) c)	viscosities of two liquids may be o Searle's Viscometer Ostwald's Viscometer		ared with the help of Rotation Viscometer Rankin's Viscometer
	7)	Botto a) c)	m effect or end effect of the Sear Zero Negative	l's vis b) d)	scometer is always positive non zero
	8)	For n a) c)	naking the hall acoustically good, Optimum Large	the r b) d)	everberation time must be Small less

Vrite short notes on any two of the following. ) Explain vector triple product.	
<ul><li>Write a note on Gyroscope.</li><li>What are the factors affecting acoustics?</li></ul>	08
<ul> <li>Inswer any Two of the following.</li> <li>Explain the Searl's viscometer method of determining the coefficient of viscosity.</li> <li>Explain Sabine's experimental work and obtain expression for reverberation time.</li> <li>Derive the expression of Modulus of rigidity of wire by Searl's method.</li> </ul>	08
	08
	Answer any one of the following.  Obtain an expression for time period of Gyrostatic Pendulum.  Define divergence of vector field and give physical significance of divergence of vector.

56		SLR-GA-56
Seat No.	t	Set P
	B.S	(Semester - III) (New) (CBCS) Examination: March/April-2024 BIO-CHEMISTRY (Paper – I) Biomolecules (22221306)
		: Friday, 26-04-2024 Max. Marks: 40 PM To 05:00 PM
Instr	uctio	<ul><li>s: 1) All questions are compulsory.</li><li>2) Draw neat diagrams and give equations wherever necessary.</li><li>3) Figures to the right indicate full marks.</li></ul>
Q.1	Mult 1)	ple choice questions: The ninhydrin test is used to check whether a given analyte contains  a) alcohol b) phenols c) esters d) amino acids
	2)	is produced with the combination of apoenzyme and coenzyme.  a) Holoenzyme b) prosthetic group c) enzyme substrate complex d) enzyme product complex
	3)	Molecular formula of cholesterol is a) C <sub>23</sub> H <sub>45</sub> OH b) C <sub>27</sub> H <sub>45</sub> OH c) C <sub>28</sub> H <sub>45</sub> OH d) C <sub>29</sub> H <sub>45</sub> OH
	4)	reagent is used for osazone formation.  a) Ninhydrin b) NaBH4 c) Alk.Copper sulphate d) phenyl hydrazine
	5)	The enzyme minus its coenzyme is known as  a) Isoenzyme b) apoenzyme c) Metalloenzyme d) protein
	6)	is not component of phospholipid. a) Phosphate b) alcohol c) Glycerol d) protein
	7)	Amino acids are building blocks of a) Acids b) proteins c) Amines d) alcohols
	8)	is a non-reducing sugar. a) Maltose b) Cellobiose c) Lactose d) sucrose
Q.2	Ans a) b)	ver any four of the following.  Distinguish between complex proteins and derived proteins.  Write the four functions of m-RNA.

How peptide bond is formed?
What are deficiency disorders of niacin?
Write four physical properties of amino acids.

c) d)

	SEK-SA		
Q.3	Wri a) b) c)	te short notes on any two of the following.  Write the classification with two examples of simple lipid and compound lipid.  Explain the importance of erythrose and erythrulose.  Write note on complex proteins & derived proteins.	80
Q.4	Ans a)	wer any two of the following. Write the reactions of monosaccharides.	08

- **b)** Explain pl and ninhydrin reaction.
- c) Define lipids. Write structure and functions of carotenes.

#### Q.5 Answer any one of the following.

- a) Write the structure, biochemical role and deficiency disorder of pyridoxin.b) What are nucleosides & nucleotides? Explain Watson-Crick model of DNA.

Seat No.		Set F	P
	B.Sc	. (Semester - III) (New) (CBCS) Examination: March/April-2024 PLANT PROTECTION (Paper-V)	
N	<b>Иајо</b> і	r crops and methods of integrated plant protection (22221312)	
		: Friday, 26-04-2024 Max. Marks: 4 ) PM To 05:00 PM	10
Instru	ıction	<ul><li>s: 1) All questions are compulsory.</li><li>2) Draw neat diagrams and give equations wherever necessary.</li><li>3) Figures to the right indicate full marks.</li></ul>	
Q.1	Multi 1)		8(
		a) Rabbi b) Kharip c) Summer d) None of these	
	2)	Jowar belongs to family  a) Graminae b) solanaceae c) liliaceae d) Rutaceae	
	3)	Botanical name of tur is  a) Cicer sp. b) Cajanus cajan c) Helianthus annus d) Najanus naja	
	4)	Sugarcane belongs to family  a) Malvaceae b) Mimosaceae c) Solanaceae d) Graminae	
	5)	Grape berries are used for preparing a) Asawa b) Kishmish c) Kadha d) Churna	
	6)	Chemicals are used to check nematodes are known as  a) Nematicides b) Fungicides c) Bactericides d) Insecticides	
	7)	Bordeaux mixture is used to kill, a) Bryophytes b) Pteridophytes c) Fungi d) Algae	
	8)	VAM is used as a) Colouring agent b) Bacterial culture c) Fungal biofertilizer d) sand	
Q.2	a)   b) ' c) ' d) '	Ver any four of the following.  Definition Biofertilizer.  Why need of crop rotation?  What is shaking?  What are Nematicides?  What is field sanitation?  Explain in brief need of plant quarantine in India	8

SL	R-G	A-57

Q.3	Write short notes on any two of the following.		
	a)	Role of organic farming in agriculture.	
	b)	Bactericides.	
	c)	Resistant varieties.	

#### Q.4 Answer any two of the following.

08

- a) Write on tin bands & light traps.
- **b)** Describe in brief physical methods of plant protection.
- c) Write in brief account & uses of nematicides.

#### Q.5 Answer any one of the following

- **a)** Give the crop identification, soil type, tillage, seed rate & spacing, intercultural operation, fertilizers, irrigation, intercropping, yield & economic importance of sugarcane.
- **b)** Give the crop identification, soil type, tillage, seed rate & spacing, intercultural operation, fertilizers, irrigation, intercropping, yield & economic importance of soyabean.

Seat No.						Set	P
E	3.Sc	. (Se	mester - I	II) (New) (CBCS) PHYSICS (Pa		mination: March/April-2024 – VI)	
			Electronic	C Devices and Ap	plio	cations (22221305)	
•			urday, 27-04 To 02:00 P <b>i</b>			Max. Marks	: 40
Instru	ictioi	2) 3)	Figures to t Use of calc	ns are compulsory. The right indicate full ulator or log table is labeled diagrams wh	allov	ved.	
Q.1	Mult	iple c	hoice ques	tions			08
		A diff	erential amp	olifier amplifies the di utput signals	b)	nce between two input signals input signal and supply voltage	
	2)	A pos a) c)	sitive voltage 0 <sup>0</sup> 180 <sup>0</sup>	e feedback circuit int	b)	ces phase shift. 90 <sup>0</sup> 270 <sup>0</sup>	
	3)			olifier, $V_1 = 9$ volt, $V_2$ ential amplifier?	b) d)	3 volt and $V_0 = 24$ volt, what is 15 5	
	4)	The va)	value of feed less than un equal to un	•	b)	passive device. greater than unity equal to zero	
	5)	a)	order of fred Crystal osc Hartley osc		b)	Colpitts's oscillator Phase shift oscillator	
	6)	In a p a) c)	electron	ET, the charge carrieon and holes	rs ar b) d)	holes none of these	
	7)	In the a) c)	Low	le of JK flip-flop, both ts of each other	n J a b) d)	nd K input must be High none of these	
	8)	A CR a) c)	O is used to voltage Phase	measure	b) d)	frequency All of these	

80

Q.2	Ans a) b) c) d) e)	wer any four of the following. Give the comparison between normal amplifier and differential amplifier. State the Barkhausen criterion for sustained oscillator. Write any two uses of CRO in detail. Draw a logical circuit diagram of Half adder. UJT has $\eta=0.6$ and $R_{BB}10K\Omega$ , then calculate the value of $R_{B1}$ .	08
Q.3	Writ a) b) c)	te short notes on any two of the following.  Write a short note on Phase shift oscillator.  Write a short note on UJT as a voltage sweep generator.  Explain the operation of transistor series voltage regulator with neat circuit diagram.	08
Q.4	Ans a) b) c)	wer any Two of the following. Find the frequency of oscillation produced by Colpitts's oscillator, if $C_1 = C_2 = 0.001 \mu F$ and $L = 1 mH$ Describe the construction and working of J-K flip-flop. What is feedback? Explain the concept of positive feedback and negative feedback.	08
Q.5	Ans a) b)	wer any one of the following. Explain transistor RC coupled amplifier with advantage and disadvantage. Draw the Block diagram of CRO and explain the function of each block.	80

Seat	Cat	D
No.	Set	<u> </u>

	B.S	c. (Semester - III) (New) (CBCS) Examination: March/April-2024 BIO-CHEMISTRY (Paper-II) Biochemical Techniques (22221307)	
		e: Saturday, 27-04-2024 Max. Marks: 00 PM To 05:00 PM	40
Instr	uctic	<ul><li>ns:1) All questions are compulsory.</li><li>2) Draw neat diagrams and give equations wherever necessary.</li><li>3) Figures to the right indicate full marks.</li></ul>	
Q.1	<b>M</b> ul 1)	tiple choice questions: is not a benefit of BLAST. a) Speed b) Statistical rigor c) Handling of gaps d) More sensitive	80
	2)	Chromatography is a physical method that is used to separate and analyse  a) Simple mixtures b) Metals c) Viscous mixtures d) Complex mixtures	
	3)	Agarose is aderivative of agar.  a) Monosaccharide b) disaccharide c) trisaccharide d) polysaccharide	
	4)	Number of milligrams of KOH required to neutralize fatty acid present in 1 mg of fat is called as  a) Potassium number b) lodine number c) Acid number d) Saponification number	
	5)	Thin Layer Chromatology is the type of chromatography. a) Partition b) Adsorption c) Gas d) column	
	6)	Cholesterol is produces by organ. a) Kidney b) Liver c) Pancreas d) intestine	
	7)	In electrophoresis, DNA will migrate towards  a) Cathode or positive b) Anode or negative c) Cathode or negative d) Anode or positive electrode	
	8)	Bioinformatics database is first created by scientist  a) Pearson b) Dayhoff  c) Richard Durbin d) Michel J. Dunn	
Q.2	Ans a) b) c) d) e)	wer any four of the following.  How gel plates are prepared?  What are the characteristics of primer used in PCR?  Write two factors affecting electrophoretic mobility.  Which are the data retrieval tools?  Write the meaning of transmittance and absorbance.	80

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Write important applications &amp; advantages of thin layer chromatography.</li> <li>b) Explain acid value and saponification value for lipids.</li> <li>c) Write note on Agarose gel electrophoresis.</li> </ul>	80
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Write note on Bradford assay and Lowery's assay.</li> <li>b) Explain principle and technique of gel permeating chromatography.</li> <li>c) Write note on applications of Bioinformatics.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) What is molar and specific absorbance? Write differences between photoelectric colorimeter and spectrophotometer.</li> <li>b) What is blotting technique? Explain in detail southern blotting technique.</li> </ul>	08

Seat No.			Set	Р
В	B.Sc. (Semester - I	II) (New) (CBCS)	Examination: March/April-2024	

	B.Sc.	·	emester - III) (New) (CBCS) PLANT PROTECTIO	ON (F	Paper – VI)	
		(	Crop Diseases and Their M	anaç	gement (22221313)	
-			iturday, 27-04-2024 I To 5:00 PM		Max. Marks:	40
Instr	uction	2	) All questions are compulsory. 2) Draw a well diagram wherever now 3) All question carry equal marks.	eces	sary.	
Q.1	Multi 1)	Nor	Choice Question. n-Living causal organisms are also Sporadic Infectious	calle b) d)		80
	2)	Citr a)	rus canker disease of plant is caus Pseudomonas bacteria Xanthomonas oryzae bacteria	ed du b)		
	3)	a)	coplasma is Eukaryotic and unicellular Prokaryotic and multicellular	,	•	
	4)	call a)	mful deviation from normal function ed Pest Infection	bning b) d)	of physiological process is  Disease  Pathogen	
	5)		wny mildew of grape is caused by Virus Bacterial	b) d)	 Fungus Mycoplasma	
	6)	a) c)	postulates which have been ad Alexander Koch's	dopte b) d)	d for isolation of plant pathogen. L. Hook None of these	
	7)		ngal disease in jawar appears at th Root formation Grain formation		e of Flower formation Stem formation	
	8)	a)	dication or Reduction of inoculum Crop rotation Rouging		host plant by methods. Sanitation All above these	
Q.2	a) b) c) d) e)	Etiol Men Path Cau Men	any four of the following logy. Ition principles of crop diseases managen. Isal organism of Okra (Bhendi). Ition symptom of bacterial disease e control measures of fungal disease	s in c	rop plants.	08

			SLR-GA-60
Q.3	Wri a) b) c)	te short notes on any two of the following Symptoms of Rust of Ground nut Methods of plant pathogen Kotch's Postulates	08
Q.4	Ans a) b) c)	swer any TWO of the following. Write mechanism of plant infection. Write about Citrus canker. Write classification of plant diseases on the basis of Symptoms.	08
Q.5	Ans a) b)	swer any ONE of the following.  Define Disease. Write control measures of plant disease.  Describe in details about Grain smut of jawar.	08

Seat	
No.	

#### B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024 STATISTICS (Paper - V) **Probability Distributions (22221308)**

Day & Date: Monday, 29-04-2024

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

**Instructions:** 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of Calculator is allowed.

#### Choose the correct alternative.

08

Let the joint probability mass function of two random variables *X* and *Y* be P(x,y) =  $\frac{x+y}{21}$ ; x = 1,2,3 y = 1,2 Then P(X = 2/Y = 2) is \_\_\_\_\_. a)  $\frac{1}{2}$ 

- 2) If *X* and *Y* are two independent r.v.s then
  - a) E(XY) = E(X).E(Y)
- b) P(x, y) = P(x).P(y)
- c)  $P_{(X+Y)}(S) = P_X(S).P_Y(S)$  d) All of these
- If *X* is a continuous random variable with p.d.f. f(x) then  $\int f(x)dx =$ \_\_\_\_. 3)
  - a) 0

- d) none of these
- A continuous random variable X has probability density function f(x) is 4)

given by  $f(x) = \begin{cases} \frac{c}{\sqrt{x}} & \text{; } 0 < x < 4 \\ 0 & \text{; otherwise} \end{cases}$  then the value of c is \_\_\_\_\_.

a) 4

b) 1

- If  $f(x) = \begin{cases} 0.5 & \text{; } -1 < x < 1 \\ 0 & \text{; otherwise} \end{cases}$  is the pdf of r.v. X, then  $P(X < 0) = \underline{\qquad}$ .
  - a) P(X > 0)

- d) None of these
- Let (X,Y) be random variables with joint probability density function 6)  $f(xy) = \begin{cases} cxy & \text{; } 0 < x < y < 1 \\ 0 & \text{; otherwise} \end{cases}$  then the value of c is \_\_\_\_\_.
  - a) 8

b) 6

c)

d) 4

- 7) Two random variables *X* and *Y* are independently distributed if
  - Their joint density is equal to the product of their marginal densities
  - b) E(XY) = E(X).E(Y)
  - c) f(X|Y = y) = f(x) and f(Y|X = x) = f(y)
  - d) all the above
- 8) If  $F_x(x)$  is the cumulative distribution function of a continuous r.v. X, then it
- Decreasing function of *X* b) Non-increasing function of *X* 
  - c) Non-decreasing function of X d) none of these

#### Q.2 Answer any four of the following.

80

- Define marginal probability distribution of X given Y = y.
- Define conditional variance of X given Y = y, in case of two-dimensional b) discrete random variable (X, Y).
- C) Define m.g.f. of continuous random variable *X*.
- Define Marginal density function of *Y*. d)
- Define correlation coefficient between X and Y, in case of two dimensional e) continuous random variable (X,Y)

#### Write short note on any two of the following. **Q.3**

80

- Define probability generating function. Show that the p.g.f. of sum of two a) independent random variable is equal to product of their p.g.f.
- The p.d.f. of the continuous v. X is given by b)

$$f(x) = \begin{cases} x & \text{; } 0 < x < 1\\ 2 - x & \text{; } 1 < x < 2\\ 0 & \text{; otherwise} \end{cases}$$

Find mean and variance of *X*.

The joint probability mass function (pmf) of two discrete random variable *X* c) and Y is given as

_			
Y	0	1	2
X			
0	0.1	0.1	0.1
2	0.15	0.2	0.15
4	0.1	0.1	0

Obtain the marginal pmf of X. Compute the mean of X

#### Answer any two of the following.

80

- For two dimensional discrete random variables (X,Y), state and prove multiplication theorem of expectation.
- A continuous random variable *X* has p.d.f. b)

$$f(x) = \begin{cases} c(3x^2 + 2x) & \text{, } 1 \le x \le 5\\ 0 & \text{, otherwise} \end{cases}$$

If 
$$Y = 3X + 2$$
 Find  $E(Y)$ 

Let (X,Y) is a bivariate continuous random variable with joint p.d.f. f(x,y), C) then prove that

$$V(aX + bY) = a^2V(X) + b^2V(Y) + 2ab Cov(X,Y)$$

#### Q.5 Answer any One of the following.

a) A continuous random variable has the p.d.f.

$$f(x) = \begin{cases} k x^2 (1-x) & \text{; } 0 < x < 1 \\ 0 & \text{; otherwise} \end{cases}$$

Find

- 1) The value of k
- E(X)
- 3) V(3-4X)
- **b)** Let *X* and *Y* have joint probability density function

$$f(x,y) = \begin{cases} 1 & \text{; } 0 < y > 2x < 2 \\ 0 & \text{; otherwise} \end{cases}$$

Find

- $1) \quad E(X/Y=y)$
- 2) V(X/Y = y)

Seat No.	t		Set	P			
I	B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024  METEOROLOGY (Paper – I)						
		<b>Climatology (22221326)</b> Ite: Monday, 29-04-2024  00 PM To 05:00 PM	lax. Marks	: 40			
Instr	ucti	<ul> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>					
Q.1	Mu 1)	Itiple choice questions.  Normal lapse rate in the atmosphere is0 C per 1000 m.  a) 5.6 b) 7.5 c) 6.5 d) 4.6		80			
	2)	Isotherm are the lines joining places of equal  a) salinity b) pressure c) rainfall d) temperature					
	3)	Climatology is compounded by word. a) Arab b) Greek c) Roman d) French					
	4)	An is an immense body of air. a) front b) air mass c) frontolysis d) humidity					
	5)	is the science which studies the atmosphere.  a) Hydrology b) Climatology c) Pedology d) Phytology					
	6)	There are major source region of air masses. a) 6 b) 4 c) 10 d) 8					
	7)	Carbon dioxide occupies% gaseous in the atmosphere. a) 0.09 b) 0.004 c) 21 d) 0.03					
	8)	Monsoon is the wind system of the region. a) tropical b) polar c) sub-polar d) sub-tropical					
Q.2	a) b) c) d) e)	Regional climatology. Define meteorology. What is mean by climate? Elements of weather. Define monsoon. Types of humidity.		08			

Q.3	<ul> <li>Write short note on any Two of the following.</li> <li>a) Explain scope and content of climatology.</li> <li>b) Describe the planetary wind systems.</li> <li>c) Continental air mass.</li> </ul>	80
Q.4	<ul> <li>Attempt any Two of the following.</li> <li>a) Explain general circulation in northern hemisphere.</li> <li>b) Explain climatology and its branches.</li> <li>c) Composition of atmosphere.</li> </ul>	08
Q.5	<ul><li>Attempt any One of the following.</li><li>a) Give an account of Structure of atmosphere.</li><li>b) Explain in brief the modification of air masses.</li></ul>	80

No.			<b>Jet</b> 1
I	B.S	Sc. (Semester - III) (New) (CBCS) Exa GEO-CHEMISTRY (P	aper – I)
		Introduction to Geochemis	etry (22221328)
•		ate: Monday, 29-04-2024 3:00 PM To 05:00 PM	Max. Marks: 40
Instr	uctio	<ul><li>ions: 1) All questions are compulsory.</li><li>2) Draw neat labeled diagram wherever</li><li>3) Figures to right indicate full marks.</li></ul>	necessary.
Q.1	Mu	ultiple choice questions.	08
	1)	In case of one component systems, curves a) univariant b) c) invariant d)	shows system. bivariant trivariant
	2)	,	
	_,	a) pentane b)	pentene pentanol
	3)	is the example of electropositive colle	oid.
		,	Lead Platinum
	4)	Phase rule was first discovered by a) Nerst b) c) Arrenius d)	Le Chatclier Gibb's
	5)	Co-ordination number of NaCl crystal is	_
	•,	a) 6 b)	
		c) 2 d)	4
	6)	,	• • • • • • • • • • • • • • • • • • • •
		,	true
			both (a) and (b)
	7)	The phase rule is expressed as  a) F = C- P + 2 b)	F + C = P + 2
			F + C = P + 1
	8)	Crystal lattice has a arrangement.	
	,		two-dimensional
		c) three-dimensional d)	four-dimensional
Q.2	An	nswer any Four the following.	08
	a)	•	
		Write two examples of aromatic compounds Define radius ratio.	S.
	•	Define radius ratio.  Define molecular formula.	
	•	What is aliphatic compound? Write one exa	mple.

Seat

Q.3	Wr a) b)	ite short note on any Two of the following.  Explain Goldschmidt's mineralogical phase rule.  The quantitative analysis of an organic compound gave the following results- C = 9.98%. H = 0.84%, CI = 89.18% Calculate its empirical formula.  Explain sulphur system for phase rule in detail.	80
Q.4	An a) b) c)	swer any Two of the following.  Write homologues series of alkynes up to eight carbon atoms. Write structures of ethyne and 2-butyne.  Write two electrical and two mechanical properties of colloids.  Explain structure of Cesium Chloride.	80
Q.5	An	swer any One of the following.	08
	a)	Write note on geological evidences of clay minerals. Explain silica as chemical sediment.	
	b)	Write note on lattice energy of crystals. Explain structure of Sodium Chloride.	

Seat No.	t						Set	P
ļ	B.S	c. (Ser	nester - II	ll) (New) (CBC ZOOLOGY Cell Biology	(Pape	•	April-2024	
			day, 29-04- Го 05:00 PN	-2024	, (		Max. Marks	: 40
Instr	uctio	2) 3)	Draw neat of Figures to r	is are compulsory diagrams whereve ight indicate full n able & calculator	er neces narks.	•		
Q.1		The pla	noice ques asma memb phospholipio	orane made up of		protein		08
			arbohydrat	=	,	None of these		
	2)	a) p	itermost lay protein layer pid layer	er of cell is	b)	plasma membrane None of these		
	3)	a) c	II Division o ell cycle nitosis	of Body cells calle	d as b) d)	meiosis None of these		
	4)	a) N	is called as ⁄litochondria Golgi compl		energy. b) d)	Endoplasmic Reticula None of these	ır	
	5)	a) T	-	called orgar	b)	Single None of these		
	6)	a) F	terial cell, th Plasma men Nucleoid	ne Genetic materia nbrane		red in Nucleus None of these		
	7)	a) E	_ is a micro Bacteria /iroid	organism that ma	•	single prokaryotic cell Virus None of these		
	8)	a) N	icide bags a ⁄litochondria /irus	are called a	b) d)	Lysosome None of these		
Q.2	a) b) c)	Endopl Structu Plasma Lysoso	a membrane	culum ction of mitochon	dria			08

		SLR-GA-64
Q.3	<ul><li>Write short note on any Two of the following.</li><li>a) Cell cycle</li><li>b) Meiosis</li><li>c) Role of chromatin</li></ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Types of Chromoses</li> <li>b) Function of the Nucleus</li> <li>c) Function of plasma membrane</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) Describe in detail on Golgi complex.</li><li>b) What are the cytoskeleton?</li></ul>	08

			_		<u> </u>				
Seat No.	t					Set	P		
	B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024 STATISTICS (Paper – VI) Statistical Methods - I (22221309)								
		e: Tuesday, 30-0 00 PM To 02:00 F			Max	. Marks	: 40		
Instr	uctio	2) Draw neat	ns are compulsory diagrams and give the right indicate f	e equatio	ns whenever necessary.				
Q.1	Cho	ose the correct The Corr $(X_{1.3}, X_{1.3})$	alternatives from	the option	ons.		80		
	''	a) $r_{12}$	2.3) 13	b)	$r_{13}$				
		c) $r_{12.3}$		d)	$r_{13.2}$				
	2)	Simple random	sample can be dra	wn with t	he help of				
	_,	•	umber tables		lottery method				
		c) drawing ch	nits	ď)	all the above				
	3)		d bearing age is	·					
		a) 20-24 yea		,	15-49 years				
		c) 13-48 yea		,	20-29 years				
	4)		en we interpret tha	ıt	 reduction in population				
		,	າ population in population	-					
	5)	,		,	rom a population of $N$ units t	ΟV			
	•	using SRSWR is				•			
		a) $N^n$		b)					
		c) $n!$		d)	None of these				
	6)		<sub>2</sub> is called as residu		er				
		a) 0 c) 2		b) d)	1 3				
	<b>-</b> \	,		,					
	7)		y the correlation be nstant is called as		vo variables when the third				
		a) simple cor	-	b)	partial correlation				
		c) multiple co		ď)	multiple regression				

The disadvantage of C.B.R. is \_\_\_\_.
a) it ignores age and sex distribution

it underestimates fertility rate

all the above

it provides very approximate fertility rate

8)

b)

c)

d)

08

Q.2	a) b) c)	wer the following questions. (Any Four)  Define A.S.F.R.  Define Census and sample.  Define multiple regression.  Define residual.  State variance of sample mean in case of SRSWOR.	08
Q.3	Writ a) b) c)	Define C.B.R. and G.F.R. State and prove any two properties of residuals. Explain SRSWR and SRSWOR.	08
Q.4	Ans a)	wer the following (Any Two) With usual notations prove that, $1 - R^2_{1.23} = (1 - r^2_{12})(1 - r^2_{13.2})$	80
	b)	Show that probability of selecting a specified unit at any draw is same as it is being selected at first draw.  Define G.R.R. and N.R.R. and also state limitations of G.R.R.	
Q.5	Ans a) b)	wer the following (Any One)  Define partial correlation coefficient and derive the formula for partial correlation coefficient.  With usual notations, prove that $var(\overline{y}_n)_{wr} \frac{N-1}{Nn} S^2$	08

Seat No.									Set	P
E	3.S	c. (Se		MÈTEO	ROLOG	Y (P	amination:   aper – II) (22221327)	March/Aլ	oril-2024	
•			esday, 30-04 To 05:00 Pt	-2024		293	(==== : 0=: )		Max. Marks	: 40
Instru	ctic	2) 3)	) Figures to t	diagrams a he right inc	nd give ed licate full i	mark	ons wherever s. or is allowed.	necessary		
	Mul 1)	-			ygen (O <sub>2</sub> )	b)	ent is about _ 21 0.03	%.		80
į	2)	a) <sup>_</sup>	is a n nitrogen argon	on-perman	ient gas ir	b)	earth's atmos oxygen ozone	phere.		
;	3)	a)	n of the follow Nitrogen Liquid nitrog	_	e highest	b)	ppy? Diamond Mercury			
•	4)	a)	atitude of the zero forty-five	equator is	d	b)	e. twenty-three ninety	point five		
,	5)	a)	of the follow pseudo forc velocity grad	е	otivating f	b)	that brings air Coriolis force pressure gra	;	notion?	
(	6)	a)	ergy technolo synergy anergy				ed as exergy work			
•	7)	a)	it voltage of Direct Curre Varying Cur	nt (D.C.)	aic cell is	b) d)	 Alternating C Displacemen	•	C.)	
;	8)	a)	ar cell has _ temperature light		itive junct	ion. b) d)	pressure moisture			
;   	a) b) c)	Two g What Calcu What	are effects of late Coriolis is non-inerti	nelts. Calcu of ozone in parameter al frame of	llate the a troposphe in rad/s, a reference	ere? at lati ?	nt of heat ene tude 43 degre science is rel	e.	ries) it abso	<b>08</b> rbs.

Q.3	Wr a) b) c)	ite short notes on any Two of the following. Discuss in detail tephigram. Discuss geostrophic wind. Discuss energy demand.	08
Q.4	An a) b) c)	swer any Two of the following.  Explain nature of radiations and its properties.  Explain non-inertial frame of reference and pseudo forces.  What is a geo-synchronous satellite?	08
Q.5	An a) b)	swer any One of the following  Explain the radiation budget of earth and its atmosphere in relation with scattering, reflection, and absorption.  Discuss role of ozone in troposphere. How is ozone hole formed?	08

Seat No.						Set	P
ļ	B.S	•	GEO-CHEMIST	ΓŔΥ (P	ımination: March/Ap aper – II) Geo-Sphers (222213		
-		te: Tuesday, 30- 00 PM To 05:00	04-2024		• ,	Max. Marks	: 40
Instru	ıctic	<ul><li>2) Draw ne</li><li>3) Figures t</li><li>4) Use of lo</li></ul>	ions are compulsory. at diagrams and give o the right indicate fu garithmic table and c : H=1, C=12, O=16, I	equation all mark calculate	or is allowed.		
Q.1		ltiple choice qu					80
	1)	The upper crusical Sandston c) Limeston			s of Shale Igneous and metamorpl	nic rocks	
	2)	Elements are thouter shell are:  a) Siderophic) Lithophile	 le	•	se ions have 18-electron Chalcophile Atmosphere	in the	
	3)	Which of the fol a) Troposph c) Mesospho	ere	•	6 of the Earth's atmospho Stratosphere Thermosphere	ere.	
	4)	In the primeval constituent.  a) CH <sub>4</sub> c) O <sub>2</sub>	atmosphere, at the fi	rst stag b) d)	e of its evolution N <sub>2</sub> None of the these	was major	
	5)	Which of the fol a) Siderophi c) Lithophile			Chalcophile-Sulfides Atmophile- Atmosphere		
	6)	The average co a) $Na > Ca$ c) $Mg > Na$	•	b)	r is $Ca > Na > Mg$ $Ca > Mg > Na$		
	7)	Which planets r a) Uranus a c) Neptune a			rograde rotation? Earth and Mars Mercury and Jupiter		
	8)	Siderites consis a) Silicates c c) Nickle - ir	-	b) d)	Nickel-iron alloy and sili Silicates and graphite's	cates	

An	swer any Four of the following.	80
a) b)	Name the geochemical elements which have the affinity towards sulphides.  Pallasites and the meso-siderites are types of which meteorites?	
•		
e)	Which constituents are responsible for the important temperature controlling mechanism known as the greenhouse effect.	
_		08
,	·	
•	· · · · · · · · · · · · · · · · · · ·	
C)	Gains and losses of elements in the oceanic water.	
An	swer any Two of the following	08
a)	Explain the primary differentiation of elements.	
b)	Discuss in brief the composition of meteorites and its types.	
c)	Describe in short, the variable constituent of Atmosphere.	
An	swer any One of the following.	08
a) b)	Describe interior structure of the earth and its whole composition.  Explain in brief the geochemical classification of elements. Add note on	
~,	cosmic abundance of elements.	
	a) b) c) d) e) Wri a) b) c) Ans	<ul> <li>b) Pallasites and the meso-siderites are types of which meteorites?</li> <li>c) Define carbonaceous chondrite.</li> <li>d) Names the major constituents of Atmosphere.</li> <li>e) Which constituents are responsible for the important temperature controlling mechanism known as the greenhouse effect.</li> <li>Write short notes on any Two of the following.</li> <li>a) Composition of earth crust.</li> <li>b) Structure and composition of lower mantle.</li> <li>c) Gains and losses of elements in the oceanic water.</li> <li>Answer any Two of the following</li> <li>a) Explain the primary differentiation of elements.</li> <li>b) Discuss in brief the composition of meteorites and its types.</li> <li>c) Describe in short, the variable constituent of Atmosphere.</li> <li>Answer any One of the following.</li> <li>a) Describe interior structure of the earth and its whole composition.</li> <li>b) Explain in brief the geochemical classification of elements. Add note on</li> </ul>

Seat No.						Set	P
	B.Sc	. (Semester -	III) (New) (CBCS) ZOOLOGY (F		mination: March/April-2 · – VI)	:024	
		Р	rinciples of Ecol	ogy (	(22221323)		
		e: Tuesday, 30-04 0 PM To 05:00 Pl			Max.	Marks	: 40
Instru	ctions	2) Draw neat d	s are compulsory. iagrams and give eq ne right indicate full m		s wherever necessary.		
Q.1	Multi	iple choice ques	stions:				08
	1)	are orga	anisms that live on ex	kterna	l surface of host.		
		a) Endoparas		b)	Prey		
		c) Mimic mod		d)	Ectoparasites		
	2)			s foun	d within a specified geograph	ical	
		region is called a a) diversity	as	b)	biodiversity		
		c) bio uniform	ity	d)	fecundity		
	3)	In an ecosystem	n carnivorous are	,	•		
	-,	a) producers		b)	primary consumers		
		c) decompose	ers	d)	Tertiary consumers		
	4)		tant abiotic factor red	quired	for plants in photosynthesis p	oroces	S.
		a) Oxygen		p)	Sun light		
		c) Soil		d)	Nitrogen .		
	5)	First step in prin  a) Nudation	nary ecological succe	ession b)	is Migration		
		c) Ecesis		d)	Aggregation		
	6)	,	near sequence of ord	,	ns through which nutrients and	d	
	•,		one organism eats a			<b>-</b>	
		a) food storag	je	b)	ecological niche		
		c) ecdysis		d)	food chain		
	7)		ample of ectoparasit				
		<ul><li>a) Lice</li><li>c) Tape worm</li></ul>	1	b) d)	Ascaris Amoeba		
	0/	,		,			
	8)	a) Molarity	umber of deaths in th	b)	Mortality		
		c) Natality		d)	Fecundity		
0.0	A	,	h o <b>f</b> ollowin	•	- -		00
Q.2		wer any four of t Define term 'Nata	_				80
			hwater ecosystem.				
	c)	What are sacred	grooves in India?				
	-		oiodiversity hot spots	in Ind	ia.		
	e)	Define term 'Eco	logy'.				

Q.3	Wr a) b)	ite short notes on any two of the following. Write on grassland ecosystem. Write parental care in fishes.	08
	c)	Discuss ecological pyramid with one example.	
Q.4		swer any two of the following.	08
	a)	What is appointed diversity, write importance of highly craity	
	b) c)	What is species diversity, write importance of biodiversity.  Discuss in brief, zones of marine ecosystem.	
Q.5	,	swer any one of the following	08

- a) Discuss in detail effect of abiotic factor temperature on animals life.b) Explain any two interspecific associations with one example.

		SLR-G	jΑ-(	59
Seat No.		S	et	P
E	3.Sc.	c. (Semester - III) (New) (CBCS) Examination: March/April-20 MATHEMATICS (Paper – V) Differential Calculus (22221316)	24	
•		te: Thursday, 02-05-2024 Max. M 00 PM To 20:00 PM	arks:	40
Instru	ıctior	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.		
	Choo 1)	Polar subnormal is equal to  a) $\frac{d\theta}{dr}$ b) $\frac{dr}{d\theta}$ c) $r\frac{dr}{d\theta}$ d) $r\frac{d\theta}{dr}$		80
	2)	Polar sub-tangent for the curve $r=ae^{\theta\cot x}$ is  a) $r\tan x$ b) $r^2\cot x$ c) $r\cot x$		
	3)	The radius of curvature of the curve $s=3a\sin\Psi=0$ is a) $a$ b) $2a$ c) $3a$ d) $4a$		
	4)	The radius of curvature of the curve $Pr=a^2$ is  a) $\frac{r}{a^2}$ b) $\frac{r^2}{a^2}$ c) $\frac{r^3}{a^2}$ d) $r$		n
	5)	If $x = u(1+v)$ and $y = v(1+u)$ then $\frac{\partial(x,y)}{\partial(u,v)} =$ a) $1+u+v$ b) $1+u-v$ c) $1-u+v$ d) $1-u-v$		
	6)	If $u=x^2\cos 2\theta$ and $v=r^2\sin 2\theta$ then $\frac{\partial(u,v)}{\partial(r,\theta)}=$ a) $-3r^3$ b) $-4r^3$ c) $3r^3$ d) $4r^3$		
	7)	A function $f(x,y)$ is miximum at point $(a,b)$ if  a) $AC - B^2 > 0$ and $A < 0$ b) $AC - B^2 > 0$ and $A > 0$ c) $AC - B^2 < 0$ and $A < 0$ d) $AC - B^2 < 0$ and $A > 0$		
	8)	The maximum value of $f(x) = \frac{x^3}{3} - 2x^2 + 3x + 1$ is		

b)  $\frac{3}{7}$  d)  $\frac{7}{3}$ 

a)  $\frac{7}{5}$  c)  $\frac{3}{7}$ 

		OLN OA	UU
Q.2		wer any Four of the following.	08
	a)	Find the length of sub-tangent of the curve $y^2 = 4ax$ at any point.	
	b)	Find the radius of curvature of the curve $x^2 + y^2 = a^2$ at any point.	
	c)	Show that the maximum value of $\left(\frac{1}{x}\right)^x$ is $e^{1/e}$ .	
	d)	If $u = 3x + 2y - z$ , $v = x - 2y + z$ and $w = x + 2y - z$ the find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$	
	e)	Find $\frac{ds}{dx}$ , for the curve $y = a \cdot \cos h \frac{x}{a}$ .	
Q.3	Ans	wer any Two of the following.	08
	a)	Find polar sub-tangent and subnormal for $\frac{l}{r} = 1 + e \cos \theta$ .	
	b)	Find radius of curvature for the curve $r = a(1 - \cos \theta)$ at any point.	
	c)	If $z_1, z_2, z_3$ are functions of three variables $y_1, y_2, y_3$ and $y_1, y_2, y_3$ are functions of $x_1, x_2, x_3$ then $\frac{\partial(z_1, z_2, z_3)}{\partial(x_1, x_2, x_3)} = \frac{\partial(z_1, z_2, z_3)}{\partial(y_1, y_2, y_3)} \cdot \frac{\partial(y_1, y_2, y_3)}{\partial(x_1, x_2, x_3)}$ .	
		Provided the concerned partial derivative exists.	
Q.4	Ans	wer any Two of the following.	08
	a)	If $y = f(x)$ be a equation of curve in cartesian form then show that radius of curvature $\varrho = \frac{\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{3/2}}{\frac{d^2y}{2}}$	
		$\frac{d^2y}{dx^2}$	
	b)	Show that the functions $u = \frac{x+y}{1-xy}$ and $v = \tan^{-1} x + \tan^{-1} y$ are dependent	
		to each other. Also find the relation between them.	
	c)	Find the extreme values of the function $u = x^2 + 2xy + 2y^2 + 2x + y$ .	

that  $\varrho = \frac{\left\{ \left( f^1 \right)^2 + \left( g^1 \right)^2 \right\}^{3/2}}{f^1 g^{11} - g^1 f^{11}}$ 

Q.5 Answer any One of the following

2) Find the radius of curvature of the parabola  $x = a \pm^2$ ,  $y = 2a \pm$  at any point.

1) If x = f(t) and y = g(t) are parametric equation of the curve then show

- 1) Explain Lagrange's method of undetermined multiplier to find the b) extreme values of u = f(x, y, z) subject to the conditions  $\phi(x, y, z) = 0$ and  $\Psi(x, y, z) = 0$ .
  - 2) Find the extreme value of  $u = xy^2z^3$  subject to the condition x + y + z = 6.

80

Seat No.	Set	Р
	•	

# B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024

		•	Pla	BOTÀNY (Pa ant Anatomy (	•	•	
•			ursday, 02-05-202 1 To 05:00 PM	24			Max. Marks: 40
Instr	uctio	3	) All questions are 2) Figures to right i 3) Draw neat diagra 4) Use of logarithm	ndicate marks. ams and give equ		n wherever necessary. s allowed.	
Q.1		The	Chlorenchyma		-	is known as Arenchyma All of these	08
	2)		complex tissue is r More Both a and b	nade up of	_	n one type of cell. Less None of these	
	3)	a)	_ is the outermost Epidermis Hypodermis	layer of the stele	e. b) d)	Endodermis Ground tissue	
	4)	a)	e stem the hypode Parenchyma Sclerenchyma	rmis is made up		tissue. Collenchyma Chlorenchyma	
	5)	The v a) c)	wood of gymnospe Porous Diffuse porous	ermic plant is	b) d)	Non-porous Ring porous	
	6)		ple epidermis is pr Maize Nerium	esent in the leav	es of b) d)	 Wheat Oxalis	
	7)		epidermal tissue sy Epidermis Both a and b	ystem includes _	b)	Cork layer None of these	
	8)	Poro a) c)	us and hard wood Dicot Pteridophyte	plants belongs to	b) d)	 Monocot Gymnosperm	
Q.2	Ans a) b) c) d) e)	Defin Give Defin Write Defin	any four of the former meristem. the definition of since complex tissue. In the function of xy the plate meristem. It is stomata.	mple tissue.			08

Q.3	<ul><li>Write short notes on any two of the following.</li><li>a) Scleirids</li><li>b) Function of epidermis.</li><li>c) Collenchyma</li></ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain the significance of Tunica carpus theory.</li> <li>b) Describe the Sclerenchyma studied by you.</li> <li>c) Explain the conjoint vascular bundle.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain the primary structure of monocot stem.</li> <li>b) Describe the structure and function of vascular cambium.</li> </ul>	08

Seat	
No.	

#### B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS (Paper - VI)** Laplace Transform (22221317)

Day & Date: Friday, 03-05-2024

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Choose the correct alternative for each of the following. **Q.1**

80

1) If 
$$L\{F(t)\} = f(p)$$
 then  $L\{F'''(t)\} = ____.$ 

a) 
$$p^3L\{F(t)\}-p^2F(0)-pF'(0)-F''(0)$$

b) 
$$p^2L\{F(t)\}-pF(0)-F'(0)$$

c) 
$$p^3L\{F(t)\} + p^2F(0) + pF'(0) - F''(0)$$

d) 
$$p^3L\{F(t)\}-p^2F(0)+pF'(0)-F''(0)$$

2) 
$$L\left\{\frac{e^{at} + e^{-at}}{2}\right\} =$$
\_\_\_\_\_.

a) 
$$\frac{p}{p^2 + a^2}$$

b) 
$$\frac{p}{p^2 - a^2}$$

c) 
$$\frac{2p}{p^2 - a^2}$$

$$d) \quad \frac{1}{p^2 - a^2}$$

$$2) L\left\{\frac{\sin t}{t}\right\} = \underline{\qquad}.$$

a) 
$$tan^{-1}\frac{1}{p}$$

b) 
$$\cot^{-1} \frac{1}{n}$$

c) 
$$tan^{-1}p$$

d) 
$$\frac{\pi}{2}$$

**4)** 
$$L^{-1}\left\{\frac{p}{p^2+a^2}\right\} = \underline{\hspace{1cm}}.$$

a) 
$$\frac{\cos at}{a}$$

b) 
$$\frac{\sin at}{a}$$

**5)** 
$$L^{-1}\left\{\frac{3}{p-3}\right\} = \underline{\hspace{1cm}}.$$

a) 
$$3e^{3t}$$

b) 
$$3e^{-3t}$$

a) 
$$3e^{3t}$$
  
c)  $\frac{e^{3t}}{3}$ 

d) 
$$e^{3t}$$

**6)** 
$$L^{-1}\left\{\frac{f(p)}{p^2}\right\} = \underline{\qquad}$$

a) 
$$\int_{0}^{t} f(x)dx$$

b) 
$$\int_{0}^{t} \int_{0}^{y} F(x) dx dy$$

c) 
$$\int_{1}^{0} \int_{0}^{y} F(x) dx dy$$

d) 
$$\int_{0}^{\infty} \int_{0}^{\infty} F(x) dx dy$$

- If y(x, t) is a function of x and t then  $L\left\{\frac{\partial^2 y}{\partial t^2}\right\} = \underline{\hspace{1cm}}$ . 7)

  - a)  $p^2 \bar{y}(x,p) py(x,0) y_t(x,0)$  b)  $p^2 \bar{y}(x,p) + py(x,0) y_t(x,0)$
  - c)  $p^2 \bar{y}(x,p) p y_t(x,0) y(x,0)$  d)  $p^2 \bar{y}(x,p) + p y(x,0) + y_t(x,0)$
- If y(x, t) is a function of x and t then  $L\left\{\frac{\partial y}{\partial t}\right\} = \underline{\hspace{1cm}}$ 8)
  - a)  $x\overline{y}(x,p) + y(x,0)$

b)  $p\overline{y}(x,0) - y(x,p)$ 

c)  $p\bar{y}(x,p) - y(x,0)$ 

- d)  $p\bar{y}(x,p) + y(x,0)$
- **Q.2** Attempt any four of the following

80

- Find  $L\{e^{-3t}t^3\}$ a)
- Find  $L^{-1}\left\{\frac{1}{\sqrt{n}}\right\}$ b)
- Find  $L^{-1}\left\{\frac{1}{n^2-6n+10}\right\}$
- d) Find  $L\{\cos h^2 2t\}$
- If y(x,t) is a function of x and t then prove that  $L\left\{\frac{\partial^2 y}{\partial x^2}\right\} = \frac{\partial^2 \bar{y}}{\partial x^2}$ e)
- **Q.3** Attempt any two of the following

08

- If  $L\{F(t)\}=f(p)$  then prove that  $L\{F(at)\}=\frac{1}{a}f\left(\frac{p}{a}\right)$
- If  $L^{-1}\{f(p)\} = F(t)$  then prove that  $L^{-1}\{f(p-a)\} = e^{at}L^{-1}\{f(p)\}$ b)
- Solve  $(D^2 2D + 2)y = 0$ ,  $y = D_v = 1$ , when t = 0c)
- **Q.4** Attempt any two of the following.

08

- Evaluate  $L^{-1}\left\{\frac{3p+7}{n^2-2n-3}\right\}$
- Find  $L\{F(t)\}$ , where b)

$$F(t) = \begin{cases} \sin\left(t - \frac{\pi}{3}\right) &, & t > \frac{\pi}{3} \\ 0 &, & t < \frac{\pi}{3} \end{cases}$$

- c) Solve ty'' + y' + 4ty = 0 if y(0) = 3, y'(0) = 0
- **Q.5** Attempt any one of the following

08

- State and prove Convolution theorem for inverse Laplace transform.
- b) Show that

i) 
$$L\left\{\frac{\cos\sqrt{t}}{\sqrt{t}}\right\} = \sqrt{\frac{\pi}{p}} e^{-\frac{1}{4p}}$$

ii)  $\int_{0}^{\infty} \frac{F(t)}{t} at = \int_{0}^{\infty} f(x) dx$  Provided that the integral converges.

Seat	0.4	<b>D</b>
No.	Set	Υ

# B.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024

			BOTA Plant Meta	NY (Pap		,	
•			day, 03-05-2024 1 To 05:00 PM		\	Max. Marks: 4	łO
Instr	uctio	3	) All questions are compu 2) Draw neat labeled diagr 3) Figures to right indicate 4) Use of logarithmic table (At. Wts.: H=1, C=12, O	am wher full mark and calc	s. ulat	or is allowed.	
Q.1		Whic coen a)	choice questions. h of the following is produ zyme: Holoenzyme Prosthetic group		b)	combination of apoenzyme and  Enzyme substrate complex Enzyme product complex	8
	2)	-	mes are made up of Fats Nucleic acids	<del></del> -	b) d)	Proteins Vitamins	
	3)	of a)	e-3-acetic acid is the mos class. Gibberellin Ethylene	t commo		aturally occurring plant hormone  Auxin  Cytokinin	
	4)		_ is a gaseous plant horm IBA Abscisic acid	none.	b) d)	Ethylene NAA	
	5)	a) ̈	mes are polymers of: Hexose sugar Fatty acids	·	b) d)	Amino acids Inorganic phosphate	
	6)		are the elements, with blete its life cycle. Fertilizers Macroelements	out which	b) d)	e plants will not be able to Microelements Essential elements	
	7)	a) c)	_ is an important mineral Hydrogen Oxygen	nutrient.	b) d)	Nitrogen Carbon	
	8)	Whice a) b) c) d)	h of the following is the si Carboxyl groups Aldehyde and Ketone gr Alcohol and Carboxyl gro Hydroxyl groups and Hyd	oups oups		·	

Q.2	a) b) c) d)	wer any Four the following.  Define enzymes.  What is symbiotic nitrogen fixation?  Enlist the plant growth regulators.  Define macronutrients.  Define Carbohydrate.	80
Q.3	a) b)	te short note on any Two of the following.  Describe any four types of enzymes with examples.  Explain the discovery of gibberellins and with its roles.  Explain the mechanism of biological nitrogen fixation.	80
Q.4	a) b)	empt any Two of the following. Explain nitrogen cycle in detail. Give the roles of auxin and cytokinin. Give the classification of enzyme with examples.	80
Q.5	a)	empt any One of the following.  Define macronutrients and enlist the roles of N, P, K.  Explain mechanism of enzyme action.	80

				SLR-GA-	13
Seat No.				Set	Р
В	Sc.	ELI	lew) (CBCS) Exa ECTRONICS (Pa tronic Circuits (2		
,		: Saturday, 04-05-202 ) PM To 02:00 PM	4	Max. Marks	: 40
Instru	ction	3) Figures to right i	ed diagram whereve	·	
	1)		oscillator, the expre	ession for frequency of oscillation	80
		is	b)	$f = \frac{1}{2\pi\sqrt{6}RC}$ $f = \frac{1}{2\pi\sqrt{8}RC}$	
		c) $f = \frac{1}{2\pi\sqrt{RC}}$	d)	$f = \frac{1}{2\pi\sqrt{8}RC}$	
2	2)	Another name for pos a) regenerative c) generative	b)	degenerative reductive	
;	3)	Cross over distortion <ul><li>a) Class-A</li><li>c) Class-AB</li></ul>		_ amplifier. Class-C Class-B	
4	4)	The stability factor is a) $\frac{\Delta I_C}{\Delta I_{CBO}}$ $\Delta I_C$	b)	$rac{\Delta \mathrm{I}_E}{\Delta \mathrm{I}_C}$ $\Delta \mathrm{I}_C$	
	<b>-</b> \	c) $\overline{\Delta I_E}$	d)	$\Delta t$	
;	5)	The ripple factor of ce a) 0.812 c) 0.483	entre tapped full wav b) d)		
(	6)	The TUF of the bridge a) 32.8 c) 69.3	e rectifier is b) d)	28.7 81.2	
7	7)	The base resistor me a) Amplifier circuits c) Rectifier circuits	thod is generally use b) d)	ed in switching circuits oscillators	
8	8)	In case of CE amplified a) $0^{\circ}$ c) $180^{\circ}$	er the phase differen b) d)	ice between input and output is 270 <sup>0</sup> 90 <sup>0</sup>	<u>_</u> .

Q.2	An	swer any Four of the following.	80
	a)	In phase shift oscillator $R=10~K\Omega,~C=0.1~\mu F$ . calculate the frequency of	
		oscillations.	
	•	Determine gain of a negative feedback if $Av = 10, \beta = 0.4$	
	c)	What is power amplifier? Give its classification.	
	d)	Enlist different methods of transistor biasing.	
	e)	What is rectification? What are its types?	
Q.3	Wr	ite short note on any Two of the following.	08
	a)	With neat diagram explain working of RC coupled amplifier.	
	b)	State any four effects of negative feedback.	
	c)	In a Hartley oscillator if $C=0.01\mu F$ , $L_1=6~mH$ and $L_2=14~mH$ . Determine	
		feedback fraction, voltage gain, and frequency of oscillation.	
Q.4	An	swer any Two of the following.	08
<b></b>	a)	Explain the basic action of transistor as an amplifier.	
	b)	Explain construction and working of centre tapped full wave rectifier.	
	c)	Explain Class-B push pull and complimentary symmetric amplifier.	
	•		
Q.5	An	swer any One of the following.	80
	a)	Explain Wein bridge oscillator. Determine frequency of oscillation	
		If $R=1.20~K\Omega$ and $C=0.1~\mu F$	
	b)	What is mean by transistor biasing? Explain voltage divider bias. Derive an	
		expression for stability factor.	

Seat No.			Set	P
В	S.Sc. (Semester - II	ll) (New) (CBCS) Ex GEOGRAPHY (Pa Climatology (222	-	
-	Date: Saturday, 04-05 12:00 PM To 02:00 PM	5-2024	Max. Marks:	40
Instru		is are compulsory. ight indicate full marks. diagrams wherever nece	essary.	
	a) Stratosphere c) Hydrosphere	e d)	-	80
	2) is a type of a) Trade wind c) Cyclone	b) local wind. b) d)		
:	<ul><li>Ozone is concentr</li><li>a) Stratosphere</li><li>c) Hydrosphere</li></ul>	,	neric layer. Exosphere Troposphere	
	<b>4)</b> The average albed a) 15 c) 35	do of the earth is9 b) d)		
	<ul><li>5) The lines joining the a) Pressure</li><li>c) Humidity</li></ul>		are called isotherms. Rainfall Temperature	
		following gases is found b) d)		€.
,	<b>7)</b> Air pressure is low a) Spring c) Summer	vest in season. b) d)		
	a) 8 minutes c) 18 minutes	s for sun rays to reach e b) d)	12 minutes	
	Answer any Four of tance)  a) Define the conceptb) Define the conceptc) Define the Air Presid) Define the concepte) Define the concepte	ot of normal lap's rate. It of westerlies. It of Climate.		08

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Indian Monsoon</li> <li>b) Precipitation</li> <li>c) Earth pressure belt</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain the composition of the atmosphere.</li> <li>b) Explain the types of humidity.</li> <li>c) Explain the Jet stream.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) Explain the structure of the atmosphere.</li><li>b) Explain the forces affecting on wind.</li></ul>	08

Seat No.						Set	P
l	B.S	c. (Semester -	III) (New) (CBCS) GEOLOGY (F Mineralogy (2	ape	,	April-2024	
•		te: Saturday, 04-0 00 PM To 05:00 P				Max. Marks	: 40
Instru	ıctic	2) Draw neat	ns are compulsory. and well labeled diag the right indicate full i		s wherever necessary.		
Q.1	Mu  1)	tiple choice ques mineral s a) Orthoclase c) Olivine	tions: hows cracks in polari	zed I b) d)	Quartz		80
	2)	Chemical compose a) SiO <sub>2</sub> c) Fe <sub>2</sub> O <sub>3</sub>	sition of Amethyst is _	b) d)	CaCO <sub>3</sub> None of these		
	3)	Relief in minerals a) High c) Low	under microscope ca	an be b) d)	e expressed as Moderate All of these		
	4)	Opal is amorphou a) Quartz c) Olivine	s variety of	b) d)	Mica Garnet		
	5)	Which of the folloga) Garnet c) Muscovite	wing mineral is isotro	pic ir b) d)			
	6)	Cross hatch twinr a) Orthoclase c) Microcline	ning is shown by	b) d)	Plagioclase Calcite		
	7)	Diamond shows _ a) Pearly c) Silky	luster.	b) d)	Adamantine Vitreous		
	8)	Actinolite and Tre a) Pyroxene c) Felspathoid	molite minerals belor	b)			
	a) b) c) d)	Give two names of Define Mineral.  Define Isotropism Define Streak of Note that Define Polarized	of Mica group mineral Minerals.	S.			08

		SLR-GA-75
Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Pleochroism with example.</li> <li>b) Physical and Chemical properties of Calcite.</li> <li>c) Twinning in minerals.</li> </ul>	08
Q.4	Answer any Two of the following.	80
	a) Explain Olivine mineral.	
	b) Describe types of fractures.	

#### Q.5 Answer any One of the following.

80

- a) Describe Physical properties, chemical composition, Occurrence of Pyroxene group minerals.
- b) Describe Crystallized, Crystalline, crypto-crystalline and Amorphous forms with examples.

c) Explain Lower assembly of Petrological Microscope.

Seat No.					Set	P
В	-		MICROBIOLO	OGY (Pa	-	١
	Bact	erial Cytol	ogy, Physiolo	gy and	Metabolism (22221314)	
•		aturday, 04-09 // To 05:00 Pl			Max. Mark	s: 40
Instrud	3	2) Draw neat 3) Figures to	ns are compulsor labeled diagram right indicate full tables and calcul	wherever marks.		
	•	choice ques				08
1	a)	major function ceil division protection	า of bacterial cell	b)	ne is locomotion membrane transport	
2	bunc a)	Flagella ch or two or m Peritrichous Lophotricho	ore.	b)	e present at 1 end are present in  Amphitrichous  Monotrichous	
3	a)	oxysome cor Carboxy oxi Carboxydisr		b)	 Deacarboxylase Carboxylase	
4	a)	heat resistan Ca dipicolin Ca++	factor in bacteria	b)	oore is DAP Peptidoglycan	
ŧ	calle a)	growth phase d pha Lag Stationary		b)	sms increases exponentially is Log Death	
6	mole a)	net gain of A <sup>-</sup> cules. 38 12	ΓP per glucose m	nolecule i b) d)		
7	is kn a)	mes that cata own as oxidoreduct ligases	_•	of atom b) d)	or group between two molecules transferases isomerases	
8	a)	ıp translocatio Lipids Sugar	on place importar		transport. Chemical None of these	

Q.2	<ul> <li>Answer any Four of the following.</li> <li>a) Define diauxic growth.</li> <li>b) What is chemotaxis?</li> <li>c) Define osmosis.</li> <li>d) Enlist anaerobic organisms.</li> <li>e) What is generation time?</li> </ul>	08
Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Synchronous growth</li> <li>b) Group translocation</li> <li>c) Chlorobium vesicles</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Components of electron transport chain</li> <li>b) Glycoxylate bypass</li> <li>c) Effect of substrate concentration on enzyme activity.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Write an essay on classification of enzymes as per IUB.</li> <li>b) Describe in detail sporulation &amp; germination of bacterial endospore.</li> </ul>	08

Seat No.	Set	Р
D 0 (0 )		

	D.3	C. (3)	, ,	TRONICS (Par	ner - VI)
				itching Circuit	•
			ursday, 09-05-2024 I To 02:00 PM	J	Max. Marks: 40
Instr	uctio	3	) All questions are con 2) Figures to the right i 3) Draw neat diagrams 4) Use of log-tables and 5) Use of Mobile is stri	indicate full marks and give equation and calculator is all	ons wherever necessary.
Q.1	Mu 1)	If the	_ wave.		e-wave, then its output will be
		a) c)	cosine triangular	b) d)	•
	2)	a) ·	pper circuit is a Linear wave-shaping averaging	b)	non-linear wave-shaping dc level shifter
	3)		h of these circuits pro UJT sweep circuit wi Miller integrator Bootstrap generator All of these		· · · · · · · · · · · · · · · · · · ·
	4)		n a transistor is used a Saturation region both a and b	as a switch, it ope b) d)	erates in cut-off region active
	5)	its hy a)	UTP and LTP of a So esteresis voltage will b 3 volt 7 volt	e b)	uit are +5V and +2V respectively,  3.5 volt 10 volt
	6)	The a)	number of inverter gat one three	es required to de b) d)	esign an astable multivibrator is two four
	7)	The l	ower and upper comp respectively. 0 V and Vcc Vcc/3 and 2Vcc/3	parators used in I0 b) d)	C555 compare the voltage levels  Vcc/4 and 3Vcc/4  Vcc/2 and Vcc
	8)	What a)	t is the role of pin-5 in Reset pin discharge pin	IC555? b)	trigger pin VCO pin

	SLR-GA	-77
Q.2	<ul> <li>Answer any Four of the following.</li> <li>a) Explain in brief the need of wave-shaping circuit.</li> <li>b) List any two features of time-base circuit.</li> <li>c) Give any two switching characteristics of a transistor.</li> <li>d) What is UTP and LTP in Schmitt trigger? Brief in short.</li> <li>e) Significance of figure 555 in IC555.</li> </ul>	08
Q.3	<ul> <li>Write short notes on any Two of the following:</li> <li>a) Negative Clamper</li> <li>b) Miller Integrator</li> <li>c) Schmitt-trigger</li> </ul>	08
Q.4	Answer any Two of the following: a) An astable multivibrator using transistors has timing component values $R_1=10K\Omega,R_2=20K\Omega,C_1=0.1uF,C_2=0.22uF.$ Calculate the duty cycle	08

#### Q.5 Answer any One of the following:

and frequency of oscillation.

**b)** Operation of IC555 as sequential timer.

c) Explain monostable multivibrator using 74121.

- **a)** Explain the operation of collector-coupled bistable multivibrator. Draw the timing diagram. Comment on the triggering method used.
- **b)** Explain the operation of IC555 as an astable multivibrator. Hence obtain the equation for frequency and Duty-cycle.

		SLR-GA-70	J
Seat No.	t	Set F	)
I	B.S	c. (Semester - III) (New) (CBCS) Examination: March/April-2024 GEOGRAPHY (Paper - VI) Geography of India (22221325)	
-		te: Thursday, 09-05-2024 Max. Marks: 4 00 PM To 02:00 PM	0
Instr	ucti	<ul> <li>2) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat diagram &amp; give equations wherever necessary.</li> <li>4) Use of maps stencil is allowed.</li> </ul>	
Q.1		tiple choice questions.  The Southernmost point of the Indian union is known as ''.  a) Rahul point  b) Indira point  c) Modi point  d) Sonia point	8
	2)	In recent, India is divided into States and union territories.  a) 28 & 8	
	3)	India is divided by Tropic of 23°30' N in almost two equal parts.  a) Cancer b) Capricorn  c) Equatorial d) None of these	
	4)	(8586 M.) the highest peak in India. a) Kangchenjunga b) Mt. Everest c) Dhavalagiri d) Dodabetta	
	5)	(1084) state has the highest sex ratio in India in 2011 census.  a) Haryana b) Punjab c) U.P. d) Kerala	
	6)	In January 2023, was the largest producer of iron ore among Indian states.  a) Gujarat  b) Odisha	
	7)	c) Maharashtra d) Karnataka  is the second-largest tribe of India. a) Gond b) Bhils c) Santhal d) None of these	
	8)	is the largest rice-producing state in India.  a) Goa b) Assam c) West Bengal d) M.P.	
Q.2	An: a) b) c) d)	Which are the top two largest spoken languages in India? In which state (Only name) Bhil tribe is located in India? Define the regur soil. Which religion is number third in the India?	8

e) How many religious groups (any two names) in India?

Q.3	Wr a) b) c)	ite short notes on any Two of the following. Indian Island Age Group composition Gond Tribe	08
Q.4	Ana) b) c)	swer any Two of the following.  What is mean by tribe & explain the Bhils tribe?  Describe the various religious groups in the India.  Explain the types of soils.	08
Q.5	An a) b)	swer any One of the following.  Define the mineral resources and explain the Distribution of Iron ore in India.  Explain the factors affecting distribution of population.	08

Seat No.					Set	P
В	3.Sc	•	II) (New) (CBCS)   GEOLOGY (Pa Igneous Petrolog	ape	•	
		e: Thursday, 09-0 0 PM To 05:00 Pl	5-2024	•	, Max. Marks	: 40
Instru	ctio	2) Draw neat	ns are compulsory. diagrams and give ed the right indicate full r		ons wherever necessary.	
•	Sele 1)	ct correct one. Which of the follo a) Basalt c) Obsidian	owing is not extrusive		eous rock? Andesite Granite	08
;	2)	A glassy texture a) very rapid o c) slow follow		,	slow cooling none of the above	
;	3)	have a tendency	to sink down is called rystallization	b)	ase of crystallization of a magma gaseous transfer gravity settling	
•	4)	In continuous Bo a) plagioclase c) olivine	wen's reaction series	b) d)	is the first mineral to crystalize. biotite muscovite	
•	5)	Magmatic gaseo a) leased pres c) any direction			high pressure towards core	
(	6)	In crystallization a) lowers c) same	of binary magma, the	mel b) d)	ting temperature of liquid increase increase or decrease	
	7)	In rock co a) granite c) syenite	ntains 80 to 85% feld	spar b) d)	as essential minerals. basalt dolerite	
;	8)	a) plutonic c) volcanic	ur as injections within	the b) d)	country rocks. hypabyssal extrusive	
;   	Ansv a) b) c) d) e)	wer any four of t Difference betwe Define Differentia Essential minera What is Labile re What is hybrid ro	en lava and magma. ation. Is in Basalt rock. gion?			08

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Classification of igneous rocks based on mode of occurrence.</li> <li>b) Describe columnar joints.</li> <li>c) Explain any two igneous textures.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Formation of Vesicular Structure.</li> <li>b) Explain Bowens continuous reaction series.</li> <li>c) Describe Extrusive igneous rocks.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain crystallization of Unicomponent and Bicomponent magma.</li> <li>b) Explain concordant igneous intrusion in unfolded region.</li> </ul>	08

					,	SLR-GA-	80
Seat No.	t					Set	Р
I	B.S	·	MICROBIOL	OGY (Pa	mination: March/ aper - VI) enetics (22221315)	-	
•		ate: Thursday, 09-0 :00 PM To 05:00 P				Max. Marks	: 40
Instr	ucti	<ul><li>3) Draw neat</li><li>4) Use of loga</li></ul>	the right indicate diagrams and g arithmic table ar	e full mark ive equati nd calculat	ons wherever necessa	ıry.	
Q.1		I <b>ltiple Choice Que</b> Molecular scissor a) restriction e c) ligase	is	b) d)	helicase exonuclease		08
	2)	, 3	n	mproving b)	genotype is called tissue culture genetic engineering	<del>-</del>	
	3)	Genetic code is _ a) overlapping c) non univers	<u> </u>	b) d)	non-overlapping ambiguous		
	4)	Nonsense codons a) mRNA c) rRNA	s are present on	b) d)	tRNA None of these		
	5)	The RNA molecu a) tRNA c) rRNA	le that contains	thymine is b) d)	mRNA All of the above		
	6)	Recombinant DN a) biotechnolo c) genetic eng	gy	also called b) d)	modern biotechnolog	-	
	7)	Reverse transcrip a) DNA from F c) RNA from F	RNA	b)	or synthesis of DNA from DNA RNA from DNA		
	8)	The anticodons a a) mRNA c) rRNA	re present on _		ecules. tRNA None of these		

# Q.2 Answer any Four of the following. a) Explain Codons. b) Define Genotype. c) What is mutation? d) Define Intron and exon. e) Define muton and recon.

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Write a short note on Plasmid.</li> <li>b) Write a short on base pair substitution.</li> <li>c) Describe Griffith experiment.</li> </ul>	80
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Semiconservative method of DNA replication</li> <li>b) Basic concept of transcription and translation</li> <li>c) Mechanism of Induced mutation</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Describe Genetic code and properties of genetic code.</li> <li>b) Explain in details on replication of DNA.</li> </ul>	80

				7		_	
Seat No.						Set	Р
E	3.S	c. (S		III) (Old) (CBC CHEMISTR Organic Chem	Y (Pap	•	
			ednesday, 24 1 To 02:00 Pl			Max. Marks:	40
Instru	uctio	3	2) Figures to 3) Draw neat 4) Use of loga	ns are compulsory the right indicate to diagrams and giv arithmic table and H=1, C=12, O=16,	full mar e equat calcula	ions wherever necessary. tor is allowed.	
Q.1		Ethyl a)	Formaldehy	n oxidation with H	b)	Glycolic acid	80
	2)	Benz a)	Oxalic acid yl alcohol is Aldol Perkin	obtained by	,		
	3)		mson's synt Aldehydes Ethers	hesis is used to p		Ketones Epoxides	
	4)		Diethyl ethe			gives Methoxy ethane None of these	
	5)	a)	h of the follo <sup>r</sup> Citric Phthalic	wing is an unsatu	b)	cid? Acrylic Chloroacetic	
	6)	a)	azotization re Sodium nitra Ammonium	ate	b)	amine is reacted with dil. HCl and Silver nitrate Sodium nitrite	_
	7)	a)	and S nomer Atomic weig Atomic num	ght	b)	ity order is based on Electronegativity Mass number	
	8)	a)		ransitions	b)	lecule leads to Vibrational changes All of these	
Q.2	a) b) c) d)	Explain Write What Write Write	ain E and Z of uses of glyon is difference one method uses of acry	e between aldehyd d of preparation of ylic acid.	de and trichlor	e. ketone? Write one example of each.	80

#### Q.3 Write short notes on any Two of the following.

08

- a) Gattermann synthesis and Kolbe reaction of phenol.
- **b)** Perkin reaction with mechanism
- c) Synthesis of congo red

#### Q.4 Answer any Two of the following.

08

- a) Explain pinacol- pinacolone rearrangement.
- b) What is the action of acetic anhydride and HI on citric acid?
- c) In Zeisel's method,  $0.226 \times 10^{-3}$  kg of an organic compound (Mol. Wt. 339 gm) gave  $0.626 \times 10^{-3}$  kg of silver iodide. Calculate percentage and number of -OCH<sub>3</sub> groups present in the organic compound.

#### Q.5 Answer any One of the following

- **a)** Define the terms chromophores, auxochromes, bathochromic shift and hypsochromic shift with example.
- **b)** Describe conformational analysis of n-butane with the help of energy profile diagram.

		32.1 371	<b>-</b>
Seat		Set	P
No.			
	`	III) (Old) (CBCS) Examination: March/April-2024 DMPUTER SCIENCE (Paper – V)	
		Data Structure (19201307)	

	B.S	ic. (S	COMPUTER	SCIENC	xamination: Marcn/Aprii-20 E (Paper – V) 19201307)	J24
•			ednesday, 24-04-2024 // To 05:00 PM	•	•	Marks: 40
Instr	uctio	2	1) All questions are compo 2) Figures to the right indi 3) Draw neat labelled diag 4) Use of log table and ca	cate full m grams mus	st be drawn wherever necessary.	
Q.1		Linke a)	the correct alternative. ed list is considered as an Dynamic Compile time	b)	of type of memory allocati Static Heap	<b>08</b> on.
	2)	thou	ch among the following da gh the current number of Simple Queue Stack	elements i b)	re may give overflow error, even in it, is less than its size? Circular Queue None of the above	
	3)		ch of the following sorting Quick sort Shell sort	-	es is the slowest? Heap sort Bubble sort	
	4)		balance factor of a node i addition of heights of lef height of right subtree m height of left subtree mir height of right subtree m	t and right ninus heigh nus height	nt of left subtree	
	5)	The a) c)	in order traversal of tree v Binary trees Heaps	b)	sorted listing of elements of tree Binary search trees None of above	in
	6)	a) b)	dummy header in linked li First record of the actua Last record of the actual Pointer to the last record None of the above	l data l data		
	7)		eue data-structure can be expression parsing resource allocation	b)	recursion all of the above	
	8)	If even be _ a) c)	ery node u in G is adjacer  isolated finite	nt to every b) d)	other node v in G, A graph is sai complete strongly connected	d to

		SLR-GA-82
Q.2	<ul> <li>Answer any Four of the following.</li> <li>a) Define dequeue.</li> <li>b) What is Binary tree? List out various</li> <li>c) What is push and pop in stack?</li> <li>d) What is postfix expression A + (B / Ce) What is doubly linked list?</li> <li>f) What is binary tree?</li> </ul>	· ·
Q.3	<ul><li>Write short notes on any Two of the fo</li><li>a) stack as ADT.</li><li>b) Bubble Sort technique.</li><li>c) Explain depth first search of a graph.</li></ul>	llowing. 08
Q.4	<ul><li>Answer any Two of the following.</li><li>a) What is binary search Tree? Explain</li><li>b) Write a program of Insertion sort.</li><li>c) What is linked list? Explain various ty</li></ul>	

Q.5 Answer any One of the following.
a) Write a program for dynamic implementation of Queue.
b) Write program of Adjacency matrix of a graph.

	1								
Seat No.								Set	P
I	B.Sc	c. (S		III) (OId) (CI CHEMIST organic Ch	ΓRY (Pap	е	er – VI)	rch/April-2024	
•			ursday, 25-0 1 To 02:00 PI		-	-	•	Max. Marks	s: 40
Instru	ıctio	2	2) Figures to t	ns are compuls the right indica labelled diagra	ate full mar		s. equations wher	ever necessary.	
Q.1	Cho 1)	Geo		I <b>lternatives fr</b> nerism is also	called as _		ions. isomerism.		80
		c)	optical		d)		structural		
	2)	a)	interaction of nonpolar covalent	f hard acid wit	h hard bas b) d)		can formionic coordinate cova	•	
	3)	The	purple colou	r of KMnCO4 i	s due to				
	-,	a)	charge trans d-f transition	sfer	b)		 d-d transition charge transfer		
	4)	a)	ng the forma one two	tion of metal c	chelate, DN b) d)		can form three four	_ heterocyclic ring	
	5)	a) c)	Ag <sup>+</sup>	st Lewis acid.	b) d)		Fe <sup>+</sup> Cd <sup>+</sup>		
	6)	Coo	rdination sph	ere includes _	<u> </u>				
		a) c)	metal ion nonmetals		b) d)		ligand metal and ligan	ds	
	7)	a)			mployed to b) d)		determine oxidation state complex format	_	
	8)		lating agents three one	possess at le	east b) d)		onor groups. two four		
	Ans a) b) c) d) e)	Why Give Defi Cr a Give	d-block elent any four lim ne the term lind nd Cu show it demerits of	irregular elect Lewis concep	ed transitio T. ne structure ronic confi ts.	e d gu	of [Ni(DMG) <sub>2</sub> ].		08

Q.3	Write short n	otes on any	two of the following.	08
	\ <b></b>		4	

- a) EDTA as a chelating agent.
- **b)** Pearson's principle.
- **c)** Comparison of first transition series with second and third transition series w.r.t. their reactivity and magnetic behavior

#### Q.4 Answers any two of the following.

08

- a) Distinguish between double salts and complex salts.
- b) Explain the position of d-block elements in periodic table.
- c) What is EAN? Calculate it for Fe in K<sub>4</sub> [Fe(CN)<sub>6</sub>] and K<sub>3</sub>[Fe(CN)<sub>6</sub>]

#### Q.5 Answers any one of the following.

- a) What do you mean by oxidation number? Explain the oxidation states of first transition series.
- **b)** On the basis of VBT, explain formation [Ni(CN)<sub>6</sub>]<sup>2-</sup>.Comment on nature of bonding, hybridization and magnetic behaviour.

Seat	Sat	D
No.	Set	

	B.Sc	. (Semester - III) (Old) (CBCS) Examination: March/April-2024 COMPUTER SCIENCE (Paper–VI)	
		Design Analysis and Algorithm (19201308)	
		: Thursday, 25-04-2024 Max. Marks: PM To 05:00 PM	40
Instr	uctior	<b>s:</b> 1) All questions are compulsory. 2) Figures to the right indicate full marks.	
Q.1	Multi 1)	ple choice questions.  What is the worst case complexity of bubble sort?  a) O(nlogn) b) O(logn)  c) O(n) d) O(n²)	80
	2)	Dijkstra's Algorithm is used to solve problems. a) All pair shortest path b) Single source shortest path c) Network flow d) Sorting	
	3)	Which of the following is false in the case of a spanning tree of a graph G?  a) It is tree that spans G  b) It is a subgraph of the G  c) It includes every vertex of the G  d) It can be either cyclic or acyclic	
	4)	Kruskal's algorithm is a  a) divide and conquer algorithm b) dynamic programming algorithm c) greedy algorithm d) approximation algorithm	
	5)	What approach is being followed in Floyd Warshall Algorithm?  a) Greedy technique b) Dynamic Programming c) Linear Programming d) Backtracking	
	6)	Master's theorem is used for?  a) solving recurrences b) solving iterative relations c) analysing loops d) calculating the time complexity of any code	
	7)	Which type of graph has all the vertex of the first set connected to all the vertex of the second set?  a) Bipartite b) Complete Bipartite c) Cartesian d) Pie	
	8)	In Huffman coding, data in a tree always occur?  a) roots b) leaves c) left sub trees d) right sub trees	
Q.2	a) b) c)	Wer any four of the following.  What are the characteristics of an algorithm?  What is Time Complexity and space complexity?  What is Exhaustive search?  What are applications of greedy algorithm?	80

- What Amortized Analysis of algorithm? What is Dynamic Programming? e)
- f)

#### Q.3 Write short notes on any Two of the following.

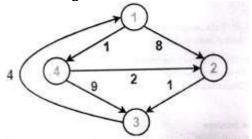
80

- a) Analyzing control statement.
- **b)** Minimum spanning tree.
- c) Prim's algorithm.

#### Q.4 Answer the any two of the following.

80

- a) Explain Brute force approach with its advantages and disadvantages.
- **b)** Explain Properties of Asymptotic Notations.
- c) Find the shortest path distance between every pair of vertices for following graph Using Floyd Warshall Algorithm



#### Q.5 Answer any one of the following.

80

- a) What is dynamic programing? How does dynamic programming work? Explain approaches of dynamic programming.
- **b)** Consider the problem having weights and profits are:

Objects: 1 2 3 4 5 6 7 Profits (P): 5 10 15 7 8 9 4 Weight (w) 1 3 5 4 1 3 2

The weight of the knapsack is 15 kg

The number of items is 7

The above problem can be solved by using the 0/1 knapsack problem method.

Seat	Sat	D
No.	Set	

# B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024

				YSICS (Pa sics and S	•	- V) nd (19201323)	
•			day, 26-04-2024 To 02:00 PM			Max. Mark	(s: 40
Instr	uctio	2 3	) All questions are com ) Figures to the right in ) Neat diagrams must ) Use of log tables and	ndicates full ı be drawn wh	nerev	er necessary.	
Q.1	Sel		rrect alternatives:				08
	1)		gradient of scalar func minimum slow		_ rate b) d)	of change of function in space. maximum constant	
	2)	In ge a) b) c) d)	eneral, the motion of gy Rotation, Precession Rotation & Precessio Rotation only only Precession	& Nutation	nsists	s of	
	3)	The a) c)	rise and fall of axis of r Precession Rotation		rotati b) d)	ng body is called Nutation Vibration	
	4)	Benda) b) c) d)	ding moment of the beat Directly proportional to Inversely proportional Directly proportional to Inversely proportional	to modulus on to radius of to radius of	f curv curva	vature ture	
	5)	torqu a)	relation between magr $ au_1 =  au_2 -  au_3$ $ au_1 =  au_2 -  au_3$ $ au_1 =  au_3 -  au_2$	torque $( au_3)$ is	b)	sional torque $( au_1)$ gravitational $\overline{ au_1} =  au_2 +  au_3 \  au_2 =  au_1 -  au_3$	
	6)	If he be _ a) c)	ight of liquid in rotation  decreased Same		is ind b) d)	creased, the rotation torque will increased no affected	
	7)	Sear a) c)	l's viscometer used to low viscous liquid any liquid		ne vis b) d)	scosities of highly viscous liquid all of these	
	8)	Deca a) c)	ay of sound energy in h Linear Constant		b) d)	Exponential Zero	

SLR-GA-8
----------

Q.2	Ans	swer any FOUR the following.	08
	a)	What is Precession?	
	b)	What is cantilever?	
	c)	Define Bending moment.	
	d)	What are the applications of Oswald's viscometer?	
	e)	What is scalar triple product?	
	f)	What is reverberation?	
Q.3	Wri	ite short notes on any TWO of the following.	08
	a)	Explain vector triple product.	
	b)	Write a note on Gyroscope.	

#### Q.4 Answer any TWO of the following.

c) What are the requirements of good acoustics?

80

- a) Explain the rotating cylinder method of determining the coefficient of viscosity?
- b) Explain Sabine's experimental work and obtain expression for reverberation time.
- c) Derive the expression of Young's modulus of wire by Searl's method.

#### Q.5 Answer any ONE of the following.

- a) Obtain an expression for angle of lean of the disc and radius of curvature of the path for rolling disc.
- **b)** Define divergence of vector field and give physical significance of divergence of vector.

Seat No.	Set	Р
B.Sc. (Semester -	III) (Old) (CBCS) Examination: March/April-2024	

	<b>D</b> .30	). (U	BIO-CHEMISTE	RY (P	- · · · · · · · · · · · · · · · · · · ·	
Day 8	& Date	e: Fric	Biomolecules day, 26-04-2024	(1920	Max. Marks:	40
Time	: 03:00	Mq C	To 05:00 PM			
Instr	uctior	2)	All questions are compulsory.  Draw neat diagrams and give ed Figures to the right indicate full r			
Q.1	Multi	iple c	hoice questions:			80
	1)		A's structure similar to clover leaf		<del></del> :	
		a) c)	tRNA rRNA	b) d)	mRNA aRNA	
	2)	The	degree of unsaturation of lipids is			
		a)	lodine number	b)	Saponification number	
		c)	Acetyl number	d)	Acid number	
	3)		ıre of an enzyme is		V	
		a) c)	Lipid Carbohydrate	b) d)	Vitamin Protein	
	4	C)	•	,	Totom	
	4)	<del>a</del> )	is a component of the coenzym Retinol	ne A? b)	Retinoic acid	
		c)	Pyridoxine	d)	Pantothenic acid	
	5)	,	simplest amino acid is	/		
	٥,	a)		 b)	Alanine	
		c)	Asparagine	ď)	Tyrosine	
	6)	Beta	a-oxidation of fatty acids occurs ir	1		
	,	a)	Peroxisome	b)	Peroxisome and mitochondria	
		c)	Mitochondria	d)	Kidney	
	7)	Anti	codon is present in			
		a)	DNA	b)	tRNA	
		c)	rRNA	d)	mRNA	
	8)		soluble vitamin is			
		a)	Vitamin B12	q)	Vitamin C	
		c)	Vitamin B12	d)	Vitamin K	
Q.2	Ansv	ver a	ny four of the following.			08
	a)	Write	the structure of carotene.			
	,		is biochemical role of riboflavin?	1		
	-		t are functions of fatty acid?	anda	dihydroxy acetone	
	-		the structures of glyceraldehyde tare vitamins? Write examples.	anu (	літучтоху асетопе.	
	•		t is phosphodiester linkage?			

SL	R-C	A:	86
----	-----	----	----

			<b>02</b> 11 <b>0</b> 71 <b>0</b> 0
Q.3	Wri	ite short notes on any two of the following.	08
	a)	Write note on tertiary & quaternary structure of proteins.	
	b)	Write the structure and role of Starch.	
	c)	Write note on Structure and function of r-RNA.	
	•		

#### Q.4 Answer any two of the following.

08

- a) Write classification of lipids.
- b) Explain Watson-Crick model of DNA.
- c) Write the sources and biochemical role of retinol.

#### Q.5 Answer any one of the following.

- a) What is oligosaccharides? Write structure and role of maltose, isomaltose and sucrose.
- **b)** Write physical properties and chemical properties of amino acids and ninhydrin reaction of amino acids.

Seat No.	1				Set	P
N		PL	ANT PROTECTI	ON	mination: March/April-2024 (Paper – I) Plant Protection (19201325)	
Day 8	k Da	te: Friday, 26-04-202 00 PM To 05:00 PM	•		Max. Marks	s: 40
Instru	uctio	3) Figures to the 4) Use of a loga		nark: alcula	ator is allowed.	
Q.1	Mul 1) 2)	Itiple choice question Jowar belongs to fation a) Liliaceae c) Solanaceae Soya milk is obtaine	mily	b) d)	Graminae Capparidiaceae	08
	<b>2</b> )	a) Ground nut c) Goat	eu 110111	b) d)	Tur Soyabean	
	3)	is a major s a) Brinjal c) Sugarcane	source of protein.	b) d)	Cotton Tur	
	4)	Sugarcane belongs a) Solanaceae c) Malvaceae	to family	b) d)	Graminae Mimosaceae	
	5)	Rose flowers are us a) Gulan jal c) Pakoda	sed to prepare	b) d)	Jam jelly	
	6)	After ploughing, sur a) Soil solarization c) Soil mixing			e known as Salinity None of these	
	7)	Chemicals are used a) Bactericides c) Fungicides	d to check insects ar	re kn b) d)	own as Insecticides Nematicides	
	8)	organisms a a) Aspergillus ni c) Fusarium oxy	_	b)	<del>-</del>	
Q.2	a) b) c) d)	wer any Four of the Define Biofertilizer. What is crop rotation What is shaking of pure What is crop draggion Why the need of so What is crop hygien	n? plants? ng? il solarization.			08

Q.3	Wr	ite short notes on any Two of the following.	08
	a)	Role of organic farming in agriculture.	

- b) Nematicides
- c) Resistant varieties.

#### Q.4 Answer any Two of the following.

08

- a) Write on tagging.
- b) Explain in brief-biological control of insect pests.
- c) Describe physical methods of plant protection.

#### Q.5 Answer any One of the following.

- **a)** Give the crop identification, soil type, tillage, seed rate & spacing, intercultural operation, fertilizers, irrigation, intercropping, yield & economic importance of Jawar.
- **b)** Give the crop identification, soil type, tillage, seed rate & spacing, intercultural operation, fertilizers, irrigation, intercropping, yield & economic importance of soyabean.

					<b>02</b> 11 <b>0</b> 71			
Seat No.					Set	P		
ı	B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 PHYSICS (Paper - VI) Electronics (19201324)							
	Day & Date: Saturday, 27-04-2024 Max. Marks: 40 Time: 12:00 PM To 02:00 PM							
Instru		2) Figures 3) Draw ne	ions are compulsor to the right indicate at diagrams and giv ogarithmic table and	full mark /e equati	ons wherever necessary.			
	1) The	_		•	amplifier is less than the product	08		
	,	power los the use o	ss f transistors	b) d)	loading effect of second stage the use many capacitors			
	the a)	•	al input signals are a se then, output is	applied to  b) d)	differential amplifier which are in doubled high			
		Positive	mploys feed	b)	negative data insufficient			
	a)	FET there Three Five	e are pn junct		he sides. Four two			
	a)	200	used for CRT is abo	b)	_ volts. 180			
	-	360 nd regulation voltage regul line regul	•	d)  b)	input regulation source regulation			
	•	electron (	gun	produce b) d)	a focused beam is  deflecting system fluorescent screen			

The inner surface of CRT is coated with \_\_\_\_\_ Material.

b) phosphor d) carbon

a) Zinc c) Fluorescent

SLR-GA-8	38	E
----------	----	---

Q.2	Ans	swers the following. (Any Four)	80
	a)	Draw the diagram of CRT.	
	b)	State limitations of the transistor series power supply.	
	c)	Write a note on Zener voltage regulator.	
	•	Define FET parameters.	
	d)	·	
	e)	What is Barkhausen criterion for oscillations?	
	f)	Explain construction and working of colpitts oscillator.	
Q.3	Wri	te short notes (Any Two)	08
	a)	Explain crystal oscillator with neat diagram.	
	b)	Explain the working of the phase shift oscillator. State its advantages.	
		, , ,	
	c)	Explain the construction and working of dual power supply.	
Q.4	Ans	swers the following. (Any Two)	08
	a)	Explain regulated power supply with block diagram. Explain its need.	
	b)	Explain the principal and operation of the Hanley oscillator.	
	•	Draw' the block diagram of the CRO and explain the function of each block.	
	c)	Draw the block diagram of the CNO and explain the function of each block.	
Q.5	Ans	swers the following. (Any One)	08
•	a)	Explain the construction, operation and characteristics of the unijunction	
	<b>.</b> ,	transistor (UJT).	
	h)	Explain transistor RC coupled amplifier with special reference to frequency	
	b)		
		response, advantage, disadvantage and applications.	

						SLR-G	Α-	89
Seat No.						S	et	P
I	B.S	c. (Semest	BIO-CF	<b>IEMISTRY</b>	(Pa	mination: March/April-202 aper – II) s (19201304)	24	
		te: Saturday, 00 PM To 05				Max. Ma	arks	: 40
Instru	uctic	2) Draw	estions are cor neat diagrams es to the right i	and give eq		ons wherever necessary.		
Q.1	Mul 1)	tiple choice The technice technique. a) northe	ue used for blo		b)	teins is called blotting western eastern		80
	2)	For monitor is used as a	ing the migration a marker dye. Diphthalein	on of protein	in s b)	starch gel electrophoresis bromophenol blue methyl orange	-	
	3)	a) Bene	protein assay, dict's reagent /lene blue		b)	l in the experiment. Coomassie brilliant blue Ethidium bromide		
	4)	a) absor			b)	coated prism is used to provide radiations split radiations		
	5)	In polymera reaction ten a) therm c) ELISA	nperature. al cycle	ŀ	o)	ately and rapidly changes the electro blotter petri plate		
	6)	,	noresis, DNA w		•	•		

The ester value is the number of milligrams of potassium hydroxide

In spectrophotometer \_\_\_\_ converts light signals into electrical signals.

b) 1 mg

d) 1 liter

b) mercury lamp

d) galvanometer

required to saponify the esters present in \_\_\_\_\_ of the substance.

anode or negative electrode cathode or negative electrode d)

c)

a)

c)

c)

1 gm

1 kg

Photocell

diagonal mirror

7)

8)

b) anode or positive electrode

cathode or positive electrode

		SLR-GA	<b>\-89</b>
Q.2	Ans a) b) c) d) e) f)	wer any four of the following. Write two applications of TLC. Define transmission and absorbance. Write two advantages of HPLC. What is Bradford assay? Define saponification value and ester value. Write two significances of monoclonal antibodies.	08
Q.3	Write a) b) c)	te short notes on any two of the following.  Describe the construction of photoelectric colorimeter.  Write note on mechanism of separation in HPLC.  Write note on 2 D electrophoresis.	08
Q.4	a)	wer any Two of the following. Write note on southern blotting. Explain iodine number method for lipids. Explain the technique of PCR.	80
Q.5	Ans a)	wer any one of the following.  What is chromatography? Explain principle, technique and applications of TLC.	08
	b)	Define electrophoresis and write principle technique and applications of agarose gel electrophoresis.	

			5LR-GA-90
Seat No.	t		Set P
	•	 - III) (Old) (CBCS) Exa PLANT PROTECTION seases and Their Man	•
-	& Date: Saturday, 27 : 03:00 PM To 05:00		Max. Marks: 40
Instr	2) Draw ne	ions are compulsory. at diagram wherever neces to the right indicate full mai	•
Q.1		,	_
	a) Pathogen c) Host	se causal organism. b) d)	•
	a) is the notation a) Bacteria c) Soil	on-infectious disease facto b) d)	Virus
	<ul><li>4) A sooty or char</li><li>a) Rust</li><li>c) Scab</li></ul>	rcoal- like powdery mass is b) d)	Smut
	<ul><li>disease</li><li>a) Infectious</li><li>c) Chlorosis</li></ul>	is classified on the basis of b)	Non- infectious
	6) Arka Anamika a) Citrus c) Bhendi	is the resistant variety of _ b) d)	
	<ul><li>7) postulat</li><li>a) Alexande</li><li>c) Koch's</li></ul>	•	ed for isolation of plant pathogen. L. Hook None of these
		,	Protection & Resistance
Q.2	Answer any Four of a) Diseases	of the following.	08

**b)** Infection

c) Write the causal organism of Rust of Soybean.

d) Mention any two symptoms of bacterial disease of citrus plant.
e) Mention factors affecting to infection.
f) Write the host plant of smut.

Page 1 of 2

Q.3	<ul> <li>Answer any Two of the following.</li> <li>a) Control measures of Downy mildew of Grapes.</li> <li>b) Kotch 's Postulates</li> <li>c) Methods of inoculation</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Give an account on classification of plant diseases.</li> <li>b) Write on Assessment of diseases in crop plant.</li> <li>c) Describe the Little leaf of Brinjal.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Describe in details about Grain smut of jawar.</li> <li>b) Write the Principles of plant disease management.</li> </ul>	08

				SLR-GA-91			
Seat No.	t			Set P			
	B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 STATISTICS (Paper - V) Probability Distributions - I (19201329)						
•		e: Monday, 29-04-2 00 PM To 02:00 PM		Max. Marks: 40			
Instr	uctio		s are compulsory. ne right indicate full mar llator is allowed.	ks.			
Q.1	2) 3) 4)	If $X$ is a Poisson variate is a) 3 c) 7  If $X \sim Geo(p)$ , then a) $q^3$ c) $pq^3$ If $X_1, X_2, \dots, X_n$ are a) Negative bind c) Geometric  Let a discrete r. v. $n = 10, p = 0.5$ are a) -2 c) -0.2	b) $P[X \ge 3] = \underline{\hspace{1cm}}$ b) $d)$ $e i.i.d G(p) \text{ then distribute}$ $d)$ $(X, Y) \text{ has trinomial distribute}$ $d q = 0.4. \text{ What is Cov}$ $d)$	P[X=4], then the mean of a $A=1$ $B=1$			
	6)	<ul> <li>a) Blood group of a randomly chosen person</li> <li>b) Gender of a newly born baby</li> <li>c) Rainfall (in mm) at a particular place</li> <li>d) Monthly attendance of a randomly chosen student</li> </ul>					
	71	then $E(X) = $ a) $\frac{4}{3}$ c) $\frac{1}{2}$	  				
	7)	If the joint p.d.f. of What is E(Y)? a) 0 c) 1/2	b)	$0 \le x \le 1$ and $0 \le y \le 1$ otherwise 1			

If a continuous r. v. (X,Y) has joint p. d. f. f(x,y) then E(XY) =\_\_\_\_\_. 8)

a) 
$$\left(\sum_{x} x f(x)\right) \left(\sum_{y} y f(y)\right)$$
 b)  $\int \int xy f(x,y) dx dy$ 

b) 
$$\iint xy f(x,y)dx dy$$

- c)  $\left(\int x f(x)dx\right)\left(\int y f(y)dy\right)$  d) both (b) and (c) are true
- Answer any four of the following. Q.2

80

- Define Geometric distribution.
- State mean and variance of negative binomial distribution. b)
- Define expectation of random variable X. c)
- Define Marginal density function of X.
- Define Conditional expectation.
- Write short notes on any two of the following. **Q.3**

08

- Find mean and variance of Poisson distribution.
- b) The proportion of cloud cover at a particular meteorological office is given by the p.d.f.

$$f(x) = 12x(1-x)^2$$
;  $0 < x < 1$   
= 0; othewise

Find Mean and variance.

- State and prove addition theorem of expectation. c)
- Answer any two of the following.

08

- State and prove memory less property of geometric distribution.
- The random variable *X* has the probability density function.

$$f(x) = \begin{cases} ax + bx^2 & \text{; } 0 \le x \le 1\\ 0 & \text{; othewise} \end{cases}$$

If E(X) = 0.6, find a and b.

Let (X, Y) have the joint density function. c)

$$f(x,y) = \begin{cases} \frac{2}{3} & \text{; } 0 < x < 1, \ x < y < 2\\ 0 & \text{; otherwise} \end{cases}$$

Verify whether X and Y are independent.

**Q.5** Answer any one of the following.

08

The random variable *X* has probability density function defined by

$$f(x) = \begin{cases} \frac{1}{2} & ; 0 \le x \le 1\\ \frac{1}{18} (x - 4)^2 & ; 1 \le x \le 4\\ 0 & ; \text{ otherwise} \end{cases}$$

- 1) Find the distribution function of x hence find the value of median.
- 2) Determine  $P(2 \le X \le 3)$
- Let X and Y be bivariate random variables having joint density function b)

$$f(x,y) = \begin{cases} \frac{3}{5}x(x+y) & \text{if } 0 \le x \le 1, \ 0 \le y \le 2\\ 0 & \text{otherwise} \end{cases}$$

Find

- 1) E(X) 2) E(Y) 3) E(X + Y) 4) E(XY)

Seat No.							Se	∍t	P
I	B.Sc.	(Semester -	METEO	(CBCS) E ROLOGY itology (1	(P	• /	April-202	4	
-		Monday, 29-04 PM To 05:00 P	-2024	337 (		· ,	Max. Ma	rks:	40
Instru	uctions	s: 1) All questio 2) Draw neat 3) Figures to 4) Use of log	diagrams a the right in	and give equi dicate full m	nark		ary.		
Q.1	<b>1)</b> A	a) front	alternative mmense b	ody of air.	b)	air mass			80
	2) _	c) frontolysis Winds ar a) Local c) Regional	e called as	primary circ		humidity tion. Seasonal Planetary			
	3) 0	zone occupies and occupies occupied occupies occ	% g	jaseous in tl	,	•			
		ne coriolis force a) strongest c) strong	is			s. weak absent			
		Latitudes a) 10 <sup>0</sup> to 20 <sup>0</sup> c) 20 <sup>0</sup> to 30 <sup>0</sup>	called as I		b)	15 <sup>0</sup> to 25 <sup>0</sup> 25 <sup>0</sup> to 35 <sup>0</sup>			
		ne line of equal a) isotherm c) isohaline	surface pre	essure of atı		phere is called as isohytes isobar	·		
	•	/phoon cyclone a) Japan c) Australia	exists in _		b) d)	China USA			
	•	amil Nadu recei a) monsoon c) seasonal	ves rainfall	during wint	er d b) d)	ue to advancing monsoon retreat monsoon			
Q.2	<ul><li>a) W</li><li>b) Ty</li><li>c) R</li><li>d) D</li><li>e) E</li></ul>	er any Four of that is mean by the pes of air mass egional climatologo ements of weat efine monsoon.	general cir ses. ogy? y?	_					08

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Composition of the atmosphere.</li> <li>b) Explain branches of Climatology.</li> <li>c) Sources region of air masses.</li> </ul>	90
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain the life cycle of cyclone.</li> <li>b) Discuss on Climatic records and statistics.</li> <li>c) Discuss on upper air circulation pattern.</li> </ul>	30
Q.5	<ul><li>Answer any One of the following.</li><li>a) Explain the planetary wind system.</li><li>b) Give an account of North eastern monsoon in India.</li></ul>	30

Seat No.							Set	Р
i	B.Sc			GEO - CHE	MISTRY	' (F	mination: March/April-2024 Paper – I) stry (19201313)	
-		e: Monday 0 PM To 0					Max. Marks	: 40
Instru	ıctio	2) Dra	w neat	s are compul diagrams and he right indica	give equ		ons wherever necessary. s.	
	Cho 1)	Co-ordina a) coo	ation nur rdinatio	Ilternative and the mber is a chain compound	racteristic k	of	coordination entity	80
	2)	,	•		nen degre l	d) e c o) d)		
	3)	,	dination	number for C	sCl struc	,	e is 6	
	4)	The compa) 1 c) 3	oonents	of a colloidal	k		2	
	5)	a) gra		fect phase rul orce	k	) )	concentration electrical force	
	6)	a) non	cles bel -colloids orphous		k	) d)	colloids crystalline particles	
	7)	a) vap	ee phas our poir ectic poi		k	)	sublimation point triple point	
	8)	•	imum	total Gibb's f	k	gy f b) d)	or all phases is maximum zero	
	Ans a) b) c) d) e)	What is control what is more what is more two White two Which factors.	oordinate nolecula neant by electric ctors affe	ne following. tion number? r formula? r atomic radii al properties ect the phase les of colloids	Write cood in a crystate of colloids diagram	al? s.	nation number for NaCl.	08

Q.3	Wri	te short notes on any two of the following.	08
	a)	Write note on clay minerals as colloids.	
	b)	Explain silica as chemical-sediment.	
	c)	Explain one component (water and sulphur) system.	
Q.4	Ans	swer any Two of the following.	08
	a)	Explain Gibbs phase rule.	
	b)	Explain general rules of the three dimensional structure with the help of	
	•	solid geometry.	
	c)	Explain empirical formula of organic compound.	
Q.5	Ans	swer any one of the following.	08
	a)	What is radius ratio? Explain structure of Zinc Sulphide, Cesium Chloride.	
	b)	What is homologous series and describe general characteristics of organic	
		compounds.	

Seat No.				Set	P
E	3.S	ŽC	d) (CBCS) Exa OCLOGY (Pape Il Biology (192	•	
		te: Monday, 29-04-2024 00 PM To 05:00 PM		Max. Marks	: 40
Instru	ctic	ons: 1) All questions are one of 2) Draw neat diagrant 3) Figures to the right 4) Use of logarithmic	ns and give equat t indicate full mar		
•	Cho 1)	Prokaryote is a c a) single c) triple		double none of these	80
;	2)	is Microorganism a) Bacteria c) Viroid	-	f single Prokaryotic cells. Virus None of these	
;	3)	In Bacterial cell, the general (a) Nucleoid (b) Plasma membrane	b)	d in Nucleus None of these	
•	4)	Human Genetic diseases a) Lysosomal disease c) Viral disease	b)	 Mitochondria disease None of these	
ļ.	5)	Cell division of body cells a) Mitosis c) Blastula	called as b) d)	Meiosis None	
(	6)	The Microscopic Infection organisms called as a) Virus c) Bacteria		cate on inside of living cells of Fungus None of these	
•	7)	Microtubules are found in a) Eukaryotype cell c) Plasma membrane	b)	, , , , , , , , , , , , , , , , , , ,	
;	8)	Cell organelle ca a) Mitochondria c) Endoplasmic Retic	,	Lysosome	
;   	Ans a) b) c) d) e)	swer any Four of the foll Plasma Membrane Structure & Function of M Lysosomes Microfilaments Nuclear Envelope	-		08

		SLR-GA-94
Q.3	<ul><li>Write short notes on any Two of the following.</li><li>a) Cell cycle</li><li>b) Meiosis</li><li>c) Role of Chromatin</li></ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Type of cell Signalling.</li> <li>b) Structure &amp; Function of Nucleus.</li> <li>c) Role of secondary Messengers.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) Give Brief idea of G-Protein.</li><li>b) Describe in detail Cytoskeleton.</li></ul>	08

Seat No.					Set	P			
	B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 STATISTICS (Paper–VI) Statistical Methods (19201330)								
		e: Tuesday, 30-04 0 PM To 02:00 PM			Max. Marks	s: 40			
Instr	uctio			equat	ions wherever necessary. rks.				
Q.1	Cho	ose the correct a	ltornativo:			08			
Q. I	1)		enstant of populat	ion un b) d)	der study is called a parameter an estimate	UO			
	2)	The range of paragraph $-1 to 1$	rtial correlation co	efficie b)	nt lies between 0 to 1				
		c) $-\infty$ to $\infty$		d)	0 <i>to</i> ∞				
	3)	Vital statistics is a) births c) marriages	a branch of biom	b)	nich deals with data and laws of deaths all the above	<u> </u>			
	4)	a) Binomial Dis	stribution	b)	s obtained by the variance of Poisson Distribution Hypergeometric Distribution				
	5)	<ul><li>a) total populate</li><li>b) number of n</li><li>c) total female</li></ul>	ewly homed babi	es					
	6)	The regression $ w  = 0$ c) $ w  > 0$	planes coincide if	b)	w  = 1 none of these				
	7)	The residual $X_{1,2}$ a) 0 c) 2	<sub>34</sub> is called as res	sidual ( b) d)	of order 1 3				
	8)	The collection of is known asa) vital statistic c) census	·	ut each b) d)	and every individual of a country demography none of the above				
Q.2	Anso a) b) c) d)	wer any four of the Define STDR Define defects and Define multiple continue Explain how G.F.	nd defectives. orrelation. R. is superior to (	C.B.R.		80			

80

Q.3	Wr	ite shor	t notes	on any two the following:	08
		_ c.	$\sim$ D D	1000	

- Define C.D.R. and S.D.R. a)
- State and prove any two properties of residuals.
- Compare SRSWR and SRSWOR

#### **Q.4** Answer any two of the following:

- 80 With usual notations prove that,
- $1 R^{2}_{1.23} = (1 r^{2}_{12})(1 r^{2}_{13.2})$
- Show that sample mean is unbiased estimate of population mean in case of b) SRSWOR.
- Explain the criteria of detecting lack of control chart. c)

#### Answer any one of the following

- Derive the equation of the least square plane of regression equation of  $X_1$ on  $X_2$  and  $X_3$ .
- With usual notations, prove that b)  $\operatorname{var}(\bar{y}_n)_{wr} = \frac{n-1}{Nn} S^2$

Seat No.		Set I	P						
	B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024  METEOROLOGY (Paper – II)								
-		<b>General Meteorology (19201322)</b> te: Tuesday, 30-04-2024 Max. Marks: △ 00 PM To 05:00 PM	10						
Instru	ucti	<ul> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic table and calculator is allowed.</li> </ul>							
Q.1	Mu 1)	Meteorology is science of  a) climate b) atmosphere c) environment d) weather	80						
	2)	Which of the following has the highest entropy?  a) Liquid nitrogen  b) Diamond  c) Air  d) Mercury							
	3)	<ul> <li>i) is measure of disorder or randomness of the system.</li> <li>ii) is measure of order of the system.</li> <li>iii) never increases in a closed system such as universe.</li> <li>iv) never decrease in a closed system such as universe.</li> <li>a) i and iii are correct</li> <li>b) i and iv are correct</li> <li>c) ii and iii are correct</li> <li>d) ii and iv are correct</li> </ul>							
	4)	The frame of reference associated with spinning earth is  a) accelerated b) unaccelerated c) steady d) nonrotating							
	5)	Which of the following force occurs in non-inertial frames of reference?  a) Pressure gradient b) Coriolis c) Frictional d) Gravitational							
	6)	The output voltage of single solar cell is about volts.  a) 0.2							
	7)	A solar cell has sensitive junction.  a) light b) heat c) temperature d) moisture							
	8)	Which of the following is the correct expression for work?  a) $W = \vec{F} \cdot \vec{S}$ b) $W = \vec{F} \times \vec{S}$ c) $W = \vec{r} \times \vec{F}$ d) $W = -(\vec{F} \times \vec{S})$							

Q.2	An	swer any Four of the following.	80
	a)	5	
	1. \	reflection.	
	•	Define atmosphere.	
	•	What are effects of depletion of ozone layer?	
	d)	What is pressure gradient force?	
	e)	A typical output of a solar cell is V=0.45 volts and I=15 mA. How much will be its power output in milliwatts?	
	f)	What is anergy in energy technology?	
Q.3	Wr	ite short notes on any Two of the following.	08
	a)	State Buys-Ballots law.	
	b)	Discuss energy demand.	
	c)	What are various forms of energy?	
Q.4	An	swer any Two of the following.	08
	a)	How is an ozone molecule broken and depletion of ozone layer in the stratosphere takes place?	
	b)	Write a note on Ozone in the troposphere.	
	c)	Discuss geostrophic wind.	
Q.5	An	swer any One of the following.	08
	a)	Explain general composition of the Earth's atmosphere.	
	b)	Draw neat diagram of a solar cell. Explain its working.	
	-,		

Seat	Set	D
No.	Set	

# B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 GEO-CHEMISTRY (Paper - II)

	Ir	ntroducti	GEO-CHEMI on to Solar Syste	•	aper - II) ieo-Sphers (19201314)	
•		e: Tuesday D PM To 05	, 30-04-2024 5:00 PM		Max. Ma	rks: 40
Instr	uctior	2) Draw 3) Figui 4) Use	uestions are compuls wheat diagrams and gres to the right indicate of logarithmic table a Wts.: H=1, C=12, O=1	give equati te full mark nd calculat	or is allowed.	
Q.1			e questions.			08
	1)	According	to Clarke and Wash	ington's the	e average amount of oxygen in	
		the crust i a) 46.66 c) 27.72	0	,	32.70 10.25	
	2)	a) Uran	nets revolve around t us and Venus une and Pluto	b)	etrograde rotation? Earth and Mars Mercury and Jupiter	
	3)	a) CI, B	r dissolved constituer r, SO4, F r, SO4, H3BO3	b)	a water is Cl, Br, SO <sub>4</sub> , HCO <sub>3</sub> Cl, Br, SO <sub>4</sub> , Mg	
	4)	decrease a) lowe b) highe c) medi	for elements of the _ r er	atom	show a rapid exponential ic numbers.	
	5)	a) Trop	r limit of the stratosph opause opause	nere is calle b) d)	ed Stratopause Thermopause	
	6)	atmophile a) Gold		siderophile b) d)	chalcophile, lithophile and Clarke (1924) Cameron (1937)	
	7)	a) Olivii	s are consisting primate only ne and/or pyroxene	arily of: b) d)	Pyroxene only Iron and Nickle	
	8)	a) Iron	e of the following aero meteorites y meteorites	olites are? b) d)	Iron-stony meteorites Metallic meteorites	

Q.2	Ans a) b) c) d) e) f)	wer any four of the following: What is the structure of Siderites? What is the average composition of Terrestrial water? Alloys of which metals are found in most of the meteorites? Name the geochemical elements which have the affinity towards sulphides. Names the major constituents of Atmosphere. What is the average composition of Mantle?	08
Q.3	Writa) a) b) c)	te short notes on any two of the following: Atmospheric addition and losses during geologic time. Composition of Sun. Cosmic abundance of elements.	80
Q.4	Ans a) b) c)	wer any two of the following:  Describe the nature of hydrosphere with gains and losses of elements in the oceanic water.  Explain in brief the primary differentiation of the elements.  Discuss the in brief, composition of Meteorites and their types.	08
Q.5	Ans a) b)	wer any one of the following:  Describe in brief the zonal structure of the Earth.  Describe the structure of the atmosphere. Add note on evolution of atmosphere.	80

Seat	Sat	D
No.	Set	<u> </u>

# B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 ZOOLOGY (Paper–VI) Principles of Ecology (19201332)

			Principles of Ecological	•	•	
•			esday, 30-04-2024 To 05:00 PM		Max. Marks:	40
Instr	uctio	2 3 4	) All questions are compulsory. ) Draw neat diagrams and give e ) Figures to the right indicate full ) Use of logarithmic table and ca At. Wts.: H=1, C=12, O=16, N= 1	marl Icula	ks. tor is allowed.	
Q.1	Mult 1)		choice questions is the study of the relationship nans, and their physical environm Ecosystem Ecology		tween living organisms, including  Ecotone  Ecotourism	80
	2)	A. (c) a) c)	G. Transley coined the term Ecosystem Ecology	_ b) d)	Ecotone Ecotourism	
	3)	a) c)		•	unit area of people per unit of time. Population Mortality	
	4)		is a graph showing the num riving to each age for a given spe Population density Log table	ecies		
	5)	in w a) c)	is generally defined as a relat hich one organism is benefitted a Predation Commensalism		nip between the two living species e expense of the other. Parasitism Mutualism	
	6)	obta	lationship between individuals of ains food or other benefits from the efiting the latter is called Commensalism Predation		•	
	7)	Gra a) c)	ss → deer → tiger is an example Food web Food cycle	of b) d)	<del></del>	
	8)	vuln a) c)	is a geographic region that is erable because of destruction.  Hot spots  Sanctuary	a res b) d)		

Q.2	<ul> <li>Answer any four of the following.</li> <li>a) Difference between autecology and synecology</li> <li>b) Define ecosystem.</li> <li>c) Characteristics of lotic ecosystem.</li> <li>d) Example of food chain in grassland ecosystem.</li> <li>e) Define Sacred grooves.</li> <li>f) Ecological Pyramid.</li> </ul>	
Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Give an account on life table.</li> <li>b) Describe marine ecosystem.</li> <li>c) Explain causes of loss of biodiversity.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Define mortality? Give an account on mortality.</li> <li>b) Define mutualism? Explain mutualism with suita</li> <li>c) Describe desert ecosystem.</li> </ul>	<b>0</b> 8 able examples.
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Describe effect of temperature and light on ani</li> <li>b) Describe types of Biodiversity.</li> </ul>	mals.

Seat	
No.	

# Set

# Ρ

#### B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 MATHEMATICS (Paper - V) Differential Calculus (19201319)

Day & Date: Thursday, 02-05-2024

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Q.1 Select the correct alternatives each of the following.

80

I) If 
$$u = x^2$$
,  $v = y^2$  then  $\frac{\partial(u,v)}{\partial(x,y)} = \underline{\hspace{1cm}}$ .

a) 4xy

b) *xy* 

c)  $\frac{1}{xy}$ 

d)  $\frac{1}{4xy}$ 

2) If 
$$u = r^2 \cos(2\theta)$$
,  $v = r^2 \sin(2\theta)$  then  $\frac{\partial(u,v)}{\partial(r,\theta)} = \underline{\hspace{1cm}}$ .

a)  $-4r^3$ 

b)  $4r^{3}$ 

c)  $r^3$ 

d)  $4r^2$ 

3) The maximum value of 
$$f(x) = \sin x + \cos x$$
 is \_\_\_\_\_.

a) √

b) 2

c)  $\sqrt{2}$ 

d)  $\sqrt{3}$ 

4) The function 
$$f(x) = x^x$$
 is minimum for  $x =$ \_\_\_\_\_.

a) e

b)  $e^e$ 

c)  $\frac{1}{e^e}$ 

d) 1/e

**5)** Angle of intersection of curves 
$$r = a \cos \theta \& 2r = a$$
 is \_\_\_\_\_\_.

a)  $\frac{\pi}{2}$ 

b)  $\frac{\pi}{4}$ 

c)  $\pi/3$ 

d)  $\pi$ 

6) The polar subnormal of 
$$r = a/\theta$$
 is \_\_\_\_\_.

a)  $-a/\theta^2$ 

b)  $a/\theta^2$ 

c)  $\theta/a$ 

d)  $a/\theta$ 

7) Radius of curvature of the curve 
$$p^2 = ar$$
 is \_\_\_\_\_.

a)  $p^2/a^2$ 

b)  $\frac{2p^3}{q^2}$ 

c)  $2p_{a^2}$ 

d)  $p^{3}/2q$ 

8) Radius of curvature of the curve 
$$y = x^2$$
 at point  $(\sqrt{2}, 2)$  is \_\_\_\_\_.

a)  $\frac{2}{27}$ 

b)  $\frac{1}{27}$ 

c) Both a & b

d)  $\frac{27}{3}$ 

		OLI COLI	
Q.2	Atte a) b)	mpt any Four of the following.  Define Maximum and Minimum.  Define Jacobian for $J(u, v, w)$ of $\frac{\partial(u, v, w)}{\partial(x, y, z)}$	80
	c) d) e) f)	Define Curvature and Radius of Curvature. Find polar subtangent and subnormal for the curve $r=a(1+\cos\theta)$ Find equation of tangent and normal for $y=f(x)$ . Find the radius of Curvature at any point for $s=c\tan\Psi$ .	
Q.3	Atte a) b) c)	empt any Two of the following. Derive Pedal equation or p.r. equation for the curve $y = f(x)$ . Find Maximum and Minimum value for the function $f(x) = 8x^5 - 15x^4 + 10x^2$ Find Radius of Curvature for the cure $r = a(1 - \cos \theta)$ .	80
Q.4	Atte a)	If $x = r \cdot \cos \theta$ & $y = r \sin \theta$ then show that $\frac{\partial(x,y)}{\partial(r,\theta)} = r$	80
	b)	Explain Length of polar sub-tangent and polar subnormal. Find the radius of Curvature at point $\left(\frac{3a}{2}, \frac{3a}{2}\right)$ for the curve $x^3 + y^3 = 3axy$	
Q.5	Atte	mpt any One of the following.	08

Seat	Sat	D
No.	Set	

	B.Sc	c. (Semester - III) (Old) (CBCS) Examination: March/April-2024 BOTANY (Paper – V) Plant Anatomy (19201301)	
•		e: Thursday, 02-05-2024 Max. Marks: 40 D PM To 05:00 PM	)
Instr	uction	<ul> <li>1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equation wherever necessary.</li> <li>3) Figures to right indicate full marks.</li> <li>4) Use of logarithm table and calculator is allowed.</li> </ul>	
Q.1	Mult	ple choice questions.	3
	1)	The term meristem is derived from Greek word meaning divisible.  a) Meristo	
	2)	Based on origin in the plant, the meristems are classified as  a) Primary b) Secondary meristems c) both a and b d) None of these	
	3)	Histogen theory was proposed byin 1870. a) Hanstein b) Manstein c) Wanstein d) Danstein	
	4)	Simple tissues are made up of type of cells. a) Four b) Five c) Two d) One	
	5)	A complex tissue is made up of than one type of cells. a) Less b) More c) Both a & b d) None of these	
	6)	The root system is the characteristic of monocotyledons.  a) Adventitious b) Tap c) both a and b d) None of these	
	7)	The region inside the is called the stele. a) Epidermis b) Cortex c) Endodermis d) Xylem	
	8)	Increase in girth or thickness due to the activity of cambium is called growth. a) Primary b) Secondary c) both a and b d) None of these	
Q.2	a) b) c) d)	ver any four of the following.  Define tissue.  What is meristem?  Define anatomy.  Write the definition of vascular plant.  What is mean by primary growth?  Define periderm.	3

			SLR-GA-100
Q.3	Wri a)	te short notes on any two of the following Wood types.	08
	b) c)	Apical cell theory. Parenchyma	
Q.4	Ans a) b) c)	Explain the sclerenchyma studied by you.  Describe the xylem complex tissue with suitable diagrams.  Explain the general character of monocot root.	08

# Q.5 Answer any one of the following a) Describe the primary structure of monocot root. b) Explain the anomalous secondary growth of bignonia stem.

Seat	
No	

Set

#### B.Sc. (Semester - III) (Old) (CBCS) Examination: March/April-2024 **MATHEMATICS (Paper - VI)** Laplace Transform (19201320)

Day & Date: Friday, 03-05-2024

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Multiple choice question. **Q.1** 

08

$$1) \quad L\left\{\frac{\sin t}{t}\right\} = \underline{\qquad}.$$

a) 
$$tan^{-1}p$$

b) 
$$\tan^{-1}\left\{\frac{1}{p}\right\}$$

c) 
$$\frac{\pi}{2}$$

d) 
$$\cot^{-1}\left\{\frac{1}{p}\right\}$$

2) 
$$L{5t-a} =$$
\_\_\_\_\_.

2) 
$$L{5t - a} =$$
\_\_\_\_\_.  
a)  $ap - 5$  $p^2$ 

b) 
$$\frac{a-5p}{p^2}$$

c) 
$$\frac{5-ap}{n^2}$$

d) 
$$\frac{a-p}{25}$$

3) The value of the integral 
$$\int_{0}^{\infty} e^{-5t} \sinh^{3}t \ dt = \underline{\qquad}.$$

a) 
$$\frac{17}{39}$$

b) 
$$\frac{1}{51}$$

c) 
$$\frac{1}{64}$$

d) 
$$\frac{6}{39}$$

4) If 
$$L\left\{2\frac{\sqrt{t}}{\pi}\right\} = \frac{1}{p^{3/2}}$$
 then  $L\left\{\frac{1}{\sqrt{\pi t}}\right\} = \underline{\qquad}$ .

a) 
$$\frac{1}{p^{1/3}}$$

b) 
$$\frac{1}{n^{2/3}}$$

c) 
$$\frac{1}{p}$$

$$d) \quad \frac{1}{p^{1/2}}$$

5) 
$$L^{-1}\left\{\frac{3}{p^2-3}\right\} = \underline{\hspace{1cm}}$$

a) 
$$\sqrt{3} \cosh \sqrt{3} t$$

b) 
$$\sqrt{3} \sinh \sqrt{3} t$$

c) 
$$\sin \sqrt{3}t$$

d) 
$$\frac{\cosh\sqrt{3}t}{\sqrt{3}}$$

6) 
$$L^{-1}\left\{\frac{f(p)}{p^2}\right\} = \underline{\hspace{1cm}}$$

a) 
$$\int_{0}^{t} F(x)dx$$

b) 
$$\int_{0}^{t} \int_{0}^{y} F(x) dx dy$$

c) 
$$(-1)^2 \frac{d^2}{dp^2} f(p)$$

d) 
$$\int_{0}^{x} F(x) dx$$

7) 
$$L^{-1}\left\{\frac{12}{4-3p}\right\} =$$
\_\_\_\_\_.

a) 
$$-4e^{4t/3}$$

b) 
$$\frac{-4}{3}e^{4t/3}$$

c) 
$$4e^{4t/3}$$

d) 
$$e^{3t}$$

8) If 
$$y = y(x,t)$$
 then  $L\left(\frac{\partial y}{\partial x}\right) = \underline{\hspace{1cm}}$ .

a) 
$$x\bar{y}(x,p) + y(x,0)$$

b) 
$$p\bar{y}(x,p) - y(x,0)$$

c) 
$$p\bar{y}(x,0) - y(x,p)$$

d) 
$$\bar{y}(x,p) - y_t(x,0)$$

### Q.2 Answer any four of the following.

Solve 
$$\frac{d^2y}{dt^2} + y = 0$$
 under the conditions that  $y = 1$   $\frac{dy}{dt} = 0$  at  $t = 0$ 

**b)** Evaluate 
$$L^{-1} \left\{ \frac{1}{(8p-27)^{1/3}} \right\}$$

**c)** If 
$$L^{-1}\left\{\frac{1}{p+a}\right\} = e^{-at}$$
 then find  $L^{-1}\left\{\frac{1}{(p+a)^n}\right\}$ 

**d)** If 
$$L\{F(t)\} = \frac{1}{p} e^{\frac{-1}{p}} \text{ find } L\{e^{-t}F(3t)\}$$

e) Find 
$$L\{\cosh^2 2t\}$$

**f)** Find: 
$$L\left\{\frac{\partial^2 y}{\partial t^2}\right\}$$

a) Find 
$$L[\sin \sqrt{t}]$$

**b)** Evaluate 
$$L^{-1} \left\{ \frac{1}{(p^2+1)^2} \right\}$$

Solve 
$$\frac{\partial y}{\partial t} = 2 \frac{\partial^2 y}{\partial x^2}$$
  $y(0,t) = 0$   $y(x,0) = 10 \sin 4\pi x$   $y(5,t) = 0$ 

### Q.4 Answer any two of the following.

a) Solve 
$$(D^2 + D)y = t^2 + 2t$$
 where  $y(0) = 4$   $y'(0) = -2$ 

**b)** Find 
$$L^{-1}\left\{\frac{p+1}{(p^2+2p+2)^2}\right\}$$

c) Show that 
$$\int_{0}^{\infty} te^{-3t} \sin t \ dt = \frac{3}{50}$$

Q.5 Answer any one of the following.

80

a) State and prove Convolution theorem and where solve  $L^{-1}\left\{\frac{1}{(p+1)(p+3)}\right\}$ 

**b)** If 
$$c(t) = \int_{t}^{\infty} \frac{\cos x}{x} dx$$
 then prove that  $L\{c(t)\} = \frac{wg(p^2+1)}{2p}$ 

					•	CIN-OA-1	UL
Seat No.						Set	Р
	B.S	Sc. (Semester		IY (Paper	•	/April-2024	
•		ite: Friday, 03-05 00 PM To 05:00				Max. Marks	: 40
Instru	ucti	<ul><li>3) Figures t</li><li>4) Use of lo</li></ul>	at labeled diagra o right indicate f garithmic table	am whereve full marks. and calcula	•		
Q.1	Mu 1)	b) Enzymes	about enzymes accelerate reac are proteins wh do not alter the	tions by low ose three-d	vering the activation e imensional form is ke nge in free energy fo	ey to their funct	<b>08</b> tion
	2)	Enzymes are po a) Hexose c) Fatty acid	•	b) d)	Amino acids Inorganic phosphat	e	
	3)	Which is the fol a) Gibberelli c) Ethylene		vth inhibitor b) d)	? Auxin Cytokinin		
	4)	a) ABA	vth promoter.	b) d)	Ethylene 2,4D		
	5)	Nitrogen is abso a) Ammoniu c) Nitrates	•		orm of Nitrites All		
	6)	Symbiotic nitrog a) Azolla c) Anthocero			e not present in Gnetum Cycas		
	7)	Which of the following a) $(C_4 H_2 0)r$ c) $(CH_2 0)n$	-	b)	la of Carbohydrates? $(C_6 H_2 0)n$ $(C_2 H_2 0)n COOH$		
	8)	<ul><li>a) Storage</li><li>b) Structural</li><li>c) Transport</li></ul>	framework	najor functio	ons of Carbohydrates	?	

			SLR-GA-102
Q.2	a) b) c)	swer any Four the following.  Define carbohydrate.  What is enzyme?  Enlist the plant growth regulators.  Define micronutrients.  Enlist the examples of Monosaccharaides.	08
Q.3	Wr a) b) c)	ite short note on any Two of the following.  Describe any four types of enzymes with examples.  Explain the role of micro and micro nutrients in plant growth.  Explain the properties of biological nitrogen fixation.	08
Q.4	Att a) b) c)	tempt any Two of the following.  Explain properties and examples of polysaccharides.  Write a short note on growth regulators.  Give the classification of enzyme with examples.	08
Q.5	Att a) b)	tempt any One of the following.  Define macronutrients and enlist the roles of N, P, K  Describe significance of biological nitrogen fixation.	08

Seat No.						Set	P
Е	3.Sc. (S		III) (OId) (CB ELECTRON Electronic C	NICS (Pa	• ,	h/April-2024	
•		aturday, 04-0 ⁄l To 02:00 Pl	5-2024	`	,	Max. Marks	: 40
Instru	2 3 4	2) Draw neat 3) Figures to 4) Use of log-	ns are compulse labelled diagran right indicate fu tables and calc oile is strictly pre	m whereve Il marks. culator is a	•		
	1) If the volta	peak input a ge at the outp 3.18V	native from th c voltage to a h out would be	nalf wave r	ptions. ectifier is 20 volts, 6.36V 1.59V	the average dc	80
2	-	n BJT is to be cut-off active	e employed as	•	er, it should operate saturation All of these	e in region	١.
3	input	nich of the am and output s Common-er common-co	ignal? nitter	ations ther b) d)	re is 180 <sup>0</sup> phase-sh common-base All of these	ift between the	
4	a) b) c)	Sum of indiv ratio of each	tistage amplifie vidual stage gai n stage gains ndividual stage se	ins			
(	5) The is is a) c)	maximum ove  100% 50%	erall theoretical		of a Class-B push- 25% 78.5%	pull amplifier	
(	can k		ven-order harm using a	amplifier.	tion in Class-B pus Class-A None of these	h-pull amplifier	
7	•	lback in an ai Increase ba decrease di		. –	increase input imp	oedance	
8		Zero	illations in an o ter than unity		ne loop-gain should unity less than unity	l be	

Q.2	Ansa) b) c) d) e)	Explain the role of filter capacitor. Why the operating point Q should be at the center of the dc load-line? What are the different amplifier configurations? What do you mean by negative and positive feedback? What is Barkhausen criterion?	08
Q.3	a)	te short note on any Two of the following. Zener Regulator Class-B push-pull amplifier Stability factor of Emitter-bias method	80
Q.4	Ansa) b) c)	Explain transformer-coupled amplifier. Explain the effect of negative feedback on voltage-gain and bandwidth of an amplifier. Discuss in short Wien-bridge oscillator. Give the equation for frequency of oscillation.	08
Q.5	Ans a) b)	Explain the analysis of Common-Emitter amplifier with voltage-divider bias. Obtain the equations for voltage-gain, input and output impedance. Give the analysis of Current-series feedback circuit and hence obtain the equations for voltage-gain and feedback factor.	08

No.			Set	P
E	3.Sc. (Semester -	III) (Old) (CBCS) Exai GEOGRAPHY (Pap Climatology (1920	•	
-	Date: Saturday, 04-09 12:00 PM To 02:00 PM		Max. Marks	: 40
Instru		ns are compulsory. right indicate full marks. diagrams wherever neces	sary.	
		b)	ections. ective absorption of ultra - violet Exosphere Stratosphere	80
:	2) To reach the eartl a) 18 Minutes c) 8 Minutes	,	sun take about 12 Minutes 30 Minutes	
	<ul><li>In the total annua</li><li>a) The Equato</li><li>c) latitude</li></ul>	,	The arctic circle High Altitude	
	<ul><li>4) The albedo of the</li><li>a) 25%</li><li>c) 50%</li></ul>	earth as a whole isb) d)	35% 10%	
	<ul><li>5) Climatology is a b</li><li>a) Cultural</li><li>c) Political</li></ul>	,	y. Social Physical	
1	<ul><li>6) The percentage of a) Oxygen</li><li>c) Carbon</li></ul>	f gas in atmosphe b) d)	ere is more. Nitrogen Helium	
,	7) pressure a) Low c) Normal	belt is formed on equator. b) d)	High None of these	
,	a) Oxygen c) Hydrogen	atmosphere is most impor b) d)	tant for all living beings. Nitrogen Argon	
,	Answer any Four of a) Elements of weath b) What is Insolation c) Importance of Iso d) Trade wind. e) Inversion of Temp f) Concept of monsor	ner. ? therms. perature.		08

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Jetstream</li> <li>b) Pressure belt</li> <li>c) Weather &amp; climate</li> </ul>	30
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Heating &amp; cooling of the land &amp; water.</li> <li>b) Explain the types of humidity.</li> <li>c) Composition of atmosphere.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) Explain the factors affecting on distribution of temperature?</li><li>b) Explain the structure of the atmosphere.</li></ul>	08

No.						Set	P
E	3.S	•	III) (OId) (CBCS) I GEOLOGY (P Igneous Petrolog	ape	•	ril-2024	
•		te: Saturday, 04-0 00 PM To 05:00 Pl	5-2024	, , , .	•	lax. Marks	: 40
Instru	ictio	2) Draw neat	ns are compulsory. diagram wherever ne right indicate full mar		eary.		
		tiple choice ques Basalt is ig a) intrusive c) plutonic		b) d)	volcanic None of these		80
	2)	, .	grained igneous rock	,	Trachyte dolerite		
	3)	The essential min a) Quartz, feld c) Quartz, olivi	•	b)	Quartz, Augite olivine, Augite		
	4)	Uni component ro a) Abundant c) Rare	cks are extremely	b) d)	Moderate None of these		
	5)	Silica minerals are a) Acidic c) Basic	e rare rock.	b) d)	Ultrabasic None of these		
	6)	The basic magma a) Si, Na and I c) K, Mg and I	<u> </u>	b) d)	Si, Mg and Fe Fe and Mg		
	7)	The undeveloped a) euhedral c) subhedral	crystal faces in Igneo	ous r b) d)	ock are called anhedral None of these		
	8)	The reaction relat a) Olivine c) Amphibole	ion began the crystal	lizati b) d)	on of mineral in magma i Pyroxene quartz	s	
	a) b) c) d) e)	wer any Four of Define igneous ro What is magma a What is eutectic p What is texture in Define holohyaling What is euhedral	ck? nd lava? oint? igneous rock? e texture.				08

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Describe the sill and dike.</li> <li>b) Describe hypabyssal igneous rock.</li> <li>c) Describe the glass and crystals.</li> </ul>	08
Q.4	<ul><li>Answer any Two of the following.</li><li>a) Describe any two discordant forms of igneous rock.</li><li>b) Describe the crystallization of bicomponant magma.</li></ul>	08
Q.5	<ul><li>Answer any One of the following</li><li>a) Describe process of formation of igneous rock.</li><li>b) Describe the differentiation process.</li></ul>	08

Seat No.						Set	Р
E	3.Sc.		MICROE	BIOLOGY	(Pa	•	
		Bacte	rial Cytolog	yy and Phy	ysi	ology (19201317)	
-		Saturday, 0 PM To 05:0				Max. Marks	s: 40
Instru	ctions	2) Draw n	stions are com eat labeled dia to right indica	agram where		necessary.	
	-	ole choice q					08
•		Gram n a)   Bacillus				ntain peptidoglycan in their cell wal E.coli	l.
		а) Bacillus c) Halobac			,	Staphylococcus spp.	
		,			•		
4		tne peptido( a) β1−4	giycan two am			gars are linked by linkage. $\alpha \ 1 - 4$	
		c) $\beta 1 - 3$			,	$\alpha 1 - 3$	
		, ,	gravitational f		′	ne bacterial cells possess	
•						Carboxysomes	
		c) Gas Vac				Magnetosomes	
4	4) N	et gain of AT	P by substrate	e level phosi	oho	rylation in EMP pathway is	
		a) 8			b)		
		c) 38		(	d)	2	
į	<b>5)</b> A:	zotobacter s	pecies form th	ick walled, d	lesi	ccation resistant dormant structure	s
	Ca	alled					
		a) Spores			,	Endospores	
		c) Cysts			,	None of these	
(						pulation is called as	
		a) Growth			,	Generation time	
_		c) Bacteria	•		,	None of these	
7	•	•	at low concen		_		
		a) Cofactoı c) Apo enz			d)	Coenzyme Isoenzymes	
(		, ,			,	•	
•		ne iinai eiect a) Molecula				ation is NO₃	
		c) SO <sub>4</sub>	ai Oxygon		,	All of the above	
		,			,		

Q.2	An: a) b) c) d) e) f)	swer any Four of the following.  Enlist the functions of the cell membrane.  Draw and label the detailed structure of flagella.  Draw and label the detailed structure of bacterial endospore.  Describe in Short about the pili.  Write in short the magnetosomes.  Define Active and Passive Transport.	80
Q.3	Wr a) b) c)	ite short notes on any Two of the following.  Define growth and explain in detail the growth phases of bacteria.  Describe in short about the effect of osmotic pressure on bacteria.  Describe in short ethanol fermentation.	08
Q.4	Ana) b) c)	swer any Two of the following.  Describe in short about mesosomes and their functions.  Describe in short about non nitrogenous reserve food material.  Describe in short about Synchronous growth.	80
Q.5	An a) b)	swer any One of the following.  Describe in detail about Germination of endospore.  Describe in detail about the effect of temperature on growth of microorganisms	08

Seat No.			Set	P
E	•	- III) (Old) (CBCS) Exa ELECTRONICS (Pa se & Switching Circu	•	
	Date: Thursday, 09- 12:00 PM To 02:00 l	05-2024	Max. Marks	: 40
Instru	3) Draw nea	the right indicate full mar	tions wherever necessary.	
	Multiple choice que 1) circuit is u a) Differentia c) Clamper	used to remove a certain p tor b)		80
;	<ul><li>A bistable multival</li><li>a) triggered</li><li>c) sine wave</li></ul>	ribrator is a oscilla b) d)	free running	
;	<ul><li>The formula for using IC 555 is _ a) W = 0.96F</li><li>c) W = RC</li></ul>	RC b)	of a monostable multivibrator  W = 0.69RC  W = 1.1RC	
•	<b>4)</b> Astable multivibi a) single NAI c) triple NAN	,	<b>G</b>	
į	The time for cha multi-vibrator us a) 0.693 (R <sub>A</sub> I c) 0.693 (R <sub>A</sub> -	ing 555 is R <sub>B</sub> ) C b)	/3 V <sub>CC</sub> to 2/3 V <sub>CC</sub> in an astable 0.693 (2R <sub>A</sub> +R <sub>B</sub> ) C 0.693 (R <sub>A</sub> +R <sub>B</sub> ) C	
	6) circuit is u a) Differentia c) Integrating	,		
•	a) saturation	•	rated in active region cut-off and saturation region	
:	<ul><li>a) duration of</li><li>b) value of control</li><li>c) value of R</li></ul>	f the input pulse urrent gain (h <sub>fe</sub> ) of a transi:	multivibrator depends on stor	

Q.2	Ans	swer any Four of the following.	80
	a)	State different types of nonlinear wave-shaping circuits.	
	b)	What is the need for time base signal?	
	c)	Define the sweep time and restoration time.	
	d)	Calculate the frequency of an astable multivibrator using BJT if the timing	
	u)	·	
		components are $R_1 = R_2 = 10 \text{ K}\Omega$ and $C_1 = C_2 = 100 \mu\text{F}$ .	
	e)	Draw the circuit diagram of a monostable multivibrator using NAND gates.	
Q.3	Wri	te short notes on any Two of the following:	08
	a)	What is a clamper circuit? Explain the positive clamper circuit.	
	b)	Explain the working of the sequential timer circuit using IC 555.	
	-	· · · · · · · · · · · · · · · · · · ·	
	c)	Explain the working of the RC differentiator circuit.	
Q.4	Ans	swer any Two of the following:	08
	a)	Explain in the brief working of an astable multivibrator using IC 555.	
	b)	Explain the working of a monostable multi-vibrator using IC 74121.	
	c)	Explain Miller Integrator with a suitable circuit diagram.	
	O,	Explain Miller integrator with a calcable chean diagram.	
Q.5	Ans	swer any One of the following:	08
	a)	Explain the construction and working of the Schmitt trigger with its Hysteresis	
	,	curve.	
	b)	Explain in brief the working of UJT as a relaxation oscillator with necessary	
	~,	waveforms and derive an expression for sweep frequency.	
		waveloins and derive an expression for sweep frequency.	

Seat No.				Se	t P
ļ	B.S	c. (Semester - III) (Old) (CB GEOGRAP Geography o	НҮ (Рар	er - VI)	1
		te: Thursday, 09-05-2024 00 PM To 02:00 PM	(	Max. Mar	ks: 40
Instru	uctic	ons: 1) All questions are compulso 2) Draw neat diagram wherev 3) Use of stencil is allowed.	•	sary.	
Q.1	Mul 1)	tiple choice questions is passed through the cent a) Tropic of Capricorn c) Equator		Tropic of Cancer None of above	08
	2)	type of soil is found in Raja a) Black c) Alluvial	asthan. b) d)	Desert Red	
	3)	In India rank first in Rice a) Maharashtra c) West Bengal	Productior b) d)	n. Rajasthan Gujarat	
	4)	In Konkani language is spo a) Rajasthan c) Kerala	oken. b) d)	Tamil Nadu Maharashtra	
	5)	As per 2023 is the most paths a) Pakistan c) Sri Lanka	oopulated b) d)	country in the world. India Brazil	
	6)	The kharif season beings  a) In December  b) With the onset of south wes  c) At the end of the south wes  d) In March			
	7)	Bombay high is famous for a) Petroleum c) Coal	 b) d)	Gold Iron	
	8)	is primary economic activit a) Agriculture c) Industry	ty. b) d)	Trade Information Technology	
Q.2	a) b) c) d)	What is tribe? What is soil? What is industry? What is information technology? What is population density? What is resources?			08

	<b>;</b>	SLR-GA-109
Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Population Growth of India</li> <li>b) Automobile Industry in India</li> <li>c) Importance of forest</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain the distribution of Coal in India.</li> <li>b) Explain the distribution of population on the basis of Religion.</li> <li>c) Explain the Climatic regions of India.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) What is Regionalization? Explain the economic regionalization</li><li>b) Explain the causes of Population growth in India.</li></ul>	<b>08</b> of India.

Sea No.	t	Set P
	B.Sc	c. (Semester - III) (Old) (CBCS) Examination: March/April-2024 GEOLOGY (Paper - VI)
		Sedimentary and Meta Morphic Petrology (19201316)
-		e: Thursday, 09-05-2024 Max. Marks: 40 0 PM To 05:00 PM
Instr	uctio	<ul><li>1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li><li>3) Draw neat &amp; well labeled diagrams wherever necessary.</li></ul>
Q.1	Mult	iple Choice Questions. 08
	1)	Arkose is a variety of  a) Sandstone b) Limestone c) Marble d) Granite
	2)	Which of the following is a sedimentary rock?  a) Marble b) Quartzite c) Shale d) Slate
	3)	facies represent Low grade metamorphism. a) Zeolite b) Granulite c) Green schist d) Blue schist
	4)	Which of the following sediments represent greater transportation history?  a) Angular b) Triangular c) Fractured d) Rounded
	5)	Quartz, garnet, staurolite are Minerals in metamorphic rocks. a) anti-stress b) secondary c) stress d) accessory
	6)	Which of the following represent stress mineral?  a) Muscovite b) Chlorite c) Biotite d) All the above
	7)	Marble is formed due to metamorphism of limestone. a) cataclastic b) plutonic c) thermal d) hydro-thermal
	8)	Limestone consists of  a) Carbonates
Q.2	Anso a) b) c) d) e) f)	Wer any four of the following.  Give any two names of rocks of showing Dynamo-thermal metamorphism.  What is thermal metamorphism?  Draw labeled diagram of Graded bedding structure.  Define Augen structure.  Give two names of argillaceous rocks.  Define Metamorphic Facies.

SL	.R-	GΑ	1	1	1
----	-----	----	---	---	---

Q.3	Wri a) b) c)	te short notes on any two of the following. Lamination structure Granulite Facies Marble	08
Q.4	Ans a) b) c)	wer any two of the following.  Describe Clastic structure.  Explain Bauxite.  Explain different Sizes of sediments.	80
Q.5	Ans a) b)	wer any one of the following questions.  Define Sedimentary rocks. Describe Rudaceous deposits.  Define Metamorphic rocks. Describe Schistose and Granulose structures.	08

Seat							Se	t P
	B.Sc	c. (Se		II) (OId) (CE MICROBIOL Bacterial Ge	-OGY (P	aper - VI)	March/April-2024	ļ
-			ırsday, 09-0 To 05:00 P <b>l</b>				Max. Mar	ks: 40
Instr	uctio	2)	Draw neat	is are compuls abeled diagrai ight indicate fu	ms where	er necessary	/.	
Q.1	Cho 1)			l <b>iternative and</b> Pendonuclease	e is involve		excision repair.	08
	2)	The r a) c)	minimal gene Muton Cistron	etic unit respor	b)	ecombinatior Recon Split genes	is called as	
	3)	The (a) c)	DNA Prima	se	b)	n is carried o DNA gyras DNA Helica		е.
	4)	acid i	is substituted	d by another co mutation	odon whic on.	•	cifying for one amino ode for any amino	ı
	5)	,	tion of plasn episome ribosome	nid in the chror	,	ONA of bacted merosome mesosome	ria is called as	<u>_</u> .
	6)	Gene a) c)	etic code is _ Singlet Triplet	in nature	b) d)	Doublet Quadra pla	te	
	7)			recombinatior or to recipients	6.	/hen F' HFr	cell transfers fragme	nt
	8)	a) c)	_ is base an 2 Amino pu Nitrous acid		mine. b) d)	5-Bromo ur Proflavin	racil	

<b>Q.2</b>	Answer any four of the following.				
	a)	Define gene.			
	b)	What is photoreactivation?			
	c)	Define Genotype.			
	d)	What is base pair substitution?			
	e)	What is competence?			
	f)	Enlist the types of plasmids.			
Q.3	Write a) b) c)	te notes on any two of the following.  Define genetic code. Enlist the properties of genetic code.  Give a brief account on Watson crick model of DNA.  Explain in short nucleotide excision repair.	08		
0.4	,		00		
Q.4	a)	wer any two of the following.  Describe in detail Avery, Macleod and McCarty experiment to prove DNA as genetic material.	80		
	b) c)	Discuss in detail induced mutation caused by UV light and alkylating agent. Describe in brief specialized transduction.			
Q.5	Answer any one of the following.				
	a) b)	Discuss in detail mechanism of DNA replication in prokaryotes.  Describe in detail mechanism of genetic recombination by conjugation.			

Seat	Set	D
No.		•

# B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024

			COMPUTER SCIENC Core Java (22			
			nday, 12-05-2024 To 11:00 AM		Max. Marks:	: 40
Instr	uction		All questions are compulsory. Figures to right indicate full mark	S.		
Q.1	Multi 1)	-	choice question. The one of the following is not a Jar Object-oriented Portable	b)	ature? Use of pointers Dynamic and Extensible	80
	2)	Whice a) c)	ch of these operators is used to al malloc new	loca b) d)	te memory to array variable in Java? alloc new malloc	,
	3)	Whice a) c)	ch keyword is used to refer current this current	b)	ect of a class in Java? new None	
	4)	try, c a) c)	catch, finally, throw, and throws ke Event handling exception handling	b)	rds in java are related to string handling None of the above	
	5)	All Ir a) c)	nterface methods in Java are public public and abstract	b <sub>!</sub> b) d)		
	6)	Whice a) c)	ch of these are types of multitaski Process based both a and b	ng? b) d)	Thread based None of the mentioned	
	7)	a)	nt does I/O stand for in Java? Input/Output Interger/Object	,	Inheritance/Overriding Iteration/Observation	
	8)	Whica)	ch of these packages contain all tl java.lang java.net	b)	ollection classes? java.util java.awt	
Q.2	1) 2) 3) 4)	Defin What What Defin	ny Four of the following. e is constructor. are the types of inheritance? is Encapsulation? e abstract class. out access specifier in java.			08
Q.3	1) 2)	Write Expla	ny TWO of the following. a program which implement Arra ain Jagged array with example. ain data types in java.	yList	class implement list interface.	08

Page **1** of **2** 

Q.4	Answer any	TWO of the following.	
-----	------------	-----------------------	--

80

- 1) Explain interface in details.
- 2) Explain Exception handling in java.
- 3) Write a program to implements method overriding.

### Q.5 Answer any ONE of the following.

- 1) Explain thread life cycle? Write a program for thread priority.
- 2) Write a program to implements 'CallableStatement' interface.

Seat No.		Set P
В	CHEMIS	BCS) Examination: March/April-2024 RY (Paper – VIII) norganic Chemistry (22221445)
•	Date: Wednesday, 10-04-2024 09:00 AM To 11:00 AM	Max. Marks: 40
Instru	2) Draw neat diagrams an 3) Figures to the right indic 4) Use of logarithmic table (At. Wt.: H=1, C=12, O=	I give equations wherever necessary. ate full marks. and calculator is allowed.
	<ul> <li>a) 3.1 to 4.4</li> <li>c) 8.3 to 10</li> <li>2) Fe(OH)<sub>3</sub> is a precipitat</li> </ul>	nge of phenolphthalein is b) 4.2 to 6.3 d) 8.3 to 12
	<ul><li>a) crystalline</li><li>c) curdy</li><li>3) is called king of chemi</li></ul>	
	<ul> <li>a) Na<sub>2</sub>CO<sub>3</sub></li> <li>c) H<sub>2</sub>SO<sub>4</sub></li> <li>4) DMG is specific reagent for</li> <li>a) zinc</li> </ul>	b) NH <sub>3</sub> d) HNO <sub>3</sub>  b) nickel
	c) cobalt  5) Bauxite is an ore of  a) aluminium	d) copper b) ferrous
	c) copper	d) silicon ndard in volumetric analysis. b) NaOH d) AgNO₃
	7) Wrought iron contains a) 2.5 to 5.0 c) 0.5 to 1.0	% of carbon. b) 0.1 to 0.2 d) 1.0 to 2.5
	<ul><li>8) Eriochrome black -T is known</li><li>a) solochrome black</li><li>c) acid-base indicator</li></ul>	b) molochrome black d) redox indicator
	<ul> <li>Answer any four of the following</li> <li>a) Define the term: <ol> <li>1) Indicator</li> <li>2) End point</li> </ol> </li> <li>b) Give the conditions for good pages</li> </ul>	
		cess for the manufacture of ammonia. ion of stainless steel.

<b>Q.3</b>	Write short notes on any two of the following.	08
------------	--	----

- a) Heat treatment on steel
- **b)** Froth floatation method
- c) Manufacture of ammonia by Haber's process

#### Q.4 Answer any two of the following.

08

- a) Distinguish between Bessemer process and L.D. process.
- b) What is metallochromic indicator? Discuss the role of metallochromic indicator.
- c) Explain role of organic precipitant DMG in gravimetric analysis.

#### Q.5 Answer any one of the following.

- **a)** What is acid-base indicator? Explain the choice of an indicator for titration between strong acid and strong base with help of neutralization curve.
- **b)** Define precipitate and precipitant. Explain physical nature of precipitate.

Seat	Sat	D
No.	Set	

# B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024

			COMPUTER SC DBMS Using	•	- ,	
			iday, 12-04-2024 M To 11:00 AM		M	lax. Marks: 40
Insti	ucti	2	1) All questions are compulso 2) Draw neat diagrams and gi 3) Figures to the right indicate	ive equation		
Q.1	Mu	ltiple	choice questions.			08
	1)	,	Operator is used to comp BETWEEN IN	b)	e to a specified list of valu ANY ALL	es.
	2)		ch of the following levels deals	s with the	ohysical representation of	the
		a)	base r? External level Conceptual level	b) d)	Internal level None of these	
	3)	_	person who has the central c	ontrol ove	data and application pro	grams
		is a) c)	 DBA Database designer	,	System analysts None of these	
	4)	level a)	ch of the following is a top-down can be divided into two lowe Aggregation  Specialization	r sub-entit b)		gher
	5)	a)	ch of the following is not a cor Lost update problem Unrepeatable read	b)	oncurrent operations? Update anomaly Dirty read	
	6)	a) c)	_ means multiple copies of the Data integrity Data redundancy	b)	ta items. Data consistency Isolation	
	7)	DCL a) b) c) d)	provides commands to perfo Change the structure of Tab Insert, Update or Delete Re Authorizing Access and othe All of the Above	oles cords and	Values	
	8)	a)	structures are used to store Network Hierarchical	<u>b)</u>	model. Relational File based system	

Q.2	a) b) c)	what is a Package in PL/SQL? What are the types of attributes in the ER model? What is %type and %rowtype? Write a list of Database users. Write the use and syntax of the create table statement.	80
Q.3	a) b)	ite short notes on any Two of the following.  Explain Relational model in details.  Explain shadow paging.  Explain the properties of transactions.	80
Q.4	a)	swer any Two of the following. Explain conflict serializability. Write difference between Procedures and Functions. What are DDL statements? Explain DDL statements with examples.	80
Q.5	Ans a) b)	swer any One of the following.  Explain timestamp-based protocol with example.  What is the procedure? Explain parameters in procedures with an example.	80

		OLIN-OA-110
Seat No.	t	Set P
	B.Sc	(Semester - IV) (New) (CBCS) Examination: March/April-2024 PHYSICS (Paper - VII)
		Geometrical, Physical and Fiber Optics (22221405)
		: Saturday, 13-04-2024 Max. Marks: 40 ) AM To 11:00 AM
Instr	uctio	<ul> <li>s: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks</li> <li>3) Use of logarithmic table ad calculator is allowed.</li> <li>4) Draw Neat diagrams and give equations wherever necessary.</li> </ul>
<b>Q</b> .1	Cho	ose correct alternatives.
	1)	The distance of an object and its image from the corresponding focal points are 12 cm and 3 cm respectively for a thick lens in air, its focal length is  a) 4 b) 5
		c) 6 d) 7
	2)	The resolving power of F-P interferometer is than the R.P of Michelson's interferometer.
		a) smaller b) very much higher c) higher d) very much smaller
	3)	By Rayleigh's modified criterion, the condition for resolution is that the ratio of the intensity at the saddle to the maximum intensity of either of the principal maxima of two wavelengths is  a) 8 b) $\pi^2$
		$\frac{\pi^2}{\pi^2}$
		c) $\frac{\pi^2}{8}$ d) $\frac{\pi^2}{8}$
	4.	$\pi^2$ 4
	4)	The substances which rotate the plane of vibration of polarized light towards the left side are known as  a) optically active b) laevo-rotatory
		a) optically active b) laevo-rotatory
		c) dextro rotatory d) laevo as well as dextro rotatory
	5)	For an optical fibre to have grater information carrying capacity, the pulse dispersion must be
		a) very small b) very large c) moderately large d) zero
	6)	An optical system has number of cardinal points.
	ŕ	a) 3 b) 4 c) 5 d) 6
	7)	The obliquity factor is measured by
		a) $1 + \cos \theta$ b) $1 + \sin \theta$ c) $1 + \tan \theta$ d) $1 + \cot \theta$
	8)	A 10% sugar solution taken in a polarimeter tube of length 20 cm rotates the plane of polarization of the light of wavelength 6000A <sup>0</sup> through 12 <sup>0</sup> . The
		specific rotation of sugar is  a) 30°  b) 60°  c) 65°  d) 90°

Q.2	Answer	any four	of the	following.	
-----	--------	----------	--------	------------	--

80

- a) For a coaxial optical system, the initial and final media are water ( $\eta_1$ = 1.33) and air respectively. For a given object the lateral magnification is 1.5. Calculate:
  - i) the axial and
  - ii) angular magnifications
- **b)** State the characteristics of Double refraction.
- c) Explain specific rotation for solids, liquids and solutions.
- d) Explain numerical aperture.
- e) State two advantages of optical fiber.

#### Q.3 Answer any two of the following.

80

- a) Write a note on Nicol Prism.
- **b)** Write a note on Fibre Optic communication system.
- c) With the help of neat ray diagram obtain Newton's formula.

#### Q.4 Answer any two of the following.

80

- a) With the help of neat ray diagram, prove that the principal points coincide with the nodal points when the medium on both sides of the system is same.
- b) In an experiment light of wavelength 6000A<sup>0</sup> is used. The point source of light is kept at a distance of 5 m and the screen is at a distance of 2 m from the straight edge of the obstacle. Calculate the position of the first two minima and their separation.
- **c)** Describe polarimeter experiment to determine the specific rotation of an optically active solution.

### Q.5 Answer any one of the following.

- With a neat diagram explain the construction of Michelson's interferometer.
   Explain the function of
  - i) silvering of the beam splitting glass plate and
  - ii) the compensating glass plate
- b) Derive an expression for the resolving power of a plane diffraction grating. The sodium double having components 5896 A<sup>0</sup> and 5890 A<sup>0</sup>. Find the minimum number of lines in a plane diffraction grating which will resolve this doublet in the second order.

Seat	Set P
No.	Set F

## B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024 BIO-CHEMISTRY (Paper - III) Nutrition and Metabolism (22221408)

	Nutrition and Metabolism (22221408)					
		e: Monday, 15-04-2024 0 AM To 11:00 AM			Max. Marks: 40	
Instr	uctio	ns: 1) All questions are compulsory. 2) Draw neat diagrams and give equal 3) Figures to the right indicate full m			<b>'</b> .	
Q.1	Cho 1)	ose the most correct alternative.  Glycolysis requires molecules a) 2 c) 12	b)		<b>08</b> e.	
	2)	40% energy is captured as ATP in a) adipic acid c) linoleic acid	b)	xidation. palmitic acid stearic acid		
	3)	Enzymes for $\beta$ -oxidation present in a) nucleus c) mitochondria	b)	cytosol golgi apparatus		
	4)	Organ responsible to deamination is a) kidney c) liver	b)	heart pancreas		
	5)	Mitochondria is the organ for  a) cellular respiration c) cellular death	,	cellular digestion cellular motility		
	6)	In $\beta$ -oxidation, $\beta$ -keto acid on cleavage a) oxalic acid c) acetic acid	b)	ns formic acid palmitic acid		
	7)	<ul><li>is the necessary coenzyme for t</li><li>a) Coenzyme A</li><li>c) Thiamine pyrophosphate</li></ul>	b)	NAD		
	8)	Saturated fatty acid is  a) oleic acid  c) linolic acid	b) d)	palmitic acid cinnamic acid		
Q.2	Ans a) b) c) d) e)	wer any four of the following. What is lipid metabolism? What is deamination? What are the three regulatory enzymes What is respiratory quotient? What is endergonic reaction?	of t	he TCA cycle?	08	
Q.3	Writ a) b)	e short notes on any two of the follow Explain Lactic acid fermentation. Explain inhibitors of electron transport			08	

Write note on Biosynthesis of palmitic acid.

c)

#### Q.4 Answer any two of the following.

80

- a) Write note on transamination and decarboxylation.
- **b)** Write note on fate of pyruvate.
- c) Write note on oxidative phosphorylation.

### Q.5 Answer any one of the following.

- a) What is balanced diet? Explain calorific values of food and its measurement.
- **b)** What are sources of the atoms in the purine molecules? Explain biosynthesis of purines.

	1	
Seat	0-4	<b>D</b>
	Set	Ρ
No.		

## B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024

_		PLANT PROTECTION (F	• ,
		Introduction to Weed and Non-Ins	ect Pests (22221417)
•		: Monday, 15-04-2024 ) AM To 11:00 AM	Max. Marks: 40
Instr	uction	<ul><li>s: 1) All questions are compulsory.</li><li>2) Draw neat labelled diagrams wherevers</li><li>3) Figures to the right indicates full marked 4) Use of logarithm table and calculator</li></ul>	S.
Q.1	Choo 1)	• •	
	2)	The weed is harmful to a) human b) c) both a and b d)	plant None of these
	3)	, .	ng organism is known as aquatic None of these
	4)	, ,	weed. aquatic All of the these
	5)	, , ,	ecology All of the these
	6)	Weed dispersal with the help of a) wind b) c) man d)	water All of the these
	7)	Example of the stem parasite a) Cuscuta b) c) Loranthus d)	Striga None of these
	8)	Example of aquatic weed are a) Hydrila b) c) Vallisneria d)	Eichhornia All of these
Q.2	a) (b) (c) (d) (e)	Ver any four of the following  Give the definition of poisonous weed.  What is weed?  Give the definition of parasite weed.  Define reproduction.  What is management?  Write the definition of Ontogeny.	08

Q.3	Writ a) b) c)	te short notes on any two of the following Crop rotation Plouging Field sanitization	30
Q.4	Ans a) b) c)	wer any two of the following.  Explain the classification of weed based on ecology.  Explain the gross morphology and reproduction of <i>Argemone maxicana</i> .  Give the 2,4-D studied by you.	08
Q.5	Ans a) b)	wer any one of the following.  Write the Euphorbia hirta with respect to gross morphology, reproduction, dispersal and management of weed.  Explain the birds with respect to nature of damage, losses and management.	30

Seat No.						Set	Р
E	3.Sc.	(Semester - I	PHYSICS (Par	oer	•	oril-2023	
			Modern Physics	(22	221406)		
•		: Tuesday, 16-04 AM To 11:00 A			N	Max. Marks	s: 40
Instru	ıction	<ul><li>2) Draw neat</li><li>3) Figures to</li></ul>	ns are compulsory. diagrams and give eq right indicate full mark arithmic table and calc	S.	ons wherever necessary or is allowed.	<b>'</b> .	
Q.1	Multip	ole choice ques	stions.				08
			uivalence is .				
		a) $E = mc$ c) $E = mc^2$			$E^2 = mc^2$ $E^2 = m^2c$		
	2) 7	The mass of obje	ect moving with velocit	ty of	light become .		
	,	a) zero	ŭ	•	infinite		
		c) constant		d)	negligible		
	3) 7		atter waves was propo				
		a) Compton		,	Einstein De Proglie		
		c) Newton		d)	De-Broglie		
	<b>4</b> ) F	Radiation exhibit a) only particle	s nature.	h)	dual		
		c) only wave	,	,	none of the above		
	5) 5	Spin of electron i	is .	,			
	-	a) ½		b)	1		
		c) 0		d)	1/4		
	6) _		st common type of cou				
		a) LS c) JJ		b) d)			
	<b>-</b> \ \	•		u)	33		
	7) >	<-rays are a) Electromag		b)	Mechanical		
		c) Longitudina		d)	None of these		
	8) 7	Γhe change in w	avelength of scattered	rac	liation is independent of		
	•	a) scattering a	ingle	b)	incident wavelength		
		c) both (a) and	d (b)	d)	neither (a) nor (b)		
Q.2	Answ	er any four of t	he following.				08
	,	Define matter wa					
	-	-	of Einstein's special the		y of relativity.		
			operties of matter wav oplications of X-rays.	<b>c</b> s.			
			lusion principle.				

### Q.3 Answer any two of the following.

80

- a) Write note on LS coupling.
- b) Obtain Bohr's quantum condition on the basis of matter waves.
- c) Calculate the Compton wavelength with given details.

(Given: 
$$h = 6.63 \times 10^{-34}$$
 J. Sec  
 $m_0 = 9.1 \times 10^{-31}$  Kg  
 $c = 3 \times 10^8$  m/s)

#### Q.4 Answer any two of the following.

08

- a) Derive Einstein's mass energy relation.
- b) Describe Coolidge tube for production of X-rays.
- c) Describe experimental verification of Compton Scattering.

#### Q.5 Answer any one of the following.

- a) Explain Michelson-Morley experiment and obtain the equation for fringe width.
- b) Explain in detail the Normal Zeeman Effect experiment.

Seat No.			Set	P	
В	B.Sc. (Semester - IV) (New) (CBCS) BIO-CHEMISTRY Molecular Biochemistry &	(Pa	aper - IV)		
-	Date: Thursday, 18-04-2024 09:00 AM To 11:00 AM		Max. Marks	: 40	
Instru	nstructions: 1) All questions are compulsory. 2) Figures to the right indicate full marks. 3) Draw neat diagrams and give equations wherever necessary.				
	Multiple choice questions.  1) Insulin promotes a) glucosuria c) glycogenolysis  2) Pinocytosis actually means a) cell mitosis	ď)	glycogenesis gluconeogenesis cell-eating	08	
	c) cell-drinking  3) Anti aids drug is a) metformin c) didanosine	ď)	cell respiration  tolbutamide crocin		
	<ul><li>4) A plasmid vector contains elem</li><li>a) 1</li><li>c) 3</li></ul>	,	2		
	<ul><li>5) Synthesis of insulin begins at</li><li>a) rRER</li><li>c) mitochondria</li></ul>	b) d)	sRER nucleolus		
1	<ul><li>6) The genetic material of AIDS virus is _</li><li>a) single stranded DNA</li><li>c) double stranded DNA</li></ul>	b) d)	 single stranded RNA double stranded RNA		
,	<ul><li>7) enzyme is responsible for making</li><li>a) DNA polymerase</li><li>c) RNApolll</li></ul>	ng a b) d)	DNA copy from RNA. RNA poll reverse transcriptase		
	8) Enzymes are made up of a) Fats c) nucleic acids	b) d)	Proteins Vitamins		
	<ul> <li>Answer any four of the following.</li> <li>a) Which cells involved in immune resport</li> <li>b) What is reverse transcriptase?</li> <li>c) Define enzyme activity and specific act</li> <li>d) Write Natural &amp; acquired immunity.</li> <li>e) What is inducible genes?</li> </ul>			80	

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Write note on Restriction endonucleases.</li> <li>b) Explain Structure of HIV.</li> <li>c) Write derivation of Michaelis-Menten equation for single substrate.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Write types and properties of antibodies.</li> <li>b) Explain Lock &amp; key model.</li> <li>c) Which are the types of diabetes mellitus?</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Explain replication of DNA and transcription in prokaryotes.</li> <li>b) Explain metabolic effects of insulin and mechanism of action of insulin.</li> </ul>	08

Seat No.	Set	Р

## B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024

		. (0	PLANT PROTECTION Insect Pests and Their Ma	•	•	<b></b>
-			ursday, 18-04-2024 1 To 11:00 AM			Max. Marks: 40
Instr	uctio	2	) All questions are compulsory. 2) Draw neat diagrams and give ed 3) Figures to the right indicate full r			ry.
Q.1		The I	choice questions. ife cycle of Insect is divided into _ five three	b)	_stages. two four	08
	2)	,	_ is the common Pest of Rose. Write grub Wooly aphid	b)	Jassid Thrip	
	3)	a)	emical which induces insects to m Pheromone Repellent		away from it is called _ Antifeedant Attractant	
	4)	a)	_ is the pest of stored grains. Jassid Rice weevil	b) d)	Stem borer Pod borer	
	5)		spider is the pest of Tomato Sugarcane	b) d)	Gram Mango	
	6)	a)	irachtin is obtained from pla Tobacco Karanj	ant. b) d)	Neem Cotton	
	7)		d is the pest of Mango Gram	b) d)	Brinjal Jowar	
	8)	a) c)	_ is the most serious pest of Gran Pod borer Stem borer	n. b) d)	Fruit borer Thrip	
Q.2	Ans a) b) c) d)	Write Expla Write Expla	any Four of the following.  the host range of stem borer.  in antifeedents.  the marks of identification of pod  ain microbial insecticides.  the management of wooly aphid.	bore	er.	08

Q.3	Wr a) b) c)	ite short notes on any Two of the following. Life cycle of white grub Classification of insects based on mouth parts Principles of insect pest control	08
Q.4	An	swer any Two of the following.	08
	a)	Write the general characters of typical insect w.r.t. wings, types of legs and abdomen.	
	b)	Describe plant origin insecticides.	
	c)	Explain host range, nature of damage and management of fruit borer.	
Q.5	An	swer any One of the following.	08
	a)	Describe the classification of insecticides based upon mode of entry and mode of action.	
	b)	Give an account of jowar stem borer w.r.t. scientific name, marks of identification and life cycle.	

Seat	Sat	D
No.	Set	

## B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024

			STATISTICS (P Continuous Probability Dis	•	•	
Day 8	& Dat		day, 19-04-2024		Max. Marks	: 40
Time	: 09:0	00 AM	To 11:00 AM			
Instr	uctio	2 3	) All questions are compulsory. ) Draw neat diagrams and give ed ) Figures to the right indicate full r ) Use of logarithmic table and cald	narks		
Q.1	Cho	ose t	he correct alternative:			08
	1)	If X ~ a) c)	$N(\mu, \sigma^2)$ , then Mean = Median = Mode Mean < Median < Mode	b) d)		
	2)	If X ~ a) c)	U[2,4], then E(X) is 2 4	b) d)	3 0	
	3)	If X ~ a) c)	$eta_{I}(m,n)$ distribution, then $1-X$ h $eta_{II}(m,n)$ $eta_{II}(n,m)$		distribution. $\beta_I(n,m)$ None of these	
	4)	If X ~	G (4,3) then distribution of 2X is		_:	
		a)	G(2,3)	b)	exp (2)	
		c)	G(4,3/2)	d)	G(4, 2)	
	5)	If X h	as chi-square variate with n d. f.	then \	/ar(X) is	
		a) c)	n 1	b) d)	2n 2	
	6)	If t ∼	t <sub>n</sub> then distribution of t <sup>2</sup> is	distri	bution.	
		a)	$F_{1,n}$	b)	111)112	
		c)	t <sub>n</sub>	d)	None of these	
	7)	of X i				
		a) c)	$\frac{\theta^2}{1/\theta}$	b) d)	$\frac{\theta}{1/\theta^2}$	
	8)	•	s are independent N (0,1) r. v. the	,	•	
	,	a) c)	Chi-square with I d. f. Normal distribution	b) d)	Chi-square with n d. f. None of these	
Q.2	Ans	wer a	ny four of the following.			08
	a)	State	e mean and variance of $G(\alpha, \lambda)$ dis			
	b) c)		e any two properties of Normal Dis e definition of Snedecor's F- distril			

Find mean of U[a, b] distribution. State m.g.f. of N( $\mu$ ,  $\sigma^2$ ) distribution. d) e)

Q.3	Ans a) b) c)	wer any two of the following. Let $X \sim N(\mu, \sigma^2)$ distribution, then find distribution of $Y = aX + b$ . Find harmonic mean of beta distribution of second kind. State and prove lack of memory property of exponential distribution.	80
Q.4	Ans a) b) c)	wer any two of the following. Find mode of chi-square variate with n d.f. If $\mathbf{X} \sim \beta_{\mathbf{I}}(\mathbf{m},\mathbf{n})$ then find $\mathbf{E}(\mathbf{X})$ . Find m.g.f. of $\exp(\theta)$ distribution.	80
Q.5	Ans a) b)	wer any one of the following. Derive the pdf of chi-square variate with n d.f. If $X \sim (\alpha, \lambda_1)$ and $Y \sim G(\alpha, \lambda_2)$ and $X \otimes Y$ are independent variates then find distribution of $\frac{X}{X+Y}$	80

Seat No.			Set	P
В	•	_ IV) (New) (CBCS) Ex METEOROLOGY (P Applied Climatology	-	
	Date: Saturday, 20-0 09:00 AM To 11:00 A	04-2024	Max. Marks	: 40
Instru	3) Draw nea	ons are compulsory. the right indicate full mar t diagrams wherever nece encils is allowed.		
-	Choose the correct  1) The term 'forecase  a) Miller  c) Coriolis	alternative. st' was first applied in me b) d)		08
	<ul><li>When the isobars</li><li>a) Gentle</li><li>c) steep</li></ul>	s are widely speed the pro b) d)		
;	<ul><li>3) Medium rang for</li><li>a) 3 to 21</li><li>c) 3 to 48</li></ul>	,	3 to 26 3 to 72	
	<b>4)</b> Statistical metho a) Hhore c) long		ge forecasting of weather. medium daily	
	<ul><li>5) In a hot dry envir</li><li>a) Breathing</li><li>c) sweating</li></ul>	onment excessive sweati b) d)	dehydration	
1		pose of clothing is to prote siological compare. b) d)		
,	7) The coriolis force a) Absent c) strongest	e is in high latitude b) d)	strong None of these	
	a) is irregula a) Anticyclone c) Cyclone		distance in the atmosphere. Turbulence Circulation	
	Answer any four of  a) What is heat isla  b) What is rotationa  c) Coriolis effect.  d) Define off- shore  e) Human body cor	nd? Il forces? drilling.		08

			SLR-GA-123
Q.3	Wr a) b) c)	rite short notes on any two of the following. Urban climate Climate and industry Atmospheric pressure	08
Q.4	An a) b) c)	swer any two of the following.  Explain the importance of pressure gradient in atmosphere.  Write the effect of urban climatic on body comfort.  Write on historical background of weather forecasting studies	<b>08</b>

# Q.5 Answer any one of the following. a) Describe the importance of industrial activities. b) Explain the method of weather forecasting.

Seat No.		Set	Р
В	.Sc. (Semester - I	V) (New) (CBCS) Examination: March/April-2024	

	D.3	c. (Semester ·	GEO-CHEMIST	•	anniauon. Maich <i>ir</i> aper – III)	φι II-2024
		Pri	nciples of Geoc	-	- · · · · · · · · · · · · · · · · · · ·	
-		ate: Saturday, 20 00 AM To 11:00	-04-2024		,	Max. Marks: 40
Instr	uctio	2) Figures t	ons are compulsory o the right indicate t at diagrams and giv	full marl	ks. ions wherever necessal	y.
Q.1		Itiple choice qu A chemical equ a) temperatu c) catalyst	ilibrium of an revers		ction is not influenced by pressure concentration	<b>08</b> y
	2)	Alkanes contain a) single c) triple	s bond.	b) d)	double multiple	
	3)	Hydrolysis of Na a) NaCl c) HCl	a <sub>2</sub> CO <sub>3</sub> gives	b) d)	H <sub>2</sub> O NaOH	
	4)	C <sub>2</sub> H <sub>4</sub> is a) methane c) ethene		b) d)		
	5)	Range of pH sc a) 7 to 10 c) 0 to 14	ale is	,	0 to 10 7 to 14	
	6)	CH <sub>3</sub> - CH <sub>2</sub> – CH a) n- butane c) cyclo buta		b) d)		
	7)		_ will not affect the lire			
	8)	At chemical equal increases c) remains c		-	/s decreases changes	
Q.2	a) b) c) d)	What is black sl What is chemical What is reducing What are limitate	al equilibrium?	otherm		08

4
4

Q.S	<ul> <li>a) Explain strontium as a stable isotope.</li> <li>b) Write note on temperature changes in acids and bases.</li> <li>c) Explain Isotope geochemistry.</li> </ul>	Uc
Q.4	<ul> <li>Answer any two of the following questions.</li> <li>a) Explain estimation of ionic concentration.</li> <li>b) Write note on radioactive isotopes.</li> <li>c) Write geological usages of acids and bases.</li> </ul>	08
Q.5	<ul><li>Answer any one of the following.</li><li>a) What is law of mass action? Explain Van't Hoff isotherm equation.</li><li>b) What is organic reaction? Explain origin of petroleum.</li></ul>	08

Seat No.						Set	P
В	3.Sc	c. (Se	emester - I	V) (New) (CBCS) ZOOLOGY (P		amination: March/April-2024 r – VII)	
			Fundar	mentals of Biocl	nem	istry (22221432)	
•			turday, 20-04 l To 11:00 Al			Max. Marks:	40
Instru	ctic	2	) Figures to t	is are compulsory. he right indicate full diagrams wherever			
Q.1	Mul	tiple (	choice Ques	stions.			08
	1)	a)	simple carbol Monosaccha Oligosaccha	aride	b)	e monomeric unite is called as Disaccharides Polysaccharides	·
:	2)		_ is left hand	ed DNA where the o	doub	le helix winds to the left in zig zac	
		,	ner. A DNA C DNA		b) d)	B DNA Z DNA	
:	3)		Glutamate	rganic molecules co		ting of a nucleosides and a Aspartate Phosphate	
	4)	a)		n secondary structur and Beta sheet	b)	proteins are Okazaki fragments Fab region	
,	5)	a)	h of these is Lysine Tyrosine	not a amino acid?	,	Isomeric Tryptophan	
	6)	a)	e the major s Cellulose Glycogen	torage form carbohy	/drate b) d)	Chitin	
,	7)	active a)	•	n catalysis. This clef	t or p b)	left or pocket in its structure which is bockets is known as Allosteric site Capsomer	
;	8)	prote a) c)	in. m RNA	RNA molecule that	help b) d)	s decode a mRNA sequence in to t RNA r RNA Polymerase	
;   	Ans a) b) c) d)	Signit Disac	ficance of 02 ccharide gen bases A	he following.			80

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Explain Isoenzyme.</li> <li>b) Biological significance of lipid.</li> <li>c) Describe general properties of Alpha- amino acid.</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain r RNA and t RNA.</li> <li>b) Describe saturated and unsaturated fatty acids.</li> <li>c) Explain properties of enzymes.</li> </ul>	08
Q.5	<ul><li>Answer any one of the following.</li><li>a) Describe structure of DNA and give its significance.</li><li>b) What are the different types of vitamins?</li></ul>	08

Seat No.							Set	P
I	B.S	c. (S		V) (New) (CBCS STATISTICS ( atistical Method	(Pape	r – VIII)	rch/April-2024	
-	Day & Date: Monday, 22-04-2024 Max. Marks: 40 ime: 09:00 AM To 11:00 AM							
Instru	nstructions: 1) All questions are compulsory. 2) Figures to right indicate full marks.							
Q.1	<b>chc</b> 1)	A rar	he correct andom variable $-3  \ge 2]$ is _	$e\ X$ has mean $3$ and			pper bound for	80
		a)	1		b)	$\frac{3}{4}$		
		c)	$\frac{1}{4}$		b) d)	$\frac{1}{2}$		
	2)	If Xi	are iid <i>N</i> (0,1)	r.vs, then limiting d			is $N(0,1)$ .	
		a)	$\bar{X}$		b)	$\frac{\bar{X}}{\sqrt{n}}$		
		c)	$\bar{X}\sqrt{n}$		d)	$\bar{X} + \sqrt{n}$		
	3)	Long a) c)	term fluctuat seasonal trend	ions in time series a		ed variati cyclical irregular	ons.	
	4)		period is 5	remove cyclic varianger remove cyclic me as that of cycle	b)	period is 9		
	5)		l of significan Type I error Not committ		of b) d)	 Type II error None of these		
	6)	a) b) c)	Rejecting <i>H</i> <sub>0</sub> Accepting <i>H</i>	when $H_0$ is wrong when $H_0$ is true $H_0$ when $H_0$ is wrong when $H_0$ is true $H_0$ when $H_0$ is true	l			
	7)	A hyp a) c)	oothesis may Simple Null	be classified are as	b) d)	 Composite All of these		
	8)	For to a)	esting a popu Z- test Chi-square t	llation variance whice	ch of th b) d)	e following test t t- test F- test	o be used?	

Q.2	a) b) c) d)	swer any Four of the following. State Chebycheve's Inequality. State central limit theorem. Define time series. Define Null hypothesis. Define Type-II error
Q.3	a) b)	swer any Two of the following. An unbiased coin is tossed 100 times. Then find the lower bound for the probability that the number of heads will be between 30 and 70. Discuss any two components of time series. Describe the procedure to test for testing population mean $\mu=\mu_0$ based on t-distribution.
Q.4	a) b)	<b>swer any Two of the following.</b> Explain in detail the meaning of time series analysis. Suppose $Xi$ are iid $P(1)$ r.vs. $i=1,2,\cdots,100$ . Then using CLT obtain approximately $P[\sum Xi > 120]$ . $[\emptyset(2) = 0.9772]$ Explain the test procedure for testing the goodness of fit.
Q.5	An: a) b)	swer any One of the following. Discuss the importance and utility of time series analysis in various fields. Describe the procedure for testing $H_0: \mu = \mu_0$ and $H_0: \mu_1 = \mu_2$ based on normal distribution.

						SLF	K-GA-T	<b>4</b>
Seat No.							Set	P
	B.S	c. (S		V) (New) (CBC METEOROLO orological Ins	GY (Pa	<u> </u>	ril-2024	
•			iesday, 23-04 /I To 11:00 Al			M	lax. Marks:	: 40
Instru	uctio	3	2) Draw neat 3) Figures to	ns are compulsory diagrams and give the right indicate for thirithmic table and	e equationul equationul equationul equationul equationul equationul equationul equationul equationul equationu equationul equationul equationul equationul equationul equationul equationul equationul equationul equationul e			
Q.1	Mu 1)	-	<b>choice ques</b> th of the follow Rain Hailstones	<b>tion.</b> wing is not the forr	m of pred b) d)	cipitation? Dew Condensation		80
	2)	a) b) c)	Atmospheric pressure gravelocity grad	$dient = \frac{dV}{dt}$				
	3)		th of the follow a torque pro a torque pro force is an e	e gradient = $\frac{dT}{dl}$ wing statement is oduces pure motion oduces pure motion entity which brings entity which brings	n of rota n of tran a body	tion. slation. at rest in motion		
	4)		Hooks anen cup anemor Thermograp	nometer neter		oressure exerted by the w	vind?	
	5)	Heat a) c)	stored in war Specific hea Absolute he		.· b) d)	Latent heat Relative heat		
	6)	a)	and wet bulb Absolute hu relative hum	•		easure atmospheric temperature minimum -maximum tem		
	7)	a)	th of the follow Anemomete Crooke's rag	er	b)	detect the radiations? Wind vane Radiation pyrometer		

b) Moistured) Thermocouple

8) \_\_\_\_ can be used to measure temperature.

a) Humidity c) Radiations

Q.2	An	swer any Four of the following.	08
	a)	Determine the common temperature shown by kelvin scale $(K)$ and Rankin $(Ra)$ scale.	
	b)	How is atmospheric pressure measured using Fortin's barometer?	
	c)	Distinguish between wind vane and anemometer.	
	d)	Why winds blow?	
	e)	For a $Fe-Cu$ thermocouple, inversion temperature is 500 °C. Calculate its neutral temperature.	
Q.3	Wr	ite short notes on any Two of the following.	08
	a)	Write a note on "The float gauge."	
	p)	Write a short note on the ordinary wind vane.	
	c)	Write a note on Ether thermoscope.	
Q.4	An	swer any Two of the following.	08
	a)	Draw neat labelled diagram of mercury barometer.	
	b)	With neat diagram explain construction and working of cup anemometer.	
	c)	Describe construction and working of radiation pyrometer.	
Q.5	An	swer any One of the following.	08
	a)	Willi neat labelled diagram, describe maximum and minimum thermometer.	
	b)	With neat labelled diagram explain construction and working of barograph.	

					JLK-GA-1	20	
Seat No.					Set	P	
B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024 GEO-CHEMISTRY (Paper – IV) Chemistry of The Earth (22221442)							
	Day & Date: Tuesday, 23-04-2024 Max. Marks: 40 Time: 09:00 AM To 11:00 AM						
Instructions: 1) All questions are compulsory.  2) Draw neat diagrams and give equations wherever necessary.  3) Figures to the right indicate full marks.  4) Use of logarithmic table and calculator is allowed.  (At. Wts.: H=1, C=12, O=16, N= 14, Na =23, CI = 35.5)							
	envii		s an Si:Al ratio a ferromagnesium		form in neutral or slightly alkaline eldspar minerals and especially Illite Chlorite	08	
:	<b>2)</b> The isoto	radioactive d	ecay of unstable ion of the daught pe	nuclides, er produc b)	which causes variation in the		
	<ul> <li>3) Sedimentation involves an interaction between</li> <li>a) Hydrosphere and Lithosphere</li> <li>b) Atmosphere and Lithosphere</li> <li>c) Hydrosphere and Atmosphere</li> <li>d) Hydrosphere, Atmosphere and Lithosphere</li> </ul>						
	a)	whose dimen 2 and 0.2, 0.02 and 0.0	sions are betwee	b)	mm is silty soil. 0.2 and 0.02, < 0.002		
	sour a)	ces of Primary Pol	•	b)	ulphur dioxide are the main Secondary pollutants None of the above		
	a)	ch one of the Iron meteor Stony mete		b)	wn as siderites? Iron-stony meteorites Metallic meteorites		
,		bonding is al atoms. lonic Metallic	the force of attra		ween valence electrons and the Covalent Hydrogen		
	abur	ording to the ondant Iron Silicon	cosmic abundand	b)	of the following element is  Carbon  Hydrogen		

Q.2	An: a) b) c) d) e)	Name the two types of Aerolite. What is the composition of chondrites. Define radiogenic isotopes. Name the factors affecting the formation of Soil. Name the trace elements of igneous rock. Which element having affinity towards metallic iron?	08
Q.3	Wr a) b) c)	ite short notes on any Two of the following. Geochemical cycle. Silicate structure. Carbon dating method.	08
Q.4	An: a) b) c)	swer any Two of the following.  Describe the types of chemical bonding with suitable examples.  Explain in brief geochemical classification of the elements.  Discuss in brief the products of sedimentation.	80
Q.5	An: a) b)	swer any one of the following.  Describe in the origin, structure and classification of clay minerals with suitable diagram.  Define colloids. Explain the its types and colloidal processes in the geological system.	08

				O.	-IX-OA-1	25
Seat No.					Set	P
В	-	ZOOLOG	Y (Paper	mination: March/ <i>l</i> – VIII) nation (22221433)	April-2024	
•	Date: Tuesday, 2 09:00 AM To 11:				Max. Marks	: 40
Instru	2) Draw	estions are compuls neat diagrams and es to the right indica	give equati	ons wherever necessa s.	ry.	
	<ul><li>a) Kill mid</li><li>b) Dissolv</li><li>c) Activat</li></ul>	ICL in the stomach		·		08
	a) muscl a) Smoot c) Cardia			Striated None of these		
	,	ctural and functiona ferous tubule		lney. Nephron Duct of Bertini		
	4) The blood ce a) Monoc c) Eosino	•	-	S Platelet Basophil		
	<b>5)</b> Hyposecretic a) Acrom c) Gigian	<b>.</b>		es Cretinism Goiter		
	6) hormo		velopment	of seminiferous tubule	s and	

b) LH

d) MSH

b) Calcitonin d) Epinephrine

b) Cartilage

d) All of the above

## Q.2 Answer any Four of the following.

7) Adrenal cortex secretes \_\_\_\_\_.

8) Growth hormone stimulate the growth of \_

a) Adrenaline

a) Bones c) Muscles

c) Aldosterone

80

- a) V.S.Tooth

- b) Parturitionc) Synapsed) Graffian follicle
- e) Epithelial tissue

a) FSH

c) GH

		<b>SLR-GA-129</b>
Q.3	<ul><li>Write short notes on any Two of the following.</li><li>a) Types of blood cells.</li><li>b) Ultra structure of skeletal muscle.</li><li>c) Pancreas.</li></ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) T.S.Testis</li> <li>b) Ultrastructure of neuron.</li> <li>c) technique of IVF.</li> </ul>	08
Q.5	<ul><li>Answer any one of the following.</li><li>a) Describe Molecular and chemical basis of muscle contraction</li><li>b) Explain Menstrual cycle.</li></ul>	<b>08</b> 1.

Seat No.	Set	Р

	B.Sc	:. (Semester - IV) (New) (CBCS MATHEMATICS Differential Equati	(Pa	per - VII)			
-		e: Wednesday, 24-04-2024 0 AM To 11:00 AM		Max. Marks: 40			
Instr	Instructions:1) All questions are compulsory. 2) Figures to the right indicate full marks.						
Q.1	<b>Choo</b> 1)	The equation $y = px + f(p)$ is called a) Linear c) Clairaut's	b)	_			
	2)		b)	(y-c)(x-c) $(y+c)(x+c)$			
	3)	If $P + Qx = 0$ then the solution of the $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = 0$ is	·				
	4)	a) $y = e^x$ c) $y = e^{2x}$ $y = e^{-x}$ is known solution of C.F. of	d)	$y = e^{-x}$ y = x ferential equation			
		$\frac{d^{2}y}{dx^{2}} + P\frac{dy}{dx} + QY = R \text{ if } \underline{\hspace{1cm}}.$ a) $1 + Px + Qx^{2} = 0$ c) $1 - P + Q = 0$	,	1 + P + Q = 0 1 + P - Q = 0			
	5)	The homogeneous linear equation constant coefficients by using substitution $x = \log z$ c) $x = \frac{1}{z}$	an be tution b)	reduced to linear equation with			
	6)	Z					
	7)	In the simultaneous equation $\frac{dx}{P} = \frac{dy}{Q}$ a) constant	$\frac{dz}{dz} = \frac{dz}{R}$	the value of $P$ , $Q$ , $R$ are function of $x$ only			
	8)	c) function of $x \& y$ If the condition of integrability is satisfy $dx + x dy + 2z dz = 0$ is  a) $xy + z = c$ c) $xy + 2z^2 = c$	b)	function of $x, y, z$ nen the solution of the equation $xy + z^2 = c$ $xy + z^3 = c$			

Q.2 Answer any four of the following.

08

- a) Solve  $P = \log (px y)$
- **b)** Solve (P+4)(P-3) = 0
- c) State the geometric Interpretation of Pdx + Qdy + Rdz = 0
- **d)** Solve  $\frac{dx}{yz} = \frac{dy}{zx} = \frac{dz}{xy}$
- **e)** Solve  $x^2 \frac{d^2y}{dx^2} 4x \frac{dy}{dx} + 6y = 0$
- Q.3 Answer any two of the following.

80

- 1) Define homogeneous linear differential equation of order n. Explain the method of solving it.
- 2) Define Clairaut's equation and Explain the method of solving it.
- 3) Solve  $x^2 \frac{d^2y}{dx^2} z(x^2 + x) \frac{dy}{dx} + (x^2 + 2x + 2)y = 0$
- Q.4 Answer any two of the following.

08

- 1) Solve yz dx + zx dy + xy dz = 0
- 2) Solve  $(x+1)^2 \frac{d^2y}{dx^2} + (x+1) \frac{dy}{dx} y = 2\log(x+1)$
- Explain the method of solving the equation  $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$  where P, Q, R are function of x by removal of the first order derivative by changing the dependent variable.
- Q.5 Answer any One of the following.

- 1) Explain the method of solving simultaneous differential equation  $\frac{dx}{P} = \frac{dy}{Q} = \frac{dy}{R}$  and Solve  $\frac{dx}{z} = \frac{dy}{z} = \frac{dz}{z^2 + (x+y)^2}$
- 2) Explain the method of solving the equation which is solvable for y and hence. Solve  $y=2px+x^2p^4$

Seat No.			Set	P
В	•	V) (New) (CBCS) Exa BOTANY (Paper Plant Physiology (2	•	
-	Date: Thursday, 25-04 09:00 AM To 11:00 AM	4-2024	Max. Marks	s: 40
Instru	,	s are compulsory. he right indicate full mar and labeled diagram whe		
,	a) Pr c) Pr & Pfr <b>2)</b> is the shortantes a) Tobacco	exists in forms. b) d) -day plant. b)	Pfr None of these Barley	08
;	c) Coconut  3) The translocation ( a) xylem c) tracheid	d) of organic substances oo b) d)	Pea ccurs through tissue. phloem vessel	
•	4) The region a) source c) utilization	supplies the organic sub b) d)	estance for translocations. sink None of these	
	5) In photosynthesis, a) Heat energy c) chemical en	,		
(	6) Initial stable produ a) PGA c) OAA	ct in C <sub>4</sub> pathway is b) d)	 PGAL Malic acid	
,	7) Photorespiration is a) C3 plants c) CAM plants	s characteristic ofb) d)	C4 plants None of the above	
;	<ul><li>8) Light reactions are a) Reducing po c) energy</li></ul>	e required for the synthes ower b) d)	<del> </del>	
;   	Answer any Four of t  a) Define photoperion  b) What is phytochro  c) What is phloem tra  d) Define Photosynth  e) What is photoresp	dism. me ansport? aesis		08

SLR-GA-1	31
----------	----

Q.3	<ul> <li>Write short notes on any Two of following.</li> <li>a) Photosynthetic Pigments</li> <li>b) Structure of Mitochondria</li> <li>c) Significance of vernalization</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Describe in brief SDP and LDP.</li> <li>b) Describe ultrastructure of Photosynthetic Apparatus with suitable diagram.</li> <li>c) Describe in brief TCA cycle.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) What is respiration? Give an account of Glycolysis.</li><li>b) Give an account of C<sub>3</sub> pathway.</li></ul>	08

Seat No.		Set	P				
B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024  MATHEMATICS (Paper - VIII)  Abstract Algebra - I (22221424)							
•		e: Friday, 26-04-2024 Max. Marks 00 AM To 11:00 AM	: 40				
Instru	uctio	<ul><li>ns: 1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li></ul>					
Q.1	1)	ose correct alternatives for each of the following. The symmetric group $S_5$ has elements.  a) 5	80				
	2)	<ul> <li>(Z, -) is not a group since it does not satisfy following property</li> <li>a) Closed</li> <li>b) Associative</li> <li>c) Identity</li> <li>d) Inverse</li> </ul>					
	3)	Let $f: G \to G'$ be homomorphism then kerf = a) $\{x \in G/f(x) = e'\}$ b) $\{x \in G/f(x) = e\}$ c) $\{x \in G'/f(x) = e\}$ d) $\{x \in G'/f(x) = x\}$					
	4)	A cyclic group is always  a) A finite group  b) An abelian group  c) An infinite group  d) A non abelian group					
	5)	The number of generators of the group $Z_{12}$ is a) 1 b) 2 c) 4 d) 11					
	6)	The value of expression [2] $\odot$ [4] in $Z_7$ is a) [1] b) [2] c) [3] d) [4]					
	7)	A relation $'\sim'$ on set $s$ defined by $a\sim b \Rightarrow b\sim a \ \forall \ a,b\in s$ is called  a) Reflexive b) Symmetric c) Transitive d) None of these					
	8)	The Euler $\emptyset$ function, $\emptyset(8) = $ a) 8					
Q.2	Atte a) b)	mpt any four of the following: Show that the inverse of each element of a group $G$ is unique. If $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 4 & 3 & 2 \end{pmatrix}$ , $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 1 & 4 & 2 \end{pmatrix}$ the find $\alpha \circ \beta \& \beta \circ \alpha$ .	80				
	c)	Solve the equation $x(1 \ 3 \ 2) = (1 \ 3)$ in $S_3$ .					
	d)	Construct the Cayley table for $Z_5$					
	e)	Let $\theta: R^+ \to R$ be defined by $\theta(x) = \log x$ then show that $\theta$ is homomorphism.					

80

b)	For permutation $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 5 & 6 & 4 & 2 & 1 \end{pmatrix}$ $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 6 & 4 & 5 & 3 & 2 \end{pmatrix}$	
c)	Compute $\beta$ o $\alpha$ , $\alpha^{-1}$ o $\beta^{-1}$ , $\alpha^2\beta$ , $\alpha\beta^2$ Show that every subgroup of cyclic group is cyclic.	
Atte	mpt any two of the following.	08
a)	Show that every quotient group of abelian group is abelian. What about converse?	
b)	Find all the subgroup of $Z_{12}$ . Also construct the subgroup lattice.	
c)	Determine the right coset of $<$ [4] $>$ in $Z_{12}$ .	
Atte a)	mpt any one of the following. State and prove Cayley's theorem.	08
	c) Atte a) b) c)	<ul> <li>Show that every subgroup of cyclic group is cyclic.</li> <li>Attempt any two of the following.</li> <li>a) Show that every quotient group of abelian group is abelian. What about converse?</li> <li>b) Find all the subgroup of Z<sub>12</sub>. Also construct the subgroup lattice.</li> <li>c) Determine the right coset of &lt; [4] &gt; in Z<sub>12</sub>.</li> <li>Attempt any one of the following.</li> </ul>

Q.3 Attempt any two of the following.

State and prove Lagrange's theorem.

	_	
Seat	Set	D
No.	Set	P

	B.S	c. (Semester - IV) (New) (CBCS)   BOTANY (Pap			2024
		Embryology of Angios		•	
		ite: Saturday, 27-04-2024 00 AM To 11:00 AM		•	Marks: 40
Instr	uctio	ons: 1) All questions are compulsory. 2) Figures to the right indicate full n 3) Draw neat diagrams and give eq			
Q.1	Cho 1)	pose the correct alternatives from the floral whorled flower is called typ a) Two c) Four	•	flower.	08
	2)	The sporangial initial cell is called as a) Archesporial cell c) Secondary nucleus	•	 Antipodal cell Peripheral cell	
	3)	Endosperm in angiosperm have a) One c) Three	b)	t of chromosomes. Two Four	
	4)	The entry of pollen tube in ovule throug a) Chalazogamy c) Porogamy	h in b) d)	egument, is known as Mesogamy None of these	<u>_</u> .
	5)	is the most common nutritive tisangiosperms. a) Endosperm c) Promeristem	b) d)	for the developing embryos  Tapetum  None of these	in
	6)	type of endosperms is supposed a) Helobial c) Nuclear		oe rare. Cellular None of these	
	7)	acts as shock absorbance in cod a) Epicarp c) Endocarp	b) d)	t fruit during dispersal. Mesocarp None of these	
	8)	seeds are exalbuminous seeds. a) Monocot c) Both a & b	b) d)	Dicot None of these	
Q.2	Ans	swers any Four of the following.			08
	•	What is mean by primordia? Define archesporium. What is mean by Autogamy? What is mean by endospermic seeds? Give the examples of non-endospermic		.dc	

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Self-seed dispersal mechanism in plants.</li> <li>b) Bisporic embryo sac development with neat, labeled diagrams.</li> <li>c) Flower as a modified determinate shoot and evidence.</li> </ul>	08
Q.4	<ul> <li>Answers any Two of the following.</li> <li>a) Give the functions of tapetum.</li> <li>b) Write on agents of pollination.</li> <li>c) Describe pollination mechanism in <i>Maize</i>.</li> </ul>	08
Q.5	<ul> <li>Answers any One of the following.</li> <li>a) Describe the development of female gametophyte with diagrams.</li> <li>b) Describe the embryo development in dicotyledons.</li> </ul>	08

		<u></u>	
Seat No.	t		Set P
E		S) Examination: March/April-2 Y (Paper – VII) raphy (22221435)	2024
	& Date: Monday, 29-04-2024 : 09:00 AM To 11:00 AM	Max.	Marks: 40
Instru	uctions: 1) All questions are compulsory 2) Draw neat labeled diagram w 3) Figures to right indicate full n	wherever necessary.	
Q.1	<ul><li>Multiple choice questions.</li><li>1) Economic Geography is a branch o</li><li>a) Cultural</li><li>c) Political</li></ul>	of Geography. b) Social d) Human	08
	<ul><li>2) The word 'agriculture' (Agricultura)</li><li>a) Arabian</li><li>c) Roman</li></ul>	derived from the language. b) Latin d) Greek	
	<ul><li>3) Agriculture Land use model by Von</li><li>a) 1726</li><li>c) 1926</li></ul>	Thunes has given in b) 1826 d) 1996	
	<ul><li>4) Transport is a type of economic</li><li>a) Primary</li><li>c) Tertiary</li></ul>	omic activity. b) Secondary d) Quaternary	
	<ul><li>5) Industrial location theory has given</li><li>a) A. Wagner's</li><li>c) Von Thunes</li></ul>	by b) A. Weber's d) Carl Ritter	
	6) Trade is types of occupation a) Primary c) Tertiary	n. b) Secondary d) Quaternary	
	7) SEZ is a a) Special Economic Zones	b) Spatial Economic Zones	

d) Special Economic Zoo

b) Mining

d) Transportation

#### Q.2 Answer any Four the following.

c) Manufacturing

a) Acting

80

- a) Define the concept of Mining.
- b) Define the concept Sustainable agriculture.c) Define the Technology Park.

c) Special Ecological Zones

\_\_\_\_ is a primary types of economic activities.

- d) Define the concept of manufacturing region.
- e) Define the concept of Trade.

SL	.R-	GΑ	-1	34	4
SL	.R-	GΑ	1	34	

Q.3	<ul> <li>Write short note on any Two of the following.</li> <li>a) Primary economic activities.</li> <li>b) Commercial agriculture.</li> <li>c) Iron and steel industries.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain the types of Tertiary economic activities.</li> <li>b) Explain the Industrial Location Theory by Alfred Weber.</li> <li>c) Explain the major characteristics of Secondary economic activities.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Explain the Agriculture Landuse Model by Von Thunes.</li> <li>b) Explain the trade organization of WTO and OPEC.</li> </ul>	08

No.					S	et	P
E	•	I	ÉLECTRONICS	S (Pap		24	
•	Date: Moi	nday, 29-04-2 To 11:00 AM	_	і Арріі	<b>cations (22221426)</b> Max. Ma	arks:	40
Instru	2) 3)	Draw neat la Figures to rig	are compulsory. beled diagram wh ght indicate full ma thmic table and c	arks.			
	<b>1)</b> The _ a)	choice questi configuinverting non-inverting		_	ain less than one. differential both inverting & differential		80
2	conne a)	ected in feedback			ration of OpAmp, the capacitor at the inverting terminal in designer chosen	is	
;	a)	andwidth of o almost zero almost infinity			OpAmp circuits is in audio frequency range in radio frequency range		
•	OpAm a)		rossing detector ι nce voltage is	_	n inverting configuration of - zero Volt All of these		
į	config a)	parame uration. slew rate CMRR	ter normally decid	les the s b) d)	peed of OpAmp in differential PSRR offset voltage		
(	resista is a)	ance is 5 KOh  + 20 mV		resistan b)			
•	<b>7)</b> The _ a)	- 5 mV of IC 7 pin 2 and Vcc pin 1 and 5	41 are utilized for	offset n	+ 5 mV ull procedure. pin 2 and 3 pin 3 and Vcc		
	a)	e of Op-Amp, transconducta conductance			amplifier. transresistance buffer		

Q.2	An a) b) c) d) e) f)	State any Four the following. State any four OpAmp 741 characteristics. State the need of feedback in OpAmp. Draw the neat labelled IC741 pin configuration. Find the CMRR in dB, if Ad is 10000 and Ac is 0.70. Define the OpAmp parameter slew rate and input offset voltage. State any two linear application of OpAmp.	08
Q.3	a) b)	swer any Two the following.  Explain slew rate & CMRR.  Explain the OpAmp as a schmitt trigger circuit.  Explain the OpAmp as an adder circuit.	80
Q.4	a)	swer any Two the following.  Explain the OpAmp as a differentiator circuit.  Explain the current mirror bias circuit for differential amplifier.  Explain the OpAmp zero crossing detector.	08
Q.5	An a) b)	<ul> <li>swer any One the following.</li> <li>Explain the following.</li> <li>1) OpAmp as a triangular wave generator.</li> <li>2) OpAmp as a current to voltage converter.</li> <li>State the various configurations of OpAmp &amp; need of closed loop configuration.</li> <li>Derive the gain relation for the closed loop non-inverting configuration.</li> </ul>	80

Seat No.						Set	P
E	3.S	c. (Semester -		(CBCS) E -OGY (Pap		amination: March/April-2024 r – VII)	
		Sedimenta			•	Petrology (22221414)	
-		te: Tuesday, 30-04 00 AM To 11:00 A				Max. Mark	s: 40
Instru	ctio	o <b>ns:</b> 1) All question 2) Draw neat of 3) Figures to t	diagram wh	erever nece			
Q.1	Mul	tiple choice ques	tions:				80
•	1)		-		ed	by deposition of sediments in	
		standing, quiet wa a) rudaceous c) argillaceous		b	o) d)	arenaceous residual	
2	2)	Which of the follo	wing shows	s non-foliate	d fa	abric?	
	,	a) Marble	J	k	၁)	Schist	
,	٥,	c) Gneiss			′	None of these	
,	-	A tendency of me called .	tamorphic i	rock to split (	eas	sily along thin, smooth planes is	
		a) slaty cleava	•	b	)		
		c) stratification			(k	None of these	
4	4)	The sediments ha	ving size le			are called pebbles	
		c) silt			d)	boulders	
į	5)		dstone has	s coarse grai	ine	d, sub-rounded texture?	
		<ul><li>a) Arkose</li><li>c) ferruginous</li></ul>	sandstone		4) 5)	Grit argillaceous sandstone	
	6)	,			•	e can be seen in	
'	υ,	a) limestone	ating of car		)		
		c) oolitic limes	tone	C	(k	bauxite	
•	7)	Composition of do	olomite is _		. \	MacCO	
		a) CaCO₃ c) CaCO₃,Mg(	CO <sub>3</sub>		(c (k	MgCO <sub>3</sub> None of these	
	8)	Gneiss represents			,		
	-,	a) strongly		b	)	non	
		c) weakly		C	(k	None of these	
; ; (	a) b) c) d)	wer any Four of What are calcared What is migmatite Give the two nam Define metamorp What is greywack	ous deposit es? es of miner hic facies.	s?	in z	zeolite facies.	08

SLR-GA-1	37
----------	----

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Limestone.</li> <li>b) Eclogite Facies.</li> <li>c) Rudaceous rocks with its verities.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Describe the bedding and stratification structures in sedimentary rock.</li> <li>b) Describe the greenschist facies.</li> <li>c) Describe the Arenaceous sedimentary rock.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) Describe structures of metamorphic rock.</li><li>b) Describe process of formation of sedimentary rock.</li></ul>	08

					OL.	-IX-OA-1	<b>J</b> U
Seat No.						Set	Р
	·		MICROBIOL ogy & Medica	OGÝ (Pa	nmination: March/A per – VII) piology (22221420)	-	· <b>4</b> 0
		ловацу, оо о Л То 11:00 А				Wax. Warks	. 10
Instru	2	2) Figures to	ns are compulse the right indicat diagrams where	e full mark			
Q.1	1) The a)	<b>choice ques</b> smallest unit Epitope Heptane	<b>itions.</b> of antigenicity i	sb) d)	Adjuvants Paratope		80
	spec	ies is called a Species im	as munity		ons shown by all memb Racial immunity None of these	per of	
	trans a)		ody or immunizo sive	ed lympho b)	r to non immune recipi cytes is known as Natural Active Artificial active		<b>1</b> .
	a)	condition who Anoxia Anemia	ere rise in body	b)	ire following infection is Leukopenia Pyrexia	s called as _	
	a) c)	 IgG	antibody appe	b)	ry immune response. IgD None of these		
	•	reaction betw ments is calle		tigen and a	antibody resulting in fo	rmation of	

b) Precipitation

d) Both b & c

b) Flaviviridae

b) Sabin

d) Poulvac

d) Lyssaviridae

#### Q.2 Answer any Four of the following.

a) Agglutination

c) Flocculation

a) Arboviridae

c) Reoviridae

80

- a) General features of IgE antibody.b) Define Epitope and Paratope.
- c) Define adjuvants.

a) TAB

c) BCG

- d) Enlist the symptoms of Candidiasis.
- e) Enlist the cells involved in innate immunity.

7) The Dengue virus belongs to \_\_\_\_\_ family of virus.

Prophylactic vaccine is used for enteric fever.

SLR-GA-138	E
------------	---

Q.3	Wr a) b) c)	ite short notes on any Two of the following.  Describe factors affecting antigenicity.  Write in short role of inflammation in immunity.  Describe in short about life cycle of Dengue virus.	30
Q.4	An a) b) c)	swer any Two of the following.  Write in short about agglutination reaction of Antigen and antibody.  Define antigen and write in short about types of antigen.  Describe in short about basic structure of antibody.	08
Q.5	An a) b)	swer any One of the following.  Describe in detail about the causative agent, pathogenesis, symptoms, laboratory diagnosis, prophylactic measures and treatment of enteric fever.  Describe in detail about the mechanical barriers involved in innate immunity.	30

Seat	Set [	<b>-</b>
No.	Set F	_

# B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024

		Geogra Environmenta	apny (Pape al Geograph	•	
•		ursday, 02-05-2024 To 11:00 AM		,	Max. Marks: 40
Instruc	2	) All questions are comp ) Draw neat diagrams w ) Use of Stencils is allov	herever neces	ssary.	
Q.1 F 1		blanks with correct a nature of environmental Changing Interdisciplinary		Complex All of these	08
2	) The f a) c)	term means surro Region Environment	ounding. b) d)	Climate Land	
3	) The v a) c)	word Ecosystem was co Tansley Lindeman	bined by b) d)	 Fosobarg Park	
4	) Natu a) c)	ral and are two ty Cultural Political	ypes of enviro b) d)	nment. Economic Historical	
5	) An a a) c)	nimal that depend on ot Autotrophic Producer	hers for food i b) d)	s called Hetrophic Decomposer	
6	a) c)	_ is a main cause of de Biome Deforestation	sertification. b) d)	Ecosystem None of these	
7	a) c)	_ gas is responsible for Carbon dioxide Oxygen	global warmir b) d)	ng. Hydrogen Nitrogen	
8	) Cultu a) c)	ıral functions are main o Air Water	b) d)	_ pollution. Land Sound	
Q.2 A a b c d	) Impo ) Wha ) Wha l) Wha	Iny four of the following ortance of Environmenta t is Biome? t is Ecosystem? t is acid rain? t is Food Chain?			08

			SLR-GA-139
Q.3	Wri a) b) c)	ite short notes on any two of the following. Global Warming Forest Ecosystem Desertification	08
Q.4	Ans	swer any Two of the following.	08
	a)	Explain the types of Aquatic Biomes.	
	b)	Explain the causes of Water Pollutions.	
	c)	Explain the causes of Climate Change.	

## Q.5 Answer any one of the following. a) What is Air Pollution? Explain the causes of Air Pollution. b) Explain the Nature and Scope of Environmental Geography. 80

Seat No.						Se	t	Р
В	.Sc	-		<b>ELECTRONICS</b>	(Pap	•	4	
			•	-	cropi	rocessor (22221427)		
•			ırsday, 02-0 To 11:00 Al			Max. Mai	'ks	: 40
Instru	ctio	2) 3)	Draw neat Figures to t	the right indicate ful	l mark	ions wherever necessary. ks. fic calculator is allow.		
Q.1	Mult	iple C	Choice Que	stions.				08
,	1)	The r a) c)	nemory chip EEPROM PROM	IC 2764 is a	 b) d)	UVEPROM MROM		
	2)	0)		is employed in ADC	,	804 for converting analog data		
•	<del>-</del> ,	into d	_ teermique ligital data.	is employed in ABC	7100	004 for converting analog data		
		a)	Dual Slope		b)	· .		
	٥,	c)	Flash		d)	SAR type		
,	3)		e 8085 proce n data is acc		store	the address of memory from		
		a)			b)	DE pair		
		c)	PC		d)	SP		
•	4)			byte instruction.	<b>b</b> \	INI		
		a) c)	JNZ ADD		b) d)	IN OUT		
,	5)	,		for generation of th	,	trol signals for memory and IO.		
	-,	a)	74138	<b>g</b>	b)	74245		
		c)	74373		d)	74244		
(	6)			the input and outpu	t of da	ata is symbolized by the		
		shape a)	ਰ. Oval		b)	Parallelogram		
		c)	Diamond		ď)	Rectangle		
	7)			ncy of the 8085 mic				
		a) c)	6 MHz 12 MHz		b) d)	9 MHz 3 MHz		
	8)	C)		generate various w	,			
,	0)	a)	_ is used to Bi-direction	_	b)	Analog to digital converters		
		c)	Digital to an	nalog converters	•	<u> </u>		
Q.2	Ans	wer a	nv four of t	he following.				08
	a)	What	do you mea	an by SRAM and Di				
	p)			esolution and accur	•			
	c) d)			the 8085 processor' an by addressing m		gram counter.		
	e)			te and a linear addr		ecoding technique.		

Q.3	Write short notes on any two of the following.					
		Volatile Memory.				
	b)	Flash ADC.				
	c)	Register array of 8085 processor.				

#### Q.4 Answer any Two of the following.

08

- a) Write assembly language program to transfer the block of 10-memory location.
- b) With a neat diagram, explain the generation of MEMR, MEMW, IOR and IOW control signals by using decoder IC 74138.
- c) Calculate the analog O/P voltage for R-2R DAC if digital data is 11010 For logic 1=10 Volt and for logic 0 = 0 volts.

#### Q.5 Answer any one of the following.

- a) Classify the instruction set according to the function of instruction with suitable examples.
- **b)** State the salient features of 8085 processor and explain ALU, Accumulator, and flag register of 8085 processor.

Seat No.								Set	P
В	3.Sc	c. (Se	emester - I	V) (New) (CE GEOLOG` Stratigrap	Y (Pape	r -	•	pril-2024	
•			day, 03-05-2 1 To 11:00 Al	024			•	Max. Marks	: 40
Instru	ictio	2	2) Draw neat	is are compulso diagrams and g he right indicat	give equa		ns wherever necessary	/.	
	1)	Whic a) c)	Vindhyan Cuddapah	ving represent	b) d)	)	ian formation? Dharwar All the above		80
	2)	a)	es Hutton has Unconformit Uniformitaria	•	e of b) d)		 Discontinuity Disconformity		
	3)		trapean beds Dharwar Siwaliks	s belong to	 b) d)		Vindhyan Deccan Trap		
	4)		of Delhi supe Cambrian Silurian	r group is	 b) d)		Precambrian Jurassic		
	5)	a)	ond deposits Vindhyan Cuddapah	found in Pann	a region ( b) d)	)	system. Dharwar Deccan Trap		
	6)	a)	der formatior Vindhyan Cuddapah	n belongs to	 b) d)		Dharwar Deccan Trap		
	7)	A Str a) c)	atigraphic Pri James Hutto Nicholas Ste	on	of Super b) d)	)	osition has been given Guttenberg William Smith	by	
	8)		h is the follov Group Formation	ving is smallest		)	raphic division? Super-group All the above		
	Ans a) b) c) d) e)	Defin Defin What Give	le Index fossi le Stratigraph t are inter-tra two names o	y.		life	e.		08

		SLR-GA	<b>\-142</b>
Q.3	Wr a) b) c)	rite short notes on any Two of the following.  Deccan Trap - Lithology and Distribution.  Lithology and Age of Dharwar super group.  Classification of Cuddapah super group.	08
Q.4	An a) b) c)	swer any Two of the following. Explain peninsular region of India. Describe the classification of Delhi super group. Economic importance of Dharwar super group.	80
Q.5	An a) b)	Swer any One of the following.  Describe lithology, distribution, life, age and economic importance of Cuddapah system.  Define Correlation. Describe any two Physical methods of stratigraphic correlation.	80

Seat No.							Set	P
E	B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024 MICROBIOLOGY (Paper – VIII) Introduction to Industrial Microbiology (22221421)							
•	Day & Date: Friday, 03-05-2024 Max. Marks: 40 Fime: 09:00 AM To 11:00 AM							
Instru	ictio	2	2) Draw neat	is are compulsory. diagrams and give he right indicate fu	equation	ons wherever necessary. s		
Q.1	Mu∣ 1)	In wh medi	um?	owing the microorg	b)	s grow on the surface of the surface fermentation batch fermentation	ne	80
	2)	What a) b)	do you mean decreasing to decreasing the increasing the	n by scale up? the scale of fermer the rate of agitation he scale of fermen rate of fermentation	ntation n tation			
	3)	— а) с)	antibiotic Penicillin Tetracycline		cell wall b) d)	of Gram positive bacteria Streptomycin Kanamycin		
	4)		Incorporatio	n of CaCO <sub>3</sub> in the ate technique e method		e detected by the method _ edium	·	
	5)	a)	h of the follow Synthetic med Simple med		b)	Crude media Complex media		
	6)	a)	nite waste liqu sugarcane paper and p	uor is the waste of ulp	b)	industry. diary None of the above		
	7)	a)	h of the follov waste liquor yeast extrac		b)	rce. corn steep liquor peptone		
	8)	a)	oatch culture open isolated	is an cultu	b)	em. closed semi closed		

SLR-	GA-1	43
SLK-	GA-I	4、

Q.2	Answer any Four of the following.	08
	<ul> <li>a) Define primary screening.</li> <li>b) What is a sparget?</li> <li>c) Define black strape molasses.</li> <li>d) What is pilot fermentor?</li> <li>e) What is corn steep liquor?</li> </ul>	
Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Write a note on chemostat.</li> <li>b) Give the details on Inoculum development.</li> <li>c) Write an account on preservation of industrially important microorganisms.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Draw a neat labelled diagram of a bioreactor.</li> <li>b) Explain recovery of alcohol with a flow sheet diagram.</li> <li>c) Give the difference between dual culture and multiple culture fermentation with suitable examples.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) What is strain? With suitable example elaborate strain improvement.</li> <li>b) Explain the concept of single cell protein fermentation in details.</li> </ul>	80

Seat No.			Set	P
E	3.Sc	c. (Semester - IV) (Old) (CBCS) Examination: March/A CHEMISTRY (Paper - VII) Physical Chemistry (19201407)	April-2024	
		te: Friday, 05-04-2024 00 AM To 11:00 AM	Max. Marks	: 40
Instru	ıctio	<ul> <li>2) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of logarithmic tables and calculator is allowed.</li> <li>(At. Wt. H = 1, C = 12, O = 16, N = 14, Na = 23, Ag = 108, Cl = 3</li> </ul>		
<ul> <li>Q.1 Choose the most correct alternative of the following and rewrite the sentences.</li> <li>1) In case of uni-univalent electrolytes, the equivalent and molecular conductions are</li> <li>a) equal</li> <li>b) zero</li> <li>c) unequal</li> <li>d) none of these</li> </ul>				08
	2)	Which of the following solid is crystalline in nature?  a) glass b) rubber c) ice d) plastic		
	3)	The sum of the transport numbers of cation and anion must be _ a) two b) one c) zero d) fractional	·	
	4)	Which of the following is completely soluble salt?  a) BaSO <sub>4</sub> b) PbSO <sub>4</sub> c) AgCl d) NaCl		
	5)	Nernst distribution law is applicable when the two liquids are	<del>-</del>	

miscible in each other

remains unchanged

When water is vaporized, the entropy will \_\_\_\_\_

partly miscible

decrease

associated

a) decrease on dilution

remains unchanged

c)

a)

c)

8)

solvent.

a) normal

electrolyte?

b) immiscible in each other

d) volatile

d) increase

b) dissociated

b) increase on dilution

d) none of these

d) solvated

The equation,  $K = \frac{c_1}{\sqrt{c_2}}$  indicates that the solute is \_\_\_\_\_ in the second

What is the effect of dilution on the equivalent conductance of strong

b) becomes zero

Q.2	Ans a) b) c) d) e)	What are crystalline and amorphous solids? What are electrolytic conductors? Define entropy. Give its units. State third law of thermodynamics. Draw and label moving boundary apparatus for determination of transport numbers. What are Weiss indices and Miller indices.	08
Q.3	Wri a) b) c)	te short notes on any two of the following. State and explain the Nernst distribution law. What are its limitations? Describe the entropy change in mixing of gases. Discuss the relation between specific and equivalent conductance.	30
Q.4	Ans a) b) c)	Explain the phenomenon of dissociation and association of solute in solvents. Define transport number. Discus factors influencing transport number. Show that for thermodynamically irreversible process, the entropy change is always greater than zero at constant temperature.  Calculate the entropy change involved in the isothermal reversible expansion of 5 moles of an ideal gas from a volume of 5 dm³ to a volume 50 dm³.  (R= 8.314 JK-1mol-1).	08
Q.5	Ans a)	Describe the determination of equivalent conductance at infinite dilution of weak electrolyte.  Calculate equivalent conductance at infinite dilution of acetic acid at 298 K. Given that molar conductivities at infinite dilution of HCI, CH <sub>3</sub> COONa and NaCl are 0.04261, 0.0091 and 0.01265 S.m <sup>2</sup> mol <sup>-1</sup> respectively.	08

The glancing angle for the first order X-ray reflection from a given lattice plane is 9.8°. Calculate the glancing angle for the second and third order reflection from the same order.

**b)** Give principle of Bragg's equation? Derive Bragg's equation.

Seat No.	Set	Р
-------------	-----	---

# B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024

	<b>D</b> .0	o. (o.	COMPUTER SCIENC Software Engineering	E (	Paper - VII)	
•			iday, 12-05-2024 To 11:00 AM	ng (	Max. Marks:	: 40
Instr	uctio		All questions are compulsory. Figures to right indicate full marks	<b>S</b> .		
Q.1	Mult	•	<b>hoice question.</b> nost important feature of spiral mo Risk management Performance management	b)	s Quality management Efficiency management	80
	2)	a)	k" refers in the black box testing m I-O is hidden User is hidden	nean: b) d)	s Design is hidden All of these	
	3)	The f a) c)	irst step in Software Development Preliminary Investigation System Testing		Cycle is System Design System Coding	
	4)	a) c)	_ is sometimes referred as 'Bubble Flowchart Decision table	e Dia b) d)	gram'. ER- Diagram DFD	
	5)		nodification of the software to mat onment, falls under which category Corrective Perfective			
	6)	ldenti a) c)	ify which one of the following is no It improves software quality Both a and b	b)	enefit of CASE Tools? Reduces time and cost None of the above	
	7)	What a) b) c) d)	is Software Engineering? Designing a software Testing a software Application of engineering princip None of the above	les to	o the design a software	
	8)	Whick a) b) c) d)	h is NOT a software characteristic Software does not wear out Software is flexible Software is not manufactured Software is always correct	?		
Q.2	Ans		ny four of the following. are the 7 Phases of SDLC?			80

- What is the DFD? 2)
- 3) What is Decision Tree?
- 4) Who is System Analyst?
  5) Define the term Entity and Attribute.
  6) What are the types of decision table?

			SLR-GA-145
Q.3		ite short notes on any two of the following.	08
	1)	Feasibility study	
	2)	Fact finding technique - Questionnaire	
	3)	What is flowchart? State the principles of flowcharting.	
Q.4	An	swer any two of the following.	08
	1)	Explain white box testing techniques.	
	2)	Differentiate between logical DFD and physical DFD.	
	3)	Explain V shape model.	

#### Q.5 Answer any one of the following

- 1) Explain Top-down incremental implementation. State its advantages and disadvantages
- 2) Explain the various types of system in detail.

Seat	Sat	D
No.	Set	

## B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024

		(-	CHEM	ISTRY (P	ape	er - VIII)	<b></b>
		An	alytical & Industria	•	•	•	408)
•			ednesday, 10-04-2024 I To 11:00 AM				Max. Marks: 40
Instr	uctio	3	) All questions are com 2) Draw neat diagrams ( 3) Figures to the right in 4) Use of logarithmic tab (At. Wts.: H=1, C=12,	and give eq dicate full note and calc	nark :ulat	s. or is allowed.	ary.
Q.1		Solut	the correct alternative ion of known strength i normal standard		b)		08
	2)	a)	D₄ is mostly pre crystalline curdy	ecipitate.	,	amorphous gelatinous	
	3)	catal <sub>y</sub>	e manufacture of ammo yst. Cobalt Fe <sub>2</sub> O <sub>3</sub> + Mo	onia by Hab	b)	process is us  V <sub>2</sub> O <sub>5</sub> Nickel	sed as a
	4)	a)	erally, sulphide ores are gravity separation magnetic separation		b)	froth floatation	
	5)		is specific reagent for nickel cobalt	·	b) d)	zinc copper	
	6)		chrome black is auto metallochromic	_ indicator.	b) d)	acid-base redox	
	7)	a)	olphthalein is neutral weak inorganic acid		b) d)	strong base weak organic acid	
	8)	For n a) c)	naking of ball bearing _ nickel silicon	stee	b)	used. chrome tungsten	

	<del></del>	
Ans a) b) c) d) e)	What are the types acid base titration? Define acid-base indicators and give example. Which catalyst is used in the manufacture of H <sub>2</sub> SO <sub>4</sub> by contact process? Give optimum temperature for better yield of SO <sub>3</sub> . Give the particle size of crystalline and gelatinous precipitate. Define the terms.  1) Hardening 2) Case hardening Draw a neat labelled diagram of froth floatation tank.	08
Wri a) b) c)	te short notes on any two of the following. Ostwald quinoid theory Alloy steel Froth floatation method	08
a)	What is metallochromic indicator? Discuss the role of metallochromic indicator.	08
a)	Define neutralization curve. Explain the neutralization curve for titration between strong acid versus weak base.	08
	a) b) c) d) e) f) Wri a) b) c) Ans a) c)	<ul> <li>b) Define acid-base indicators and give example.</li> <li>c) Which catalyst is used in the manufacture of H<sub>2</sub>SO<sub>4</sub> by contact process? Give optimum temperature for better yield of SO<sub>3</sub>.</li> <li>d) Give the particle size of crystalline and gelatinous precipitate.</li> <li>e) Define the terms. <ol> <li>hardening</li> <li>Case hardening</li> <li>praw a neat labelled diagram of froth floatation tank.</li> </ol> </li> <li>Write short notes on any two of the following. <ol> <li>Ostwald quinoid theory</li> <li>Alloy steel</li> <li>Froth floatation method</li> </ol> </li> <li>Answer any two of the following. <ol> <li>What is metallochromic indicator? Discuss the role of metallochromic indicator.</li> <li>Discuss manufacture of sulphuric acid by contact process.</li> <li>Draw neat labelled diagram of blast furnace. Discuss products of blast furnace.</li> </ol> </li> <li>Answer any one of the following. <ol> <li>Define neutralization curve. Explain the neutralization curve for titration between strong acid versus weak base.</li> <li>Draw the structure of DMG and Oxine. Explain the role of organic precipitant DMG and oxine in gravimetric analysis and give advantages of organic</li> </ol> </li> </ul>

Seat	Sat	D
No.	Set	

	B.Sc.	(S	emester - IV) (Old) (CBCS) E COMPUTER SCIENC	E (	Paper– VIII)	
	Database Management System (19201411)					
			day, 12-04-2024 1 To 11:00 AM		Max. Marks:	40
Instr	uction	2	) All questions are compulsory. 2) Figures to the right indicate full n 3) Draw neat labelled diagrams and			
Q.1	Choo	se 1	the correct alternative from the o	optio	on.	08
	1)		ich of the following is the full form	•		
	•		Data definition language	b)	Dynamic Data language Database definition language	
	2)	Wh	ich normalization form is based on	the	transitive dependency?	
	•	,	1NF	b)	2NF	
		c)	3NF	d)	4NF	
	3)		ich of the following SQL command ation form the database?	is u	sed for removing (or deleting) a	
		,	Drop	p)	Delete	
		,	Rollback	d)	Remove	
	4)		al view of a database is known as?			
		a) c)	Physical View external view	b) d)	internal view conceptual view	
	<b>5</b> \	,		,	•	
	5)		ich of the following command is us Update	b)	o modify a column in a table? Alter	
		c)	•	d)	Set	
	6)	,	rocedure is created with the	sta	tement	
	•,	•			REPLACE PROCEDURE	
		c)	Both a and b	d)	None of the above	
	7)	PL/	SQL Loops are also known as			
		,	Iterative Case Statements			
		,	Iterative Control Statements			
	<ul><li>c) Indentation Control Statements</li><li>d) Indentation Case Statements</li></ul>					
	0)	,			fice each record in a table	
	8)	a)	e KEY constraint uniquely id foreign	b)		
		c)	Identify	d)	check	
	_					
Q.2			any four of the following.			80
	<ul><li>a) What is DBMS?</li><li>b) What are the limitations of traditional file system?</li></ul>					
	c) What is Entity?					
	•		erence between 2 tire and 3 tire arc	chite	cture.	
	-		at is concurrency control?			
	f) '	Wha	at is trigger?			

Q.3	Write short notes on any two of the following.		
	a)	Database Architecture	
	b)	Normalization	

#### Q.4 Answer any Two of the following.

c) E-R model

08

- a) Explain Components of DBMS.
- b) Explain Dr. Codd's rules.
- c) What is join and explain types of join?

#### Q.5 Answer any one of the following.

- a) What is transaction and explain transaction states, scheduling and its types.
- **b)** Create employee table with fields first name, last name, emp\_id, designation, joining date and salary and perform the following operation on employee table.
  - i) Insert 10 employee Records into Table
  - ii) Write an SQL query to print all employee details from the employee table order by FIRST NAME as Ascending.
  - iii) Write an SQL query to print details of the employee whose SALARY lies between 100000 and 500000.
  - iv) Write an SQL query to print details of the employee who have joined in Feb'2014.
  - v) Write an SQL query to count total rows from a table.
  - vi) Write an SQL query to fetch employee names with start alphabet 's'.

	SLR-GA-148					
Sea No.	t	Set F	<b>)</b>			
	B.S	(Semester - IV) (Old) (CBCS) Examination: March/April-2024 PHYSICS (Paper - VII) Optics (19201434)				
		: Saturday, 13-04-2024 Max. Marks: 4	10			
Instr	uctio	<ul> <li>s: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat labelled diagram and give equations wherever necessary.</li> <li>4) Use of log table and calculator is allowed.</li> </ul>				
Q.1			8			
	1)	Langrange's law for magnification is given by  a) $n_1y_1 \tan \theta_1 = n_2y_2 \tan \theta_2$ b) $n_1y_1 \sin \theta_1 = n_2y_2 \sin \theta_2$				
		c) $n_1y_1 \tan \theta_1 = n_2y_2 \tan \theta_2$ d) $n_1y_1 \cos \theta_1 = n_2y_2 \cos \theta_2$				
	2)	Find the resolving power of grating which can just resolve the wavelengths $5890  A^0$ and $5896  A^0$ .				
		a) 491 b) 981 c) 392 d) 296				
	3)	By Rayleigh's criterion, two spectral lines are said to be just resolved if the ntensity at the dip is times the intensity of either of the maxima.  a) $\frac{\pi^2}{8}$ b) $\frac{8}{\pi^2}$ c) $\frac{4}{\pi^2}$ d) $\frac{\pi^2}{4}$				
	4)	The substances which rotate the plane of polarization to the left of the observer are called  a) Optically active b) dextrorotary  c) Laevorotatory d) laevo as well as dextro rotatory				
	5)	Principal planes are the cardinal planes of  a) unit positive angular magnification  b) unit positive lateral magnification  c) unit positive longitudinal magnification  d) unit negative angular magnification				
	6)	n F-P interferometer, high quality quartz plates may be of in diameter and thick.  a) 1 to 7 mm, 3 to 10 cm b) 1 to 20 cm, 1 to 3 mm c) 1 to 3 cm, 1 to 5 mm d) 1 to 7 cm, 3 to 10 mm				
	7)	n Fresnel's diffraction, the area of each half period zone is a) $2\pi b\lambda$ b) $\pi b\lambda$ c) $3\pi b\lambda$ d) $4\pi b\lambda$				
	8)	The half angular width of the central maximum is  a) $d\theta = 1.22 \frac{\lambda}{D}$				
		a) $d\theta = 1.22 \frac{\lambda}{D}$ b) $d\theta = 2.44 \frac{\lambda}{D}$ c) $d\theta = 1.22 \frac{D}{\lambda}$ d) $d\theta = 2.44 \frac{D}{\lambda}$				

#### Q.2 Answers any four of the following.

80

- a) For an optical image forming system, the refractive indices of the initial and final media are water ( $\eta_1 = 1.33$ ) and air respectively. If the focal length in the image space is + 10 cm, calculate the focal length in the object space.
- **b)** State any two points of superiority of Fabry-Perot interferometer over Michelson's interferometer.
- c) Explain Zone plate.
- d) State any two advantages of optical fibers.
- e) Explain any two differences between geometrical and spectral resolution.
- **f)** Explain numerical aperture.

#### Q.3 Answer any two of the following.

08

- a) Show that area of each half period zones are equal.
- **b)** Define Double refraction. State the characteristics of the phenomenon of double refraction.
- **c)** Explain Graphical construction of image using cardinal points and obtain Newton's formula.

#### Q.4 Answers any two of the following.

80

- a) Obtain the relation between the lateral, longitudinal and angular magnifications.
- **b)** Calculate the length of the base of a  $60^{\circ}$  prism capable of just resolving the sodium lines of wavelength 5896 A<sup>0</sup> and 5890 A<sup>0</sup>. The material of the glass has  $\mu_C = 1.6545$  and  $\mu_E = 1.6635$  for *C* and *E* lines in the solar spectrum of wavelength  $6563A^{\circ}$  and  $5270A^{\circ}$  respectively.
- c) Explain the formation and working of Fibre optic communication system.

#### Q.5 Answers any one of the following.

- a) Explain the principle, construction and working of Nicol Prism. Explain how Nicol prism can be used as analyzer.
- **b)** With neat ray diagram, explain the construction of Michelson's interferometer. Explain its use of determination of the thickness of thin transparent plate.

No.
-----

	B.\$	Sc. (Semester - IV) (Old) (CBCS)   BIO-CHEMISTRY	' (P	aper - III)	
		Nutrition and Metabo	olis	m (19201404)	
•		ate: Monday, 15-04-2024 :00 AM To 11:00 AM		Max. Marks:	: 40
Instr	ucti	ons: 1) All questions are compulsory. 2) Draw neat diagrams and give eq 3) Figures to the right indicate full n			
Q.1		Itiple choice questions.  Which of the following is a non-essentia  a) Serine c) Lysine	al an b) d)	nino acid? Threonine Histidine	80
	2)	Salvage pathway is used in the synthes <ul><li>a) amino acid</li><li>c) nucleotide</li></ul>	b)	f carbohydrate fatty acid	
	3)	The respiratory quotient is greater than a) glucose c) fructose		in fat organic acid	
	4)	a) uric acid c) CO <sub>2</sub>	b)	ne nucleotide. NH <sub>3</sub> NH <sub>3</sub> and CO <sub>2</sub>	
	5)	Human blood pH is maintained in the ra a) 5.35 to 5.45 c) 7.35 to 7.45	_	of 6.35 to 6.45 8.35 to 8.45	
	6)	molecules of ATP are formed from molecule.  a) 12 c) 36	b) d)	the catabolism of one glucose  24  48	
	7)	The two organ systems that work togeth body's water balance are  a) digestive and respiratory b) urinary and respiratory c) cardiovascular and urinary d) digestive and cardiovascular	ner t	o regulate most aspects of the	
	8)	Electron transport chain is present in a) inner membrane c) matrix	b) d)	_ parts of mitochondria. outer membrane stroma	
Q.2	<b>An</b> : 1) 2)	swer any four of the following. What is nucleotide metabolism? What is pH regulation?			80

- 3) What is bioenergetics?4) Sources of the atoms in the pyrimidine molecules.5) What are the functions of water?
- 6) Define transamination.

SLR-GA-14	ĺ
-----------	---

		3LK-GA-149
Q.3	<ul><li>Write short notes on any Two of the following.</li><li>Write note on endergonic reactions.</li><li>Explain Douglas bag method.</li><li>Write note on TCA cycle.</li></ul>	08
Q.4	Answer any Two of the following.  1) Explain protein buffer system of blood in body.	08

# 2) Explain on degradation of pyrimidine.3) Write note on oxidative phosphorylation.

Answer any One of the following. 80

- 1) Define nutrition. Explain proteins in terms of biological value, essential and non-essential amino acids.
- 2) What is amino acid metabolism? Write general reactions of amino acid metabolism.

		3	LR-GA-1	50
Seat No.			Set	P
E	3.Sc.	c. (Semester - IV) (Old) (CBCS) Examination: March/ PLANT PROTECTION (Paper – VII) Introduction to Weeds & Non-Insect Pests (192014	-	
•		e: Monday, 15-04-2024 00 AM To 11:00 AM	Max. Marks	: 40
Instru	ıction	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Draw neat labelled diagrams wherever necessary.</li> <li>3) Figures to the right indicates full marks.</li> <li>4) Use of logarithm table and calculator is allowed.</li> </ul>		
Q.1	Multi 1)	tiple choice questions.  The first chemical shown to have herbicidal activity is  a) 2, 4-DB		80
	2)	is a poisonous weed.  a) Datura b) Striga c) Loranthus d) Eichhornia		
	3)	is commonly called as 'asthma' weed.  a) Cyperus rotundus b) Cynadon dactylon c) Euphorbia hirta d) Argemone mexicana	1	
	4)	is the local/vernacular name of <i>Amaranthus Spinosus.</i> a) Math b) Kantemath c) Aghada d) Durva		
	5)	The chemical which kills the snails & slugs is called  a) Herbicide b) Nematicide c) Molluscicide d) Bactericide		
	6)	are non-insect pests.  a) Mites b) Snails c) Slugs d) All of these		
	7)	'Nutgrass' is the common name of a) Portulaca oleracea b) Cyperus rotundus c) Cynadon dactylon d) Parthenium hysterop	horus	
	8)	are the most destructive pests in the field as well as in  a) Mites b) Snails c) Rats d) Nematodes	storage.	
Q.2		wer any four of the following. Write agents of weed dispersal		08

- Write agents of weed dispersal. a)
- Write the management of Cynadon dactylon. b)
- c)
- Write morphology of Mites.
  Write botanical names of any two aquatic weeds.
  State the damage caused by birds. d)
- e)

			SLR-GA-150
Q.3	Wri a)	ite short notes on any two of the following Biological weed control	08
	b)	Parasitic Weeds	
	c)	Phytopathogenic Nematodes	
Q.4	Ans	swer any two of the following.	08
	a)	Write the classification of weeds based on ontogeny.	
	b)	Write the properties, mode of action and use of 2, 4-D.	
	c)	Describe the losses caused by weeds.	

- Answer any one of the following.
  a) Describe the weed "congress grass" w.r.t. botanical name, morphology, reproduction and management.
- Describe the cultural methods of weed management. b)

			OLIN-OA-101
Sea No.	t		Set P
	B.S	c. (Semester - IV) (Old) (CBCS) Examination: Marc PHYSICS (Paper - VIII)	:h/April-2024
		Modern Physics (19201435)	
-		nte: Tuesday, 16-04-2024 00 AM To 11:00 AM	Max. Marks: 40
Instr	ucti	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.	
Q.1	1)	Itiple choice questions.  The inertial frame of reference is frame of reference.  a) an accelerated b) unaccelerated c) a rotating d) a steady	08
	2)	Mass energy equivalence is expressed as  a) $E = mc$ b) $E^2 = mc^2$ c) $E = mc^2$ d) $E = m^2c$	
	3)	The wavelength of matter waves is independent of  a) mass b) velocity c) momentum d) charge	
	4)	If the particle velocity is c/2, then the phase velocity of the massociated with the particle is  a) $c/2$ b) $2c$ c) $2/c$ d) $c^2$	itter wave
	5)	Zeeman effect is the splitting of spectral lines in the presence a) electric field b) magnetic field c) inert environment d) vacuum	of
	6)	Spin quantum number associated with single electron is a) zero b) one c) one half d) two	<u>_</u> .
	7)	Energy released per fission of U235 is about  a) 200 MeV b) 300 MeV c) 400 MeV d) 500 MeV	
	8)	The value of change in Compton wavelength is  a) 2.42 A° b) 0.0242 A°  c) 0.242 A° d) 24.2 A°	
Q.2	An a) b) c) d) e)	Swers any four of the following.  State Einstein postulates on special theory of relativity.  A body of mass 100 gm is moving with a velocity of 10 m/s. F Broglie wavelength. Given: $h = 6.62 \times 10^{-34}$ Js.  State Pauli's exclusion principle.  What is Compton effect?  Define nuclear fission.	08 Find its De
	f)	State Hund's Rule.	

80

		<ol> <li>in the satellite and</li> <li>in the stationary laboratory</li> </ol>	
Q.4	An	swers any two of the following.	08
	a)	An electron is put in a one-dimensional box of length 1 A°. Calculate the minimum uncertainty in its velocity. (h= $6.62 \times 10^{-34}$ Js, m = $9.1 \times 10^{-31}$ Kg)	
	b)	Explain in detail on LS coupling and JJ coupling.	
	c)	Discuss experimental arrangement to verify Compton effect.	
Q.5	Att	empt any one of the following.	08
	a)	Describe Stern and Gerlach Experiment and hence discuss importance of result.	

**b)** Derive the expression for variation of mass with velocity.

a) Obtain Bohr's quantum conditions on the basis of matter waves.b) Describe working of nuclear reactor with its essential parts.

c) A rod of length 2 m kept in a satellite with its length along the direction of motion. If the satellite has velocity 0.8 c, calculate the length of the rod as

Q.3 Attempt any two of the following.

measured by an observer.

Seat No.	Set	Р
140.		

# B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024

	٥.٥	. (O		BIO-CHEM	•	aper - IV)	7.pm 202-
			Molecula	r Biochemi	stry & Dis	seases (19201405	5)
•			nursday, 18-0 /I To 11:00 A				Max. Marks: 40
Inst	ructi	2	2) Draw neat	ns are compul diagrams and the right indica	give equat	ions wherever necess	sary.
Q.1	Mu 1)	a)	choice ques _ is respons Glycogenol Glycogenes	ible for hypogl <sub>)</sub> ysis	_	Gluconeogenesis both a and b	08
	2)	a) c)	_ acts as an Allolactose Galactose	inducer of the	•	Lactose Gluctose	
	3)	a)	nucleus of ca unchanged abnormally	ancerous cells large	b)	degenerated hypertrophide	
	4)	a)	product of re RNA protein	verse transcrip	otion is b) d)	 DNA lipid	
	5)	a)		ster bonds	b)	linked together by covalent bonds hydrogen bonds	·
	6)	a)	xample of ho GDB BLAST	mology and si	=	is EMBOSS OMIM	
	7)			system		ausing pathogens. Digestive system Immune system	
	8)	The a) c)				ptors is monocytes dendritic cells	
Q.2	An a) b) c) d) e)	Wha Write Wha Write Wha	t is gene clore two charact t are the syme two applica t turnover nu	eristics of tum optoms of diabo tions of bioinfo	or cells. etes? ormatics.		08

SLR-GA-15	1
-----------	---

Q.3	Write short notes on any Two of the following.			
	a)	Write note on Database similarity searching (BLAST).		
	b)	Explain Induced fit hypothesis.		
	c)	Write note on two anti AIDS drugs.		
	•	G		

#### Q.4 Answer any Two of the following.

08

- a) Write formation of insulin from preproinsulin.
- **b)** Write characteristics of tumor cells.
- c) Explain transcription in prokaryotes.

#### Q.5 Answer any One of the following.

08

- **a)** What is natural & acquired immunity? Explain Immune response to antigen. Clonal selection theory for formation of antibodies.
- **b)** Explain Lock & key model and write note on active site of enzyme and its features.

Seat No.	Set P
----------	-------

	D.3C	PLANT PROTECTION		<del>_</del>	
		Insect Pests and Their Ma	•		
-		e: Thursday, 18-04-2024 O AM To 11:00 AM		Max. Marks: 4	10
Instr	uctior	<ul> <li>1) All questions are compulsory.</li> <li>2) Draw neat diagrams and give ed</li> <li>3) Figure to the right indicates full (4) Use of log table and calculator is</li> </ul>	mark	S.	
Q.1	Multi 1)	ple Choice Questions. In Bengal state suffered from on Rice. a) 1942 c) 1944			08
	2)	In Shri Lanka coffee crop was destro a) rust c) viral	,	oy disease.	
	3)	Classification of insect and pest base a) nature of damage c) metamorphosis		mouth parts	
	4)	<ul><li>Hand rotary duster is the example of</li><li>a) mouth parts</li><li>c) nature of damage</li></ul>		 metamorphosis all of these	
	5)	Thrips is the example of crop. a) Sugarcane c) Groundnut	b) d)	Jowar Rose	
	6)	Red Spider damage the crop like a) Sugarcane c) Tomato	b) d)	Rose Mango	
	7)	The which are released to attra) Repellents c) Chemo sterilant	act c b) d)	• •	
	8)	Fruit borer is the example of c a) Mango c) Tomato	rop. b) d)	Brinjal Rose	
Q.2	a) (d) (d) (e) (d)	ver any Four of the following.  Give the definition of quantitative.  Define abdomen.  What is wettable power?  Define attractants.  Give the two control measures of Rose  Write two control measures of Tomato.			80

		SLR-GA-153
Q.3	<ul><li>Write short note on any Two of the following.</li><li>a) Types of legs</li><li>b) Pulse beetle</li><li>c) Metamorphosis</li></ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain the nature of damage and management of Gram.</li> <li>b) Describe the classification based on mode of entry.</li> <li>c) Give the mark of identification and life cycle of Groundnut.</li> </ul>	08

# Q.5 Answer any One of the following. a) Explain the classification of insect pests based on the mouth parts. b) Describe the Sugarcane insect pest in details.

Seat No.			S	et	P
I	-	IV) (Old) (CBCS) Exa STATISTICS (Pap ability Distributions	•	24	
•	Date: Friday, 19-04-2 09:00 AM To 11:00 Al	024	— II (13201443) Max. M	arks	: 40
Instru	3) Figures to				
		native from the option. ution, then c.d.f. evaluate b) d)	d at $F_X(2)$ is  0.5		80
;	2) If $X \sim N (\mu, \sigma^2)$ dis a) 0.9545 c) 0.9973	,	$(\mu - + \sigma)$ is $0.6827$ None of these		
;	3) If $X \sim \beta_I(m, n)$ , then a) $\frac{m}{n}$ c) $\frac{n}{m+n}$	n <i>E(X)</i> is b)	$\frac{m}{m+n}$ None of these		
•		xponential distribution wit b) d)			
,	<ul><li>5) The Normal distril</li><li>a) Mesokurtic</li><li>c) Platykurtic</li></ul>		Leptokurtic None of these		
(	<ul> <li>6) The β<sub>I</sub>(1,1) distribute</li> <li>a) U[0,1]</li> <li>c) both a &amp; b</li> </ul>	oution, is equivalent to b) d)	exp(1) None of these		
•	7) The variance of cl a) n c) 2	hi-square distribution with b) d)	1 d. f. is $2n$ None of these		
:	8) If $X \sim t_n$ variate, the a) $F_{1,n}$ c) $F_{n,1}$	hen $X^2$ follows b) d)	$egin{array}{c} t_n \ t_{2n} \end{array}$		

			SLR-GA-154
Q.2	a) b) c)	State m. g. f of exponential with parameter $\theta$ . State mean and variance of standard normal variate Write p. d. f. $G(\alpha,\lambda)$ distribution. state m. g. f. of $N(\mu,\sigma^2)$ distribution. Define student's t-distribution.	08
Q.3	a)	rempt any Two of the following questions. Find C.D.F. of exp $(\theta)$ variate. Find mode of chi -square variate with n d. f. State and prove additive property of $G(\alpha, \lambda)$ variate.	08
Q.4	a) b)	rempt any Two of the following questions. If $X \square N(\mu, \sigma^2)$ variate then find distribution of $y = ax + b$ . Let $X \square U[a, b]$ then find $E(X)$ . $X \square \beta_I(m, n)$ then find $E(X)$ .	08
Q.5	Att a)	tempt any One of the following questions.  If $X \square \beta_{II}(m,n)$ then find distribution of $\frac{x}{1+x}$ .	08
	b)	Derive the p. d. f. of chi – square variate with n d. f.	

Seat No.		Set P	)				
B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024 METEOROLOGY (Paper – III) Applied Climatology (19201431)							
-		e: Saturday, 20-04-2024 Max. Marks: 40 0 AM To 11:00 AM	0				
Instru	ıctio	<ul><li>1) All questions are compulsory.</li><li>2) Figures to the right indicate full marks.</li><li>3) Draw neat diagrams wherever necessary.</li><li>4) Use of stencils is allowed.</li></ul>					
Q.1	Cho 1)	ose the correct alternative and rewrite sentences.  The heat island are formed due to additional of heal from automobile.  a) Hamlet b) Rural c) Urban d) village	8				
	2)	Surface pressure varies routinely from about mb to 1050mb.  a) 950 b) 955 c) 960 d) 965					
	3)	Shivering is physiological response to condition. a) Cloudy b) cold c) warm d) hot					
	4)	The primary purpose of clothing is to protect man against and mprove him physiological compare  a) humidity b) temperature c) wind d) weather					
	5)	The term 'forecast' was first applied in meteorology by  a) Miller  b) Fitzroy  c) Coriolis  d) Trewartha					
	6)	When the isobars are widely speed the pressure gradient is  a) Gentle  b) moderate  c) steep  d) vertical					
	7)	Medium rang forecast up to days.  a) 3 to 21  b) 3 to 26  c) 3 to 48  d) 3 to 72					
	8)	Statistical method are used for range forecasting of weather.  a) Shore  b) medium  c) long  d) daily					
Q.2	a) b) c)	wer any four of the following.  Define urban climate. Human body comfort.  What is heat island?  What is periodic local wind?  Coriolis effect.	8				

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Atmospheric pressure</li> <li>b) Agro climatology</li> <li>c) Climate and industry</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) State the importance of air operation in transportation.</li> <li>b) Statistical weather forecasting.</li> <li>c) What are the rotational forces?</li> </ul>	08
Q.5	<ul><li>Answer any one of the following.</li><li>a) Explain urban climate on body comfort</li><li>b) Explain off- shore drilling.</li></ul>	08

Seat No.	Set	Р

	B.S	GEO-CHEMISTI	S) Examination: March/April-2024 RY (Paper – III) hemistry (19201419)
		te: Saturday, 20-04-2024 00 AM To 11:00 AM	Max. Marks: 40
Instr	uctio	<ul><li>2) All questions are compulsory.</li><li>2) Figures to the right indicate futing</li><li>3) Draw neat diagrams and give</li></ul>	
Q.1		Itiple choice questions.  Petroleum is found in  a) core of earth  c) in water	b) in seas d) crust of the earth
	2)	The number of atoms or molecules verthemical change is its  a) molecularity c) change in reaction	whose concentration alters during a b) order of reaction d) molality
	3)	When more and more water is dilute a) increases c) remains the same	ed with acids its H <sup>+</sup> ion concertation will  b) decreases d) depend on the type of acids
	4)	Primary causes of water pollution are a) plants c) animals	re b) human activities d) natural sources
	5)	In Van't Hoff isotherm, whent a) $\Delta G > 0$ c) $\Delta G = 0$	the reaction moves in backward direction. b) $\Delta G < 0$ d) $\Delta G$ is absent
	6)	of the following has a pH grea a) lemon juice c) blood plasma	eater then 7. b) vinegar d) butter milk
	7)	The clean water should have BOD va a) 40 mg/L c) 10 mg/L	value b) 20 mg/L d) less than 5 mg/L
	8)	According to organic theory c a) plant debries c) from the decomposers	compound does the petroleum formed. b) animal and vegetable debries d) from sunlight
Q.2	a) b) c) d)	wer the following questions. (Any What is TDS? What is law of mass action? Write three examples of mineral acid What are two types of organic sedim What are limitations of Van't Hoff iso Where is carbon found in rocks?	d. nentary rocks?

Q.3	Write short notes	on any	Two	of the	following
-----	-------------------	--------	-----	--------	-----------

80

- a) Write note on origin of petroleum and origin of coal.
- **b)** Explain chemical equilibrium in case of hydrogen chloride.
- c) Write note on organic matter in black shale.

#### Q.4 Answer any Two of the following questions.

08

- a) Write note on hydrolysis of Na<sub>2</sub>CO<sub>3</sub>.
- **b)** What is water pollution? Explain types of water pollution.
- **c)** Explain treatment on water pollutant by chemical oxygen demand.

#### Q.5 Answer any one of the following.

08

- a) Explain acids and bases, Chemical definition, Geological usage and effect of pH.
- **b)** Explain Le chateliar's rule and Van't Hoff isotherm equation.

Seat No.			Set	P		
E	B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024 ZOOLOGY (Paper – VII) Fundamentals of Biochemistry (19201446)					
•			x. Marks	: 40		
Instru	ctic	ons: 1) All questions are compulsory. 2) Figures to the right indicate full marks.				
	Mul 1)	Hiple choice Questions.  General formula of carbohydrate is  a) $Cx(H_3O)y$		80		
	2)	How many numbers of essential amino acids  a) 10				
	3)	Simple lipids are made from  a) Carbon and Hydrogen b) Hydrogen and oxygen c) Oxygen and carbon d) Carbon, Hydrogen and Ox	ygen			
	4)	A peptide with three amino acid is called  a) Pono-peptide b) Tetra-peptide c) Di-peptide d) Tri-peptide				
	5)	The antibodies are a) Y-shaped b) X-shaped c) Linear d) Hyperbolic				
	6)	Which of the following is not a lipid?  a) Proteins b) Fats c) Oils d) Waxes				
	7)	Nucleic acid is discovered by  a) Griffith				
	8)	In DNA how many numbers of nitrogen base pairs are present.  a) 02 b) 04 c) 06 d) 08				
	a) b)	wer any four of the following.  Mono-saccharides.  What are simple lipids?  General properties of amino acids.  Importance of the protein.  Difference between purines and pyrimidines.  What are the Codon and Anticodon?		08		

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Groups of the carbohydrates with their examples.</li> <li>b) Structure of antibody.</li> <li>c) Clinical significance of lipids</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Difference between DNA and RNA.</li> <li>b) Biological significance of immunoglobin.</li> <li>c) What are the properties of enzymes?</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Describe protein synthesis/Central dogma in detail.</li> <li>b) Describe types and structure of compound lipids.</li> </ul>	30

Seat No.							Set	Р		
	B.S	Sc. (S	Semester -	IV) (Old) (CE STATISTIC Applied Sta	CS (Pape	r – VIII)	n: March/April-2024 )			
-	Day & Date: Monday, 22-04-2024 Max. Marks: 40 Time: 09:00 AM To 11:00 AM									
Instru	ctic	2	2) Figures to	ns are compulso the right indicate culator is allowe	e full marks	<b>S</b> .				
	1)	In tim a) c) Meth a)	time slope od of least so seasonal va	lysis independe	b) d) to b)	Y values intercept	luctuations	08		
	3)	A hy <sub>l</sub>	trend pothesis may simple null	be classified a	s	cyclic fluc composit All of the	e			
	4)	obse a)	degrees of free rvations is $n-1$ $2(n-1)$		b)	red t-test by $2n-1$ None of t	pased on $n$ pairs of these			
	5)	Degris a) c)	ees of freedo	om for statistic $\chi$	y <sup>2</sup> in case o b) d)	4	ncy table of order 4 × 3			
	6)	Total	population w NRR>1 NRR =1	vill remain same		nen NRR<1 none of t	hese			
	7)		ndom variable $-3  \ge 2]$ is _				n the upper bound for			
		a) c)	$\frac{1}{4}$		b) d)	$\frac{3}{4}$ $\frac{1}{2}$				
	8)		P(-4 < X < 0)	e with mean 1 a 6) is	nd standar	d deviatior				
		a)	16 25 9 25		b)	At least	16 25 9			
		c)	25		d)	at most	9 25			

a) b) c) d) e)	Define Composite Hypothesis. Define Type-II error. Define level of significance. State Central limit theorem. Define CDR.	08
Wri a) b) c)	te short notes on any two of the following. Describe the procedure to test for testing population mean $\mu=\mu_0$ based on Normal distribution. Describe Paired t- test. Define Components of time series.	08
a) b)	Define Total Fertility Rate (TFR). Also state the merits and demerits of TFR. Explain the test procedure for testing equality of two population variances.	08
		08
	a) b) c) d) e) Wri a) b) c) Ans a) Ans a)	<ul> <li>b) Define Type-II error.</li> <li>c) Define level of significance.</li> <li>d) State Central limit theorem.</li> <li>e) Define CDR.</li> <li>Write short notes on any two of the following.</li> <li>a) Describe the procedure to test for testing population mean μ = μ₀ based on Normal distribution.</li> <li>b) Describe Paired t- test.</li> <li>c) Define Components of time series.</li> <li>Answer any two of the following.</li> <li>a) Define Total Fertility Rate (TFR). Also state the merits and demerits of TFR.</li> <li>b) Explain the test procedure for testing equality of two population variances.</li> <li>c) A r.v X is such that E(X) = 3 and E(X²) = 13</li> <li>1) Find least value for P( X - 3  &lt; 4)</li> <li>2) Determine lower bound for P(-2 &lt; X &lt; 8).</li> <li>Answer any one of the following.</li> <li>a) Describe the procedure for testing</li> <li>1) H₀: P = P₀ against H₁: P ≠ P₀ and</li> <li>2) H₀: P₁ = P₂ against H₁: P₁ ≠ P₂ based on normal distribution.</li> <li>b) Explain the procedure of moving average method and gives merits and</li> </ul>

Seat No.	Set P
----------	-------

	D.3	METEOROLOGY		<del>-</del>	
		Meteorological Instrur	•		
		te: Tuesday, 23-04-2024 00 AM To 11:00 AM		Max. Marks:	40
Instr	uctio	ons: 1) All questions are compulsory. 2) Draw neat diagrams and give eq 3) Figures to the right indicate full n 4) Use of logarithmic table and calc	nark	S.	
Q.1		tiple choice questions.			80
	1)	Rain gauge is used for  a) Hydrological survey  c) Marine survey	b) d)	Measuring precipitation River survey	
	2)	On Celsius scale ice point is at  a) 0 °C c) 0 K	b) d)	100 °C - 273 °C	
	3)	Six's Thermometer is used to measure a) Wind velocity c) Blood pressure	b)	Lowest, Highest temperature Wind direction	
	4)	C. G. S. unit of pressure is  a) N/m c) dynes /cm²	b) d)	N/m <sup>2</sup> dynes/cm	
	5)	Normal atmospheric pressure is taken to			
		a) 1 atm. c) 3 atm.	b) d)	2 atm. 4 atm.	
	6)	Wind is  a) Atmosphere in motion c) climate in motion	b) d)	weather in motion None of these	
	7)	Theis line of equal wind speed.			
		a) agonic c) isotach	b) d)	isobar isoclinic	
	8)	If the temperature of a place increases a) Increases c) Remains constant	sudo b) d)	denly, the relative humidity Decreases Fluctuates	
Q.2		swer any Four of the following.			80
	a) b)	What is rain gauge? What precautions are to be taken in pla measurement?	cing	a rain gauge for rainfall	
	c)	At what temperature do the Celsius and			
	d) e)	How atmospheric pressure is measured What is an anemometer?	d usi	ng Fortin's barometer?	
	f)	What is a hygrometer?			

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) With neat diagram explain construction and working of mercury barometer.</li> <li>b) Explain construction and working of dry and wet bulb thermometer.</li> <li>c) What is thermopile?</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) With neat diagram explain construction and working of mercury thermometer.</li> <li>b) Write a note on "The different temperature scales."</li> <li>c) Draw neat diagram of barograph.</li> </ul>	08
Q.5	Answer any one of the following.	08

- a) With neat diagram explain construction and working of float gauge.
  b) With neat diagram explain construction and working of Hooke's anemometer.

Seat No.		Set P
E	GEO-CHEMIST	S) Examination: March/April-2024 RY (Paper – IV) Earth (19201420)
•	Date: Tuesday, 23-04-2024 09:00 AM To 11:00 AM	Max. Marks: 40
Instru	2) Draw neat diagrams and give 3) Figures to the right indicate for the table and (At. Wts.: H=1, C=12, O=16,	e equations wherever necessary. ull marks. calculator is allowed.
Q.1	Fill in the blanks with correct answer  1) The number of water molecules be the  a) Size of the ion b) Shape of the ion c) Charge on the ion d) Cohesive forces between water	packed around a given ion depends on
	<ul><li>2) The swelling and shrinkage properti</li><li>a) Kaolinite</li><li>c) Montmorillonite</li></ul>	ies of soil are due to b) Halloysite d) None of these
	<ul><li>3) Smoke, fumes, ash, dust, nitric oxid sources of</li><li>a) Primary Pollutants</li><li>c) Bio-Degradable Pollutants</li></ul>	le and sulphur dioxide are the main b) Secondary pollutants d) None of the above
	<ul> <li>4) In geochemical classification of sedi</li> <li>a) Fe(OH)<sub>2</sub></li> <li>c) NaCl</li> </ul>	iments, which of the following is evaporates. b) CaCO <sub>3</sub> d) SiO <sub>2</sub>

5) \_\_\_\_\_ is the reaction of rock minerals with oxygen, thus changing the

6) Which of the following method is used for dating relatively recent geological

b) Hydrolysis

d) Reduction

b) Climate

d) All the above

b) U - Pb method

d) Rb - Sr method

b) Charge multiplied by radius

d) Radius divided by charge

mineral composition of rock.

c) Carbon - 14 method

a) Charge on the ions.

8) Type of soil depends upon:a) Parent rock

c) Biological activity

c) Charge divided by radius

a) Hydration

c) Oxidation

a) K - Ar method

event?

7) Ionic potential is:

Q.Z	a) b) c) d)	Name the most stable form of manganese in the secondary environment.  Define oxidation potential.  Give the factors affecting the rate of formation of soil are:  Which type of clay structure has one tetrahedral layer linked with one octahedral layer.	Uð
	e) f)	Name any two stable isotopes.  Name the horizons of soil profile.	
Q.3	Wr a) b) c)	ite short notes on any Two of the following.  Describe the process of formation of clay minerals.  Explain the concept of 'Crust as a separate system'.  Describe in short the Hydrogen ion concentration.	08
Q.4	An a) b) c)	swer any Two of the following.  Explain the geochemical cycle with neat labeled diagram.  Write short note on soil degradation.  Describe in brief the radioactive decay.	08
Q.5	An a) b)	swer any one of the following.  Explain in brief the processes of chemical weathering with suitable examples.  Discuss in brief the causes, effects and control measures of air pollution.	08

Seat No.	t				Set	P
	B.S	c. (Semester -	IV) (Old) (CBCS) E ZOOLOGY (Pa		mination: March/April-2024	
Ar	nim	al Physiology:	•	•	– viii) dinating Systems (19201447	<b>'</b> )
-		ate: Tuesday, 23-0- 00 AM To 11:00 A			Max. Marks	: 40
Instr	ucti	2) Draw neat	ns are compulsory. diagrams and give eq the right indicate full n		ons wherever necessary. S.	
Q.1		Itiple choice ques Which of the follo a) Thrombocy c) Leucocytes	wing blood cells play a tes		mportant role in blood clotting Neutrophils Erythrocytes	<b>08</b> 
	2)	Which of the follo a) Chondrin c) Keratin	wing the hardest cove	b)	of the body? Dentine Enamel	
	3)	A nerve impulse j a) Synapse c) node and R		to a b) d)	nother during salutatory conduction axon myelin sheath	า.
	4)	The length of this a) Sarcomeres c) A band	reduced while muscles		tracts. I band H Zone	
	5)	a) Oestrogen c) Testosteror	ary female sex hormo า	ne. b) d)	Androgen All of these	
	6)		cycle in the female pri			
	7)	•	e fertilization		the body of the female? In-vivo fertilization In vitro fertilization	
	8)	a) Decrease b	rmone in human body llood sodium level ood sodium level	b) d)	 Increase blood calcium level Decrease blood calcium level	
Q.2	An a) b) c) d) e)	swer any Four of Nerve cell. Sketech and labe Male sex hormon Oral contraceptive Endocrine gland. Female sex horm	el T.S. of tooth. e. e pills.			08

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Explain types of blood cells.</li> <li>b) Give ultra-structure of striated muscle.</li> <li>c) Disorder of parathyroid gland.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Describe In-vitro Fertilization.</li> <li>b) Explain oestrous cycle.</li> <li>c) Describe T.S. of Liver of mammal.</li> </ul>	90
Q.5	Answer any one of the following.  a) Describe in detail menstrual cycle.  b) Sketch label and describe T.S. of mammalian testis	08

Seat	
No.	

#### B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024 **MATHEMATICS (Paper - VII) Differential Equations (19201428)**

Day & Date: Wednesday, 24-04-2024

Max. Marks: 40

Time: 09:00 AM To 11:00 AM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.



80

The solution of the differential equation  $p^2 - 9p + 18 = 0$  is \_\_\_\_\_. 1)

a) 
$$(y + 3x - c)(y + 6x - c) = 0$$

a) 
$$(y+3x-c)(y+6x-c)=0$$
 b)  $(y+3x-c)(y-6x-c)=0$ 

c) 
$$(y-3x-c)(y-6x-c) = 0$$

c) 
$$(y-3x-c)(y-6x-c)=0$$
 d)  $(y-3x-c)(y+6x-c)=0$ 

The solution of the differential equation  $p = \log(px - y)$  is \_\_\_\_\_. a)  $y = cx + e^c$  b)  $y = cx + e^{-c}$ 2)

a) 
$$y = cx + e^{\alpha}$$

b) 
$$y = cx + e^{-c}$$

c) 
$$y = cx - e^{-c}$$

$$d) \quad y = cx - e^c$$

The differential equation of the form  $y = 2px + f(xp^2)$  reduces to Clairaut's 3) form by Substitution \_\_\_\_\_.

a) 
$$x^2 = u, y = v$$

b) 
$$x = u^2, y = v$$

c) 
$$x = u^2, y = v^2$$

d) 
$$x = u, y = v^2$$

If \_\_\_\_\_ then y = x is the one known solution of complementary function of 4) the differential equation.

$$\frac{d^2y}{dx^2} + P\frac{dy}{dx} + QY = R$$

a) 
$$P - xQ = 0$$

b) 
$$1 + P + Q = 0$$

c) 
$$P + xQ = 0$$

$$1 - P + Q = 0$$

The one known solution of the equation 5)

$$x \frac{d^2 y}{dx^2} - (1 - x) \frac{dy}{dx} - y = 0$$
 is  $y = \underline{\hspace{1cm}}$ .

a) 
$$e^{-x}$$

b) 
$$e^x$$

c) 
$$x^2$$

$$d)$$
  $x$ 

6) The homogeneous liner differential equation

$$x^n \frac{d^n y}{dx^n} + c_1 x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \dots + c_{n-1} x \frac{dy}{dx} + C_n y = X(x)$$
 can be reduced to linear

equation with constant coefficients by using substitution \_\_\_\_.

a)  $x = z^2$  b)  $x = \frac{1}{z}$ c)  $x = e^z$  d)  $x = \log z$ 

a) 
$$x = z^2$$

b) 
$$x = \frac{1}{2}$$

c) 
$$x = e^z$$

$$d) \qquad x = \log z$$

One solution of the equation  $\frac{dx}{yz} = \frac{dy}{xz} = \frac{dz}{xy}$  is \_\_\_\_\_.

a) 
$$x^2 - y^2 = c_1$$

b) 
$$y^2 + z^2 = c_1$$

c) 
$$x^2 + y^2 = c_1$$

$$d) x - y = c_1$$

- 8) The differential equation of the form Pdx + Qdy + Rdz = 0, (where P, Q and R are functions of x, y, z) are called \_\_\_\_\_ differential equation.
  - a) homogeneous

b) non-homogeneous

c) total

- d) simultaneous
- Q.2 Answer any four of the following.

08

- 1) Solve  $x^2p^2 + 3xyp + 2y^2 = 0$
- 2) Solve (y px)(p 1) = p
- 3) Define Clairaut's equation and explain the method of solving it.
- 4) Solve  $x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + 2y = 0$
- 5) Solve  $\frac{dx}{x(y-z)} = \frac{dy}{y(z-x)} = \frac{dz}{z(x-y)}$
- 6) Test the condition of integrability for the differential equation 2yz dx 3zx dy 4xy dz = 0
- Q.3 Answer any two of the following.

08

- 1) Solve  $y = 2px + x^2p^4$
- 2) Explain the method of solving the differential equation  $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + QY = R,$

(where P, Q, and R are functions of x only) by changing the dependent variable.

- 3) Solve  $\frac{dx}{y^2} = \frac{dy}{x^2} = \frac{dz}{x^2 y^2 z^2}$
- Q.4 Answer any two of the following.

80

- 1) Solve  $x^2 \frac{d^2y}{dx^2} 2(x^2 + x) \frac{dy}{dx} + (x^2 + 2x + 2)y = 0$
- 2) Solve  $\frac{dx}{x^2 yz} = \frac{dy}{y^2 zx} = \frac{dz}{z^2 xy}$
- 3) State and prove the necessary condition for the integrability of the differential equation Pdx + Qdy + Rdz = 0 (where P, Q and R are functions of x, y, z)
- Q.5 Answer any One of the following.

80

1) Show that a homogeneous Linear differential equation

$$x^{n} \frac{d^{n} y}{dx^{n}} + c_{1} x^{n-1} \frac{d^{n-1} y}{dx^{n-1}} + \dots + c_{n-1} x \frac{dy}{dx} + c_{n} y = X(x)$$

(where  $c_1$ ,  $c_2$  ...and  $c_n$  are Constants) can be transformed into a Linear differential equation with constant coefficients by changing the independent variable x to z using the substitution  $x = e^z$ 

Hence solve  $x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + 6y = x$ 

2) Explain the method how to solve the second order Linear differential equation  $\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy = R$ 

(where P, Q & R are functions of x only)

when one solution belonging to complementary function is known.

Seat	t					Set	Р
	B.S	Sc. (Semester -	V) (Old) (CBCS BOTANY (I		nmination: March/Ap – VII)	ril-2024	
			Plant Physiolo	ogy (1	9201401)		
•		ate: Thursday, 25-0 :00 AM To 11:00 A			N	lax. Marks	: 40
Instr	ucti	3) Draw neat	the right indicate for	ull marl e equat	ions wherever necessary		
Q.1	Mu	Iltiple choice ques	tions.				08
	1)	Phytochrome is a					
		<ul><li>a) Geotropism</li><li>c) photoperiod</li></ul>		,	phototropism photorespiration		
	٥١	,		,	•		
	2)	Which of the follogation a) auxin	wing normones ca		ethylene		
		c) cytokinins		,	gibberellins		
	3)	Which of the follo	wing crops does n	ot unde	ergo vernalisation		
	,	a) wheat	0 1	b)	<del></del>		
		c) rice		d)	rye		
	4)	The term vernalis	ation is used by $\_$		ъ .		
		a) Koog c) Lysenko		b) d)	Benda Weiner		
	5)	Photosynthesis o	scure in	u)	VVCIIICI		
	3)	a) chloroplast		b)	golgi body		
		,	c reticulum	•			
	6)	is a produc	t of aerobic respir	ation.			
		a) Malic acid		b)	Pyruvate		
		c) Ethylene		d)	Lactose		
	7)		ring aerobic respir	ration is	s times more than a	anaerobic	
		respiration. a) 8		b)	12		
		c) 19		d)			
	8)	The first reaction	in photorespiraton	is			
	,	a) carboxylatio	n	b)			
		c) phosphoryla	ation	d)	oxygenation		
Q.2	An	swer any Four of	the followina.				08
	a)	Define photorespi	ration.				
	•	Give the definition					
	-	Write the two exa		netic pi	gments.		
	d) e)	What is photosynt Define translocati					
	f)	Give the definition		n.			

Q.3	<ul> <li>Write short notes on any Two of following.</li> <li>a) Significance of vernalization.</li> <li>b) Phloem loading.</li> <li>c) Role of phytochrome.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Explain the cyclic reaction studied by you.</li> <li>b) Give the structure of mitochondria.</li> <li>c) Describe the significance of photorespiration.</li> </ul>	08
Q.5	<ul> <li>Answer any One of the following.</li> <li>a) Describe the mechanism of photorespiration.</li> <li>b) Explain the photosynthetic apparatus studied by you.</li> </ul>	30

Seat No.	t							Set	P
	B.Sc	. (Se		V) (Old) (CBC MATHEMATI bstract Algel	CS (Pap	er - VIII)	March/April-	2024	
•			lay, 26-04-2 o 11:00 AM				Max.	Marks	: 40
Instr	uctior		•	s are compulsor he right indicate	-	S			
Q.1	Choo 1)	The	symmetric $g$	natives for eacly roup $S_n$ has	eleme b)	ents.			08
	2)	a)	ch of the follow $< Z, +>$ < N, +>	owing is not a gr	b)	< R, +> < C, +>			
	3)		1	subgroups of $Z_8$ a	are b) d)				
	4)		[2]	oression [2]⊙[4]	b)	[3] [5]			
	5)	a)	and <i>K</i> are so <i>HK</i> = <i>KH</i> <i>HK</i> = <i>H</i>	ubgroups of a gr	b)	HK = G $KH = H$	roup of G iff		
	6)	IF Ø a) c)	is Euler fund 41 39	ction then Ø(41)	=b) d)	40 1			
	7)	The a) c)	_	enerators of the	•	is Two Five			

Let  $f: G \to G'$  be homomorphism then kerf= \_\_\_\_\_

a)  $\{x \in G / f(x) = e'\}$ c)  $\{x \in G / f(x) = x\}$  b)  $\{x \in G / f(x) = e\}$ d)  $\{x \in G/f(x) = G\}$ 

8)

80

	f)	positive real numbers then $f: R \to R_+$ defined by $f(x) = e^x$ then show that $f$ is homomorphism. Show that Every cyclic group is an abelian group.	
Q.3	Atte a) b) c)	<b>Impt any two of the following.</b> Find order of element of a group $\{1,-1,i,-i\}$ under complex multiplication. Determine the right cosets of $<$ [4] $>$ in $Z_{12}$ Show that intersection of any two normal subgroup is normal subgroup.	08
Q.4	Atte a) b)	State and prove Lagrange's theorem.  Show that $(G, +_6)$ is abelian group.  Where $G = \{0, 1, 2, 3, 4, 5\}$ and $+_6$ is addition modulo 6 is binary operation.	08
	c)	For permutation $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 1 & 4 & 5 & 6 & 2 \end{pmatrix}$ $T = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 4 & 1 & 3 & 6 & 5 \end{pmatrix}$ find $T^2\sigma$ and $\sigma^2T$	
Q.5	Atte a) b)	State and prove Cayley's theorem. Find g.c.d. of 616 and 427 and express $(616, 427) = 616x + 427y$	08

If R is additive group of real numbers and  $R_+$  is multiplicative group of

Show that the identity element in group *G* is unique. If  $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 7 & 2 & 4 & 5 & 6 & 1 & 8 \end{pmatrix}$   $\beta = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 1 & 2 & 3 & 8 & 5 & 4 & 7 & 6 \end{pmatrix}$  find  $\alpha$ .  $\beta$ 

Q.2

b)

c)

d)

Solve any four of the following:

Draw a Cayley table  $Z_5^{\#}$ 

Solve the equation (12)x = (123) in  $S_3$ .

Seat	Sat	D
No.	Set	

## B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024

		BOTANY (Par	er ·	– VIII)	
		Embryology of Angios	per	ms (19201402)	
-		te: Saturday, 27-04-2024 00 AM To 11:00 AM		Max. Marks	40
Instr	uctio	ons: 1) All questions are compulsory. 2) Figures to the right indicate full r 3) Draw neat diagrams and give ed 4) Use of logarithmic table and cald	quati	ons wherever necessary.	
Q.1	Cho	oose the correct alternatives from the	opt	ions.	80
	1)	Typical flower consists of floral a) Two c) Four	b)	orls. Three Five	
	2)	The sporangial initial cell is called as _ a) Archesporial cell c) Secondary nucleus	b)	 Antipodal cell Peripheral cell	
	3)	Double fertilization is characteristic fea a) Bryophyta c) Gymnosperms	b)	of Pteridophyta Angiosperms	
	4)	The entry of pollen tube in ovule throug a) Chalazogamy c) Progamy	b)	icropyle, is known as Mesogamy None of these	
	5)	is the most common nutritive tistangiosperms. a) Endosperm c) Promeristem		for the developing embryos in  Tapetum  None of these	
	6)	type of endosperms is supposed a) Helobial c) Nuclear		oe rare. Cellular None of these	
	7)	acts as shock absorbance in code a) Epicarp c) Endocarp	conu b) d)	t fruit during dispersal. Mesocarp None of these	
	8)	seeds are albuminous seeds. a) Monocot c) Both a & b	b) d)	Dicot None of these	
Q.2	Ans a) b) c) d)	Define primordia.  Define archesporium.  What is mean by Xenogamy?  What is mean by non-endospermic see Give the examples of endospermic see			08

Q.3	<ul><li>a) Give the functions of tapetum.</li><li>b) Describe anomalous secondary growth in <i>Dracaena</i> stem.</li></ul>	08
Q.4	<ul> <li>c) Write on agents of pollination.</li> <li>Answers any Two of the following.</li> <li>a) Describe self-seed dispersal mechanism in plants.</li> <li>b) Describe flower as a modified determinate shoot with evidence.</li> <li>c) Describe pollination mechanism in <i>Vallisneria</i>.</li> </ul>	08
Q.5	<ul> <li>Answers any One of the following.</li> <li>a) Describe the development of male gametophyte with diagrams.</li> <li>b) What is endosperm? Describe the development of different types of endosperms.</li> </ul>	08

Seat No.	Set	Р

	B.\$	Sc. (S	Semester - IV) (OId) (CBCS) GEOGRAPHY (			-2024
			Economic Geogra	-	•	
•			onday, 29-04-2024 // To 11:00 AM		•	x. Marks: 40
Instr	ucti		1) All questions are compulsory. 2) Figures to the right indicate full 3) Draw neat diagrams and amp; ( 4) Use of maps stencil is allowed.			ary.
Q.1		SEZ a)	choice questions. approvals granted under the SEZ 2000 2010	b)	2005 2015	08
	2)	a) b) c)	nomic geography can be divided in Geography of industry Geography of international trade Geography of transport and comi All of these			
	3)	A Te a) c)	chnology park is also called as University research park Technopark / technopole	b)	 Science park All of these	
	4)	a)	tronics City located in in Ind Hydrabad Mumbai		Bangalore Kolkata	
	5)	a)	imary sector coloured wor Blue Pink	b)	are observed. White Red	
	6)		has the largest number of cotto on its called "Cotton polis of India". Maharashtra Tamilnadu			this
	7)		formulated a theory of industria ed where the transportation costs num. Alfred Weber Strabo			ct is a
	8)		nple of primary activities is IISCO Manufacturing	 b) d)	Hunting & Mining Services	

Q.2	An	swer the following. (Any Four).	08
	a)	What is mean by Technology Parks?	
	b)	In which state (Only name) the iron and steel is located in India?	
	c)	Define the Subsistence agriculture?	
	d)	Write down the example of secondary activity (only names)?	
	e)	Definition of economic geography?	
Q.3	Wr	ite short notes on. (Any Two)	08
	a)	Transport	
	b)	SEZ	
	c)	Forestry	
Q.4	An	swer the following. (Any Two)	08
	a)	What is mean by agriculture & explain the commercial agriculture?	
	b)	Describe the industrial location theory by Weber in short?	
	c)	Describe the Concept of economic activity and Explain it's classification in short	?
Q.5	An	swer the following. (Any One)	08
	a)	Explain the agriculture land use model by Vonthunen?	
	b)	Explain the factors affecting location of economic activity?	
	•	· · · · · · · · · · · · · · · · · · ·	

Seat	t   _		Se	t P
	B.S	c. (Semester - IV) (Old) (CBCS) Ex ELECTRONICS (Pa Operational Amplifier and App	per – VII)	١ -
•		e: Monday, 29-04-2024 0 AM To 11:00 AM	Max. Mar	′ks: 40
Instr	uctio	ns: 1) All questions are compulsory.  2) Draw neat diagrams and give equat  3) Figures to the right indicate full mar  4) Use of logarithmic tables and calcul	KS.	
Q.1	Muli	iple choice questions.  The configuration of OpAmp offer a) inverting b) c) non- inverting d)	differential	08
	2)	The bandwidth of open loop configuration <ul> <li>a) almost zero</li> <li>b)</li> <li>c) infinity</li> <li>d)</li> </ul>	audio frequency range	
	3)	In case of emitter coupled differential ampericular is used to make stable.  a) collector current of Q1 transistor b) collector current of Q2 transistor c) tail current	lifier, the constant current bias	

To construct zero crossing detector using OpAmp, the reference voltage is ...

In case of OpAmp non-inverting amplifier, input voltage is 2 mV, input resistance

is 15 KOhm and feedback resistance is 45 KOhm then the out voltage is

The voltage to current converter using OpAmp is also called as \_\_\_\_\_ amplifier.

In case of basic differentiator circuit using OpAmp, the capacitor is connected

b) 6 mVd) 4 mV

b) buffer

d) conductance

The \_\_\_\_\_ configuration of OpAmp is used for voltage follower circuit.

b) - zero volt

d) All of these

b) open loop non-inverting

b) at the inverting terminal

d) in designer chosen

d) closed loop non-inverting

d) both a and b

a) +zero Volt

a) closed loop inverting

c) open loop inverting

a) transresistance

\_\_\_\_ path.
a) in feedback

c) transconductance

c) at the non-inverting terminal

c) zero Volt

a) 2 mV

c) 8 mV

4)

5)

6)

7)

8)

<b>Q.2</b>	Answe	r the	following.	(Any	Four)	

08

- a) State any four ideal characteristics of Operational Amplifier.
- **b)** Find the CMRR in dB, if Ad is 12000 and Ac is 0.60.
- c) State the need of differential amplifier.
- d) Define the OpAmp parameter Input bias current and input offset voltage.
- e) State any two non-linear application of OpAmp.
- f) Draw the neat labelled equivalent circuit of OpAmp.

#### Q.3 Write short notes on. (Any Two)

08

- a) Define slew rate & explain it.
- b) Explain the current mirror bias circuit for differential amplifier.
- c) Explain the adder circuit using OpAmp.

#### Q.4 Answer the following (Any Two)

08

- a) Explain the triangular wave generator using OpAmp.
- **b)** Explain the Integrator circuit using OpAmp.
- c) Explain the zero crossing detector using OpAmp.

#### Q.5 Answer the following (Any One)

80

- a) State the various configurations of OpAmp & need of closed loop closed loop configuration. Derive the gain relation for the closed loop Inverting configuration.
- **b)** Explain the following.
  - 1) Astable multivibrator using OpAmp.
  - 2) Current to voltage converter using OpAmp.

No.					Set	t P
E	3.Sc.	(Semester -	IV) (Old) (CBCS) GEOLOGY (P Stratigraphy (	apeı	•	,
-		Tuesday, 30-04 AM To 11:00 A			Max. Mark	ເs: 40
Instru	ctions	2) Draw neat	ns are compulsory. and well labeled diao the right indicate full		wherever necessary.	
	1) A	le choice ques Stratigraphic Pi a) James Hutt c) Nicholas St	rinciple of Order of So on		oosition has been given by Guttenberg William Smith	<b>08</b> _·
;		ge of Fishes is _ a) Devonian c) Proterozoic		b) d)	Mesozoic Eocene	
;	,	hich of the follo a) Vindhyan c) Cuddapah	wing represent Pre-0	b)	rian formation? Dharwar All the above	
		er-trapean bed a) Dharwar c) Siwaliks	s belong to	b) d)	Vindhyan Deccan Trap	
		hich is the follo a) Group c) Formation	wing is smallest litho		graphic division? Super-group All the above	
(		hich of the follo a) Era c) Epoch	wing is NOT a chron	b)	<u> </u>	
	•	amond deposits a) Vindhyan c) Cuddapah	s found in Panna reg	ion o b) d)		
;		ge of Kutch geo a) Cambrian c) Silurian	logical formation is _	b) d)	 Precambrian Jurassic	
	<ul><li>a) De</li><li>b) Gi</li><li>c) De</li><li>d) De</li><li>e) De</li></ul>	er the following of the Index fossive two names of the Correlation of the Marker be the name of the Index for the name of the Index for the name of the Index for the Inde	il. of Eons. n. ny.	dera	tely developed life?	08

Q.3	Write	e sh	ort	notes	on.	(Any	Two)
	_						_

80

- a) Classification of Cuddapah.
- b) Lithology and Age of Vindhyan.
- c) Deccan Trap Lithology and Distribution.

#### Q.4 Answer the following. (Any Two)

08

- a) Explain Indo Gangetic Plains of India.
- **b)** Umia series Lithology and Life.
- c) Economic importance of Dharwar.

#### Q.5 Answer the following (Any One)

80

- **a)** Describe lithology, distribution, life, age and economic importance of Cuddapah system.
- **b)** Define Stratigraphy. Describe a principle of stratigraphy 'Uniformitarianism'.

Seat	Set	Р
No.		

	B.S	c. (Semester - IV) (Old) (CBCS) Examination: March/A MICROBIOLOGY (Paper – VII)	pril-2024
		Immunology & Medical Microbiology (19201425)	
•		ate: Tuesday, 30-04-2024 00 AM To 11:00 AM	Max. Marks: 40
Instr	uctio	<ul><li>ons: 1) All questions are compulsory.</li><li>2) Draw neat diagrams and give equations wherever necessa</li><li>3) Figures to the right indicate full marks.</li></ul>	ry.
Q.1		oose the correct alternative.  Step ladder fever is characteristic of  a) dengue fever b) urinary tract infection c) Typhoid d) candidiasis	08
	2)	Antigen antibody reaction requires  a) complement b) electrolyte c) fibrinogen d) plasma	
	3)	is iron binding protein involved in innate immunity.  a) Lactoferin b) Interferon c) Opsonins d) Complement	
	4)	All are the molecules of innate immunity except  a) complement b) acute phase proteins c) interferon d) granzymes	
	5)	cells are called polymorphonuclear leucocytes.  a) Monocyte b) Neutrophil c) Macrophage d) Basophil	
	6)	Vaccination is immunity.  a) artificial active b) artificial passive c) natural active d) natural passive	
	7)	Immunogenicity of an antigen depends upon  a) foreignness b) chemical complexity c) molecular size d) All of these	
	8)	Live vaccines contain  a) attenuated bacteria. b) inactivated bacteria. c) immunogenic component of the bacteria. d) inactivated toxin.	
Q.2	a) b) c) d)	swer any Four of the following.  Mention two biological role of IgA.  Write two differences between IgG and IgM.  What are Isoantigen?  What is autoantigen?  What is precipitation?  What is the role Inflammation in immunity?	08

SLR-GA-170	
08	

Q.4	Answer any Two of the following.

**b)** Immunofluorescence test.

a) Active Immunity.

08

a) General features antigen antibody reactions.

c) Collection, handling & transportation of specimen.

- b) Factors affecting antigenicity.
- c) Cells of innate immunity and their role.

Q.3 Write short notes on any Two of the following.

## Q.5 Answer any One of the following.

- a) Write an essay on Basic structure of antibody (immunoglobulin).
- b) Write an essay on enteric fever.

Seat	Sat	D
No.	Set	

# B.Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024

	D.\	JC. (J	, ,	OGRAPHY (I		r – VIII)	
			Environm	nental Geog	raph	y (19201417)	
-			ırsday, 02-05-2024 To 11:00 AM	ļ		Max. Marks	s: 40
Instr	ucti	2) 3)	All questions are of Draw neat diagram Figures to the right Use of Stencils is	ns wherever ne t indicate full m		<u> </u>	
Q.1	Mu 1)	a)			a-biot b) d)	ic components of the environment. Food chain Colony	80
	2)	The te a) c)	erm Environment m Region Surrounding	neans	b) d)	Land Area	
	3)	The w a) c)	ord Ecosystem wa Tansley Lindeman	is coined by	b) d)	Fosobarg Park	
	4)	a) c)	is the most impor Kangaroo Cow	tant animal in t	he gra b) d)	asslands of Australia. Primary Tiger	
	5)	a) c)	_is known as produ Plant Animal	ucers.	b) d)	Eater Aquatic	
	6)	World a) c)	Environment Day 5 <sup>th</sup> May 5 <sup>th</sup> June	is celebrated o	on b) d)	this day. 5 July 5 <sup>th</sup> August	
	7)	a) c)	gas is responsible Carbon dioxide Oxygen	e for global war	ming. b) d)	Carbon monoxide Nitrogen	
	8)	Marin a) c)	e life is in danger d Air Water	lue to po	ollutio b) d)	n. Land Sound	
Q.2	An: a) b) c) d)	What What What What	ny four of the foll is Environmental G is Biome? is Food Web? is Ecosystem? is Air Pollution?	_			80

Q.3	<ul> <li>Write short notes on any two of the following.</li> <li>a) Importance of environmental geography</li> <li>b) Tundra Biome</li> <li>c) Characteristics of ecosystem</li> </ul>	08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain any four causes of global warming</li> <li>b) Explain the human impact on environment.</li> <li>c) Explain the A-biotic components of ecosystem</li> </ul>	90
Q.5	<ul><li>Answer any one of the following</li><li>a) Explain the nature of environmental geography?</li><li>b) Explain any four national environmental movements?</li></ul>	08

Seat No.		Set F	<b>&gt;</b>
	B.S	Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024 ELECTRONICS (Paper – VIII) Digital Techniques and Microprocessor (19201414)	
•		te: Thursday, 02-05-2024 Max. Marks: 4 00 AM To 11:00 AM	10
Instru	ıctio	<ul> <li>2) All questions are compulsory.</li> <li>2) Draw neat diagrams and give equations wherever necessary.</li> <li>3) Figures to the right indicate full marks.</li> <li>4) Use of a logarithmic table and calculator is allowed.</li> </ul>	
Q.1	Mu 1)	Itiple choice questions:  uses capacitors for storing the data.  a) SRAM b) DRAM c) Flash memory d) PROM	8
	2)	technique is used in the IC ADC 0804 for data conversion.  a) Single slope b) Flash c) Dual slope d) SAR	
	3)	In 8085 processor is a non-maskable interrupt. a) RST 7.5 b) RST 6.5 c) TRAP d) INTR	
	4)	RAL is an example of addressing mode. a) Implied b) Immediate c) Register d) Direct	
	5)	In linear address decoding address are used for decoding purpose.  a) all unused b) only one unused c) no d) all used	
	6)	instruction is a used to stop the execution of program.  a) SIM b) EI c) HLT d) NOP	
	7)	The suitable crystal frequency for 8085 microprocessors is  a) 9 MHz b) 12 MHz c) 3 MHz d) 6 MHz	
	8)	is the first machine cycle of every instruction.  a) opcode fetch b) memory read c) memory write d) input read	
Q.2	a) b) c)	Swer any Four of the following.  Compare RAM and ROM memory.  Write the name of ICs i) 74244 ii) 74245 iii) 74138 iv) 74373  Write the name pins used for serial data transfer in 8085 processor.  Write the roll of ALE signal.  Define accuracy and resolution of DAC.	8

Q.3	Write short notes on any	Two of the following.	08
٠.٠		ine or and remember.	~

- a) Non-volatile memories.
- **b)** Flash ADC.
- c) Flag Register of 8085.

## Q.4 Answer any Two of the following.

08

- a) What is instruction? State any three two-byte instruction.
- **b)** Determine the analog output for 4-bit binary weighted DAC, if 0 = 0V and 1= 5 V for digital input 1) 1110 2)1010.
- c) Write assembly language program to add two 8-bit numbers.

### Q.5 Answer any One of the following.

- a) Classify the instruction set of 8085 processor according to the functions of instruction with suitable example of each.
- **b)** Explain the concept of Memory Mapped IO Scheme and IO mapped IO Scheme.

						3	LK-G	<b>A</b> -1	74
Seat No.	t						5	Set	P
	В.	Sc. (\$	Semester -	GEOLO	CBCS) Exa GY (Pape tology (19		April-20	24	
-			iday, 03-05-2 И То 11:00 Al				Max. N	/larks	: 40
Instru	ucti		1) All questior 2) Draw neat 3) Figures to	and well labe	led diagram	s give wherever neces ss.	sary.		
Q.1		At th matt a)	choice questle time of prestler is term mould petrification	servation foss 		by molecule replacem impression carbonification	ent of		80
	2)	a)	are the mould petrification	•	b)	ement of the organism. imprints carbonification			
	3)	a)	sils are used i geology stratigraphy		b) d)	research All of these			
	4)	a)	theory of orga dog horse	anic evolution	b)	s shown by the studyir goat cat	ng	fossi	ls.
	5)	Cepl a) c)	halopod shell one lateral	s consist of _	valves b) d)	two None of these			

b) curved

b) oggygia

b) ventral

d) all of these

d) All of these

d) None of these

# Q.2 Answer any Four of the following.

**6)** Gastropod shells may be \_\_\_\_\_.

7) The trilobite is consisting of \_\_\_\_\_.

8) The lower side of the echinoderm is called \_\_\_\_\_ side.

a) spirally coiled

c) straight

a) dorsal

c) oral

a) trinuclious

c) paradoxide

- a) What is paleontology?
- b) Name the fossils of gastopod?
- c) What is suture in fossil?
- d) Write two Conditions of fossilization.
- **e)** Describe whorls in gastropod.
- f) Fossils in cold climate.

Q.3	<ul> <li>Write short notes on any Two of the following.</li> <li>a) Imprints</li> <li>b) Glossopteris and Gangamopeteris.</li> <li>c) Cephalon in trilobites.</li> </ul>	08
Q.4	<ul> <li>Answer any Two of the following.</li> <li>a) Describe any two lamellibranches.</li> <li>b) Describe evolution of horse.</li> <li>c) Describe the Coelenterate.</li> </ul>	08
Q.5	<ul><li>Answer any One of the following.</li><li>a) Describe uses of fossils.</li><li>b) Describe mode of preservation of fossil.</li></ul>	80

Seat	Sat	D
No.	Set	L

	B.S	Sc. (Semester - IV) (Old) (CBCS) Examination: March/April-2024 MICROBIOLOGY (Paper – VIII) Industrial Microbiology (19201426)
		te: Friday, 03-05-2024 Max. Marks: 40 00 AM To 11:00 AM
Instr	uctio	ons: 1) All questions are compulsory. 2) Draw neat diagrams give equations wherever necessary. 3) Figures to the right indicate full marks.
Q.1	Mu 1)	Itiple choice questions:  Industrial cultures are maintained byprocess.  a) Incubation b) Lyophilisation  c) Pasteurization d) Sterilization
	2)	is not used as Nitrogen source in fermentation medium.  a) Molasses b) Soyabean meal c) Peptone d) Pharmamedia
	3)	Approximately% sugar is present in cane molasses. a) 10
	4)	Vortex formation during fermentation process is prevented by  a) Baffles b) Spargers c) Impellers d) Antifoam agents
	5)	Zone of growth inhibition is found in primary screening ofproducers.  a) Enzyme b) Organic acid c) Antibiotic d) Growth factor
	6)	processing is nothing but the purification and recovery of product after fermentation.  a) Upstream b) Middle stream c) End d) Down stream
	7)	Temperature between oC is maintained during bacterial amylase production.  a) 10-15
	8)	Water coils around the fermenter are used to maintain the of fermentation medium.  a) pH b) Water level c) Viscosity d) Temperature
Q.2	a) b) c)	Swer any Four of the following.  Define crude media.  What is advantage of Strain improvement?  Give four names of industrially important organisms?  What is Lyophilisation?

- e) What is SCP?
- f) What are the inoculum media?

Q.3	Write short	notes	on any	Two	of the	following
-----	-------------	-------	--------	-----	--------	-----------

80

- a) Primary Screening of Antibiotic producers.
- **b)** Dual and multiple fermentation.
- c) Recovery by Precipitation and distillation.

### Q.4 Answer any Two of the following.

08

- a) Describe in detail alcohol fermentation.
- b) Describe in brief various raw materials used for designing of fermentation media.
- c) Describe the various method for preservation of Industrially important organisms.

## Q.5 Answer any One of the following.

- a) Discuss in detail Penicillin production.
- b) Describe with diagram Design of fermenter and its applications.

Seat	Sat	D
No.	Set	

	B.50	e. (Semester - v) (New) (CBCS) Examination: March/A ENGLISH (Compulsory) Literary Mindscapes - I (19201500)	Aprii-2024
•		e: Friday, 05-04-2024 O PM To 05:00 PM	Max. Marks: 40
Instr	uction	ns: 1) All questions are compulsory. 2) Figures to the right indicate full marks.	
Q.1		ose the correct option from the given alternatives and comple ence.  Della bought as a gift to Jim in the story 'The Gift of the M a) a gold watch	
		<ul><li>b) A jacket</li><li>c) Platinum fob chain for his watch</li><li>d) Silver chain</li></ul>	
	2)	Phatik's deepest desire in the story 'The Home Coming'.  a) to belong and be loved b) to be a gang leader c) to be a boatsman d) to become a teacher	
	3)	The girl in the poem 'The Solitary Reaper' used the instruation in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the instruction in the poem 'The Solitary Reaper' used the poem 'The Solitary Reaper' used the poem 'The Solitary Reaper' used the in the poem 'The Solitary Reaper' used the in the poem 'The Solitary Reaper' used the in the poem 'The Solitary Reaper' used the in the poem 'The Solitary Reaper' used the poem 'The Solitary Reaper' used the in the poem	ment.
	4)	Queen Gulnaar desired for in the poem 'The Queen's Riv a) a rival b) more clothes c) more jewellery d) King's love	al'.
	5)	The schoolmaster lived in a in the poem 'The Village School bungalow b) cottage d) apartment	oolmaster'.
	6)	The road in the poem 'The Road Not Taken' diverged  a) on the green road b) on the brown road c) in the gray road d) in the yellow wood	
	7)	She will finish her project in a week. (Change the sentence from passive voice)  a) Her project will be finished in a week.  b) She finishes her project in a week.  c) She is going to finish her project in a week.  d) She needs a week to finish her project.	active into
	8)	I was so that I could not even have my dinner. (Choose the phrasal verb)  a) tied up  b) tied in  c) tied down  d) tied on	ne correct

		<del></del>			
Q.2	Writ a)	te answers in short. (Any Four)  How did the couple feel about their prized possessions in the story 'The Gift of The Magi'?	12		
	b)	Describe The character of Phatik's from the story 'The Homing Coming'.  Describe the use of nature and harmony in the poem 'The Solitary Reaper'.			
	d) e) f)	Why is the Queen unsatisfied and seeks a rival? How did the villagers regard the Schoolmaster? What is the significance of the roads in the poem 'The Road Not Taken'?			
Q.3	Answer the following questions. (Any One)				
	a)	You were in a situation where communication issues led to your poor performance in the organization. How did you recognize the issue and solve it?			
	b)	You have been selected as the leader for a project which has people from diverse backgrounds working together for the first time. How will you help the group members to break the ice and brain storm about the project, as			

well as delegate responsibility among the team to ensure that the project

gets completed on time.

				_					
Seat No.								Set	P
	B.S	c. (S	emester	- V) (New) (Cl PHYSICS (S	-		-	I-2024	
		Ma	thematic	cal Physics &	Statistic	al Physic	s (19201511)		
			nday, 12-0 To 06:00 F				M	ax. Marks	s: 80
Instru	uctio			ons are compuls oright indicate fu					
Q.1	A)	Mult	iple Choic	e Questions.					10
	,	1)	-	of differential ed	quation $\frac{d^2y}{dx^2}$	$= 6x \text{ is } _{}$	<del>.</del>		
			a) 1 c) 3			2 4			
		2)	Curl of ve a) maxir c) const		line integ b) d)	gral of the v minimum zero		nit area.	
		3)	The three a) $(x, y, z)$ c) $(\rho, \phi, z)$	-	b)	o-ordinate s $ (r, \phi, \theta) $ $ (x, r, \phi) $	system are		
		4)	Which of a) $h_2u_2$	the following hav	b)	$h_1u_1h_2u_2$			
			c) $h_2h_2$		a)	$h_1u_1h_2u_2$	$n_3u_3$		
		5)	. 7	f a cell in phase-	b)	$h^2$ $h^4$			
		6)	The cond a) $\delta \log \theta$ c) $\log W$			ibution is gi $W = 0$ $\log W = 1$	-		
		7)	Maxwell E a) He at c) Electr		ics is appli b) d)				
		8)	a) Helm	/namic potential holtz free energy s free energy		Enthalpy			
		9)		any ways two pa ı to Bose- Einste		_	d in three phase	cells	

		10) The average electron energy in electron gas at 0°K is  a) $u_f$ b) $5 u_f$ c) $3$ d) $5$	
		c) $\frac{3}{5}u_f$ d) $\frac{5}{3}u_f$	
	B)	Fill in the blanks.	06
		The degree of differential equation $\left(\frac{d^2y}{dx^2}\right)^2 + 6\left(\frac{dy}{dx}\right)^3 = y$ is	
		<ul> <li>The gradient of scalar function is function.</li> <li>Phase space is combined position and space.</li> <li>Bose Einstein statistics is applicable to particles.</li> <li>Spin value of electron is</li> <li>Rayleigh-Jean's law applies to wavelength region.</li> </ul>	
Q.2	Solv a) b) c) d) e) f) g) h) i)	What is partial differential equation. Write expression for length element in spherical polar coordinate system. Define microstate and microstate. Define thermodynamic probability. Draw a graph of distribution curve for molecular speed. Obtain expression for partition function Z. State Wiens displacement law. State the conditions of particles obeying Bose-Einstein distribution law. Define Fermi Energy of electrons in metal. Define specific heat of metals.	16
Q.3	A)	<ul> <li>Answer any Two of the following.</li> <li>1) Define ensemble. Describe microcanonical and canonical ensemble.</li> <li>2) Derive the relation for entropy in terms of partition function Z.</li> <li>3) Derive Stefan's law from Planck Radiation Formula.</li> </ul>	10
	B)	Compare Maxwell Boltzmann, Bose Einstein and Fermi Dirac Statistics.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe spherical polar coordinate system.</li> <li>2) Obtain the relation between entropy and probability.</li> <li>3) Using Maxwell Boltzmann distribution law obtain expression for most probable speed.</li> </ul>	80
	B)	Derive Planck's radiation formula in terms of frequency using Bose Einstein Statistics.	80
Q.5		mpt any Two of the following.	16
	a) b)	State and prove Gauss Divergence Theorem.  Obtain expression for curl of a vector field in orthogonal curvilinear coordinate system.	
	c)	Derive Maxwell Boltzmann distribution law.	

			3	LR-GA-	1/8
Seat No.				Set	Р
	B.S	c. (S	emester - V) (New) (CBCS) Examination: March/A CHEMISTRY (Special Paper - IX) Physical Chemistry (19201506)	pril-2024	
•			nday, 12-05-2024 To 06:00 PM	Max. Mark	s: 80
Instru	ıctio	2) 3)	All questions are compulsory. Figures to right indicate full marks. Neat diagrams must be drawn whenever necessary. Use of logarithmic table/scientific calculator is allowed.		
Q.1	A)		ose correct alternative from given options and rewrite the	e	10
		sent 1)	tence.  Lead-silver system is an example of system.  a) one component b) two component  c) three component d) all the three		
		2)	The dotted line in the phase diagram represents equil a) True b) Metastable c) Real d) most stable	librium.	
		3)	In phase diagram the triple point is called point. a) Invariant b) Monovarient c) Univariant d) Bivariant		
		4)	In the photosynthesis process acts as sensitizer. a) Water b) Oxygen c) Chlorophyll d) Carbon dioxide		
		5)	The wavelength range 400 nm to 750 nm belongs toa) UV b) Visible c) IR d) all of these	region.	
		6)	The quantity (2S+1) is known as  a) spin pairing b) spin multiplicity c) spin of electron d) rotation of electron		
		7)	In concentration cell emf is produced due to decrease in a) Free energy b) Temperature c) Pressure d) Concentration	·	
		8)	Cu <sup>2+</sup> /Cu <sub>(S)</sub> represents electrode.  a) amalgam b) metal-metal ion c) metal insoluble salt d) oxidation-reduction		
		9)	The unit for cell potential is a) faraday b) joules c) volt d) ergs		
		10)	equation is known as de Broglie equation.  a) $\lambda = h/mv$ b) $\lambda = h/mc$ c) $\lambda = mvr$ d) $\lambda = hv$		

	B)	Ans 1) 2) 3) 4) 5) 6)	wer in short/Fill in the blanks/ One Word answer/True or False.  In phase diagram of water system curves are invariant systems. (True/False)  Define congruent melting point in salt-water system. Give one example of reversible cell. Give the representation of calomel electrode. In photosynthesis process acts as photosensitizer. Black body is perfect absorber and emitter. (True/False)	06		
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9)	What Explored What How What What What What What What What What	Any Eight of the following. What do you meant by electrochemical series? What is cryohydric point? Explain oxidation-reduction electrode. What is luminescence? How emf of the cell is used to calculate Gibbs free energy change? What is polymorphism? What is mathematical equation for phase rule? What are thermal reactions? What is Heisenberg's uncertainty principle? Define the term photoelectron.			
Q.3	A)	Atte 1) 2) 3)	mpt any Two of the following.  Write a note on Pattinson's process for desilverization of lead.  Give a brief account on photosensitized reactions.  Discuss the application of emf measurement in the determination of pH of solution.	10		
	B)		e the following. t is photoelectric effect? Give its characteristics.	06		
Q.4	A)	1) 2) 3)	mpt any Two of the following. Write a note on Compton Effect. What is photochemical equilibrium? Explain with respect to photodimerization of anthracene? Define the term triple point. Explain with example of water system.	08		
	B)	How value	we the following.  will you determine equilibrium constant from cell emf? Calculate the  e of equilibrium constant for the cell reaction in Daniel cell at 298 K	08		
		Zn <sub>(S)</sub>	+ $Cu^{2+}$ $\longrightarrow$ $Zn^{2+}$ + $Cu(s)$ ( $E^0Zn = -0.76$ V and $E^0Cu = 0.34$ V)			
Q.5	Attera) b)	Wha with State	t are concentration cells? Explain in detail electrolyte concentration cell suitable example.  e and explain the law of photochemical equivalence. What are the one for high and low quantum yield?	16		
	c)	Wha	t is transition temperature? Discuss in detail the application of phase to Sulphur system.			

Seat No.		Set	Р
E	3.Sc. (Semester -	V) (New) (CBCS) Examination: March/April-2024	

		( )		BOTANY (Spe Plant Systema		-	
			nday, 12-05 To 06:00 P			Max.	Marks: 80
Instr	ructio	2 3	) Draw neat ) Figures to	ns are compulsory diagrams whereve right indicate full m table and calculate	er neces narks.	•	
Q.1	A)		tiple choice	e questions. s grow in saline Hal phytes	bitat is o		10
		2)	The flower a) equal c) actino		al symm b) d)	netry through one axis is called unequal zygomorphic	t
		3)	Species is 'species'. a) Difference of Individual	ent	uals sho b) d)	wing characters are ca Similar None of above	illed
		4)	Modern he a) Angios c) Pterid	-	b)	plants. Gymnospermic All the above	
		5)	Lead Bota a) Kolha c) Pune		ablishe b) d)	d by university. Mumbai Solapur	
		6)		water lilies	n garde b) d)	ns (Calcutta) to visitors. Bamboos Phlox	
		7)	a) Gener	ing works were pul a Plantarum Lapponica	blished b) d)	by Carolus Linnaeus. Species Plantarum All above	
		8)	in origin.	phyletic	of clas b) d)	sification angiosperms are Polyphyletic None of the above	
		9)	a) ANNC	<i>n arboreum</i> belong NACEAE .CEAE	s to the b) d)	family MALVACEAE RUBIACEAE	
		10)	a) LAMIA	<i>anctum</i> belongs to ACEAE GONACEAE	family <sub>_</sub> b) d)	NYCTAGINACEAE ORCHIDACEAE	

	в)	1) Define mesophytes. 2) Define inflorescence. 3) Define the Species Concept. 4) What is meant by herbarium? 5) Give full form of APG. 6) Give the botanical name of custard apple.	06
Q.2	Solv 1) 2) 3) 4) 5) 6) 7) 8) 9)	Define foliar roots with suitable example.  Describe bulb with suitable example.  What is meant by true fruit?  What is meant by parthenocarpic fruit?  Enlist any two herbaria of India.  What is meant by the botanical garden?  Enlist the types of classification.  Mention a plant of economic importance from family Rutaceae.  Give the economic use of family POACEAE.  What are the accessory whorls?	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe modification of roots for vital functions.</li> <li>2) Describe the forms of polypetalous corolla with suitable example.</li> <li>3) Describe the role of the Botanical Garden.</li> </ul>	10
	B)	Give the salient features of Bentham and Hooker's Classification.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write on Indian Botanical Garden Kolkata.</li> <li>2) Give merits and demerits of Bentham and Hooker's System.</li> <li>3) Mention the plants of economic importance from family Lamiaceae.</li> </ul>	80
	B)	Give the distinguishing characteristics of any two families and add an economically important plant with use from the below families.  1) RUBIACEAE 2) BIGNONIACEAE 3) LAMIACEAE 4) NYCTAGINACEAE	08
Q.5	a)	Describe the types of placentation with diagrams. Write on Lead Botanical Garden. Identify any four plants to their respective family and add economic importance to it.  1) Polyalthia longifolia 2) Abutilon indicum 3) Bougainvillea glabra 4) Vanda roxhurghii	16

Seat							Set	Р
No.	D C	. (6)		 	·DC6/ E	Vor		
	D.30	C. (S	emester -	ک (New) (C Soology (S Molecular I	Special	Pa	•	
•			iday, 12-05 To 06:00 P				Max. Mark	s: 80
Instru	ıctioı	2)	Draw neat	ns are compuls diagrams whei right indicate fu	rever nec		ary.	
Q.1	A)	Mult 1)	Single stra	aki fragments		o coi b) d)	mplex of ribosomes is called Polymer Polypeptide	10 _·
		2)	A DNA secompleme a) Hexa	quence is read ntary antiparall	by an RN el RNA s	vÁ p	olymerase that produces	
		3)	, ·	n Rice variety i		b) d)	 B-carotene and ferritin Lysine	
		4)	compleme a) Hexa	ntary antiparall	el RNA s		· · · · · · · · · · · · · · · · · · ·	
		5)	The 3' end a) Donor c) AT ric			-	Acceptor site Branch point site	
		6)		on of replication polymerase		red I b) d)	by Helicase Tus protein	
		7)	During spl splicesome a) Donor c) Accep	e		ing s b) d)	sites is not recognized by the  Branch point  G-rich site	
		8)	a) Agrob	acterium	•	oduc b) d)	tion of insulin by genetic engineeri Rhizobium Mycobacterium	ng.
		9)		with ne		cells b) d)	s, the synthesis of protein chains  Methionine  Valine	
		10)	The synthology (a) Transloc) Translocy			s b) d)	 Metabolism reduction	

### **SLR-GA-180 Give Definition** B) 06 1) **DNA** replication 2) Translation 3) Splicing Gene regulation 4) 5) Transcription Recombinant DNA 6) Q.2 Solve any eight of the following. 16 Describe mismatch pair 1) 2) Explain Wobble hypothesis. Describe steps of PCR. 3) 4) Explain genetic code. Explain the DNA repair mechanism. 5) Define RNA polymerase. 6) Explain initiation of transcription mechanism. 7) Explain RNA interference. 8) 9) Explain replication of circular DNA. **10)** Describe DNA fingerprinting. Q.3 A) Attempt any two of the following. 10 Describe Lac Operon. 1) 2) Define mechanism capping. 3) Explain difference between prokaryotic and eukaryotic translation. 06 B) Short note. SOS mechanism of DNA repair. Q.4 Attempt any two of the following. 80 A) Describe properties of genetic code. 1) 2) Explain properties of cloning vector. Explain RNA structure. 3)

Describe semi conservative mechanism of DNA replication.

Describe steps in recombinant DNA technology and its application.

Describe mechanism of transcription in prokaryotes.

B)

b)

c)

Attempt any two of the following.

Explain Watson and Crick model of DNA.

80

			31	LIX-GA-	101
Seat No.				Set	Р
	Sc. (S	emester - V) (New) (CBCS) MATHEMATICS (Sp Algebra - II (	ecial Paper - IX)	April-2024	
•		ınday, 12-05-2024 /I To 06:00 PM		Max. Marks	s: 80
Instruc		) All questions are compulsory. 2) Figures to the right indicate full	marks.		
Q.1 A	) <b>Ch</b> o	which of the following is ring with a $(Z, +, \cdot)$ c $(E, +, \cdot)$	-		10
	2)	The characteristic of the ring $Z_5$ a) 5 c) 10	X = 1 b) 2 d) $\{0\}$		
	3)	The number of ideals in field $f$ i a) zero c) two	s b) one d) in finite		
	4)	A non empty subset $w$ of vector and $\alpha \in F$ a) $x + y \in w$ c) Both a and b	space $V(F)$ is subspace if b) $\alpha x \in w$ d) Neither a nor b	for $x, y \in w$	
	5)	If $W_1$ and $W_2$ are finite dimensio $\dim(W_1 + W_2) = $ a) $\dim W_1 + \dim W_2$ b) $\dim W_1 + \dim W_2 + \dim(W_1$ c) $\dim W_1 + \dim W_2 - \dim(W_1$ d) $\dim W_1 + \dim W_2 - \dim(W_1)$	$\cap W_2$ ) $\cap W_2$ )	ces V then	
	6)	The vector $V_1, V_2,, V_n$ is a vector dependent if $\sum aivi = 0$ implies a) All $ai = 0$ c) All $ai \neq 0$	or space $V$ are said to be lin b) At least one $ai \neq 0$ d) All $aivi = 0$	early in	
	7)	The linear transformation define then <i>T</i> is called as  a) Rotation  c) Projection	ed by $T: \mathbb{R}^2 \to \mathbb{R}^2$ by $T(x, y) = 0$ b) Reflection d) Normal	=(x,-y)	
	8)	Let $T: v \to w$ be linear transform by a) $N(T) = \{x \in v/T(x) = x\}$ c) $N(T) = \{x \in v/T(x) = 0\}$	b) $N(T) = \{x \in w / T(x)\}$	= 0}	

- 9) Which of the following is incorrect?
  - a) < cx, y > = c < x, y >
- b)  $\langle \overline{x,y} \rangle = \langle y,x \rangle$
- c)  $\langle x, x \rangle \ge 0, x = 0$
- d)  $\langle x + z, y \rangle = \langle x, y \rangle + \langle z, y \rangle$
- 10) If  $x = (2,1,2) \in V_3(R)$  then unit vector is \_\_\_\_\_.
  - a) (2/3, 1/3, 2/3)

b)  $(2/\sqrt{3}, 1/\sqrt{3}, 2/\sqrt{3})$ 

c) (2/5, 1/5, 2/5)

- d)  $(2/\sqrt{5}, 1/\sqrt{5}, 2/\sqrt{5})$
- B) Fill in the blanks with suitable answer.

06

- 1) An element x in a ring R is idempotent if \_\_\_\_\_.
- 2) The vector space  $f^n$  has dimension \_\_\_\_\_(n).
- 3) Let U and V be vector space with  $\dim U = \dim V = 5$  then L(U, V) is of dimension
- 4)  $T: \mathbb{R}^3 \to \mathbb{R}^2$  is linear transformation defined by  $T(a_1, a_2, a_3) = (a_1 a_2, a_3)$  then  $N(T) = \underline{\hspace{1cm}}$ .
- 5) Determine trace of  $\begin{bmatrix} 10 & 0 & -8 \\ 2 & -4 & 3 \\ -5 & 7 & 6 \end{bmatrix}$ \_\_\_\_\_.
- 6) If x = (2, 1 i, i) and y = (-2, 1 + i, -i) then  $||x + y|| = _____.$
- Q.2 Attempt any eight of the following.

16

- a) Define ring with zero divisor.
- **b)** If *R* is ring then prove that a(-b) = -(ab) = -a(b).
- c) If x, y, z are vector in veretor space V such that x + z = y + z then show that x = y (Cancellation Law).
- d) Determine whether first vector can be written as liner combination of other two vectors (-2,0,3) (1,3,0) (2,4,-1).
- **e)** Show that the set  $S = \{(1,2) (3,4)\}$  is linearly independent.
- **f)** Show that  $w = \{(y, 0, 0): y \in R\}$  is subspace of the vector space  $R^3$ .
- **g)** Prove that ||cx|| = |c| ||x||
- **h)** Let V be inner product space over F then show that  $||x + y||^2 = ||x||^2 + ||y||^2$
- Show that mapping T is non linear  $T: V_2 \to V_2$  defined by  $T(a_1, a_2) = (1, a_2)$
- j) Let  $\alpha$  and  $\beta$  be the standard ordered basis and  $T: R_2 \to R_3$  defined by  $T(a_1, a_2) = (2a_1 a_2, 3a_1 + 4a_2, a_1)$  Compute  $[T]^{\alpha}_{\beta}$ .
- Q.3 A) Attempt any two of the following.

10

- 1) Show that intersection of two left ideals of R is left ideal of R.
- 2) Determine whether the following set of polynomial is linearly dependent or linearly independent.

$$S = \{x^3 + 2x^2, -x^2 + 3x + 1, x^3 - x^2 + 2x - 1\}$$

3) If  $T: R_2 \to R_3$  is linear transformation T(1,1) = (1,0,2)T(2,3) = (1,-1,4) What is T(8,11).

**B)** Let v be the vector space over f prove that polar identities for all  $x, y \in v$ 

$$< x, y > = \frac{1}{4} ||x + y||^2 - \frac{1}{4} ||x - y||^2$$

Q.4 A) Attempt any two of the following.

80

06

- 1) Let  $W_1$  and  $W_2$  be subspace of vector V then show that  $W_1 + W_2$  is also subspace.
- 2) Prove that every field is an integral domain.
- 3) Let v be inner product space over f then for all  $x, y \in v$  and  $c \in f$  then show that triangles inequality  $||x + y|| \le ||x|| + ||y||$
- **B)** Let  $U: P_3(R) \to P_2(R)$  and  $T: P_2(R) \to P_3(R)$  be linear transformation defined by U[F(x)] = f'(x) and  $T[f(x)] = \int_0^x f(t) dt$  Let  $\alpha$  and  $\beta$  be the standard ordered bases of  $P_3(R)$  and  $P_2(R)$ . Compute
  - 1)  $[T]^{\alpha}_{\beta}$
- 2)  $[U]_{\alpha}^{\beta}$
- Q.5 Attempt any two of the following.

- a) State and prove Cauchy-Schwarz Inequality.
- b) Let V and W be vector space and let  $T: V \to W$  be linear. If V is finite dimensional then show that  $\operatorname{nullity}(T) + \operatorname{rank}(T) = \dim(V)$ .
- c) If  $Z_6 = \{0,1,2,3,4,5\}$  with  $+_6$  and  $\times_6$  operations then prove that  $(Z_6, +_6, X_6)$  is commutative ring with unit element.

Seat	Sat	D
No.	Set	<b>P</b>

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 STATISTICS (Special Paper - IX) Statistical Inference - I (19201528)

				Statistical Inferen		-	-		
•			•	12-05-2024 6:00 PM				Max. Mark	s: 80
Instr	uctio	2)	Figu	uestions are compulsory. res to the right indicate ful of log table and calculator					
Q.1	A)	<b>Mult</b> i 1)	-	Choice Questions.  types of estimates are Point estimate Interval estimate Estimation of confidence all the above					10
		2)	Ney a) b) c) d)	raman's factorisation criter Sufficiency of an estimate Consistency of an estimate Unbiasedness of an estimate Efficiency of an estimate	or ator nator	pplied <sup>·</sup>	for testing	·	
		3)	Bias a) c)	s of an estimator can be _ Positive Either positive or negativ	b)		ative ays Zero		
		4)	Whi a) c)	ich one of the following is the Unbiased U.M.V.U.E.	unique 6 b) d)	Bias			
		5)	By r a) b) c) d)	method of moments one c All constant of a populati Only mean and variance All moments if a populati None of the above	ons of a dis	tributic	on		
		6)	The a) c)	e estimator $\frac{\sum X_i}{n}$ of population An Unbiased estimator An biased estimator	b)	An (	Consistent est	imator	
		7)	An e a) b) c)	estimator is considered to Continuous Discrete Concentrated about the t Normal				·	

	8)	If th function (a) c)	e expected value of ction, it is said to b Unbiased estima Consistent estima	e a tor	b)	not equal to it's parametric  Biased estimator  None of the above	
	9)	a) b)	thod of minimum C Chi-square distrik Pearson's Chi-sq Contingency tabl All of the above	oution functi Juare statisti	on	estimation of parameters utilised:	:
	10)		ven by	ntial distribu	ution   b) d)	based a random sample of size sample median $X_{(1)}$	
B)	<ol> <li>Fill in the blanks.</li> <li>If X<sub>1</sub>X<sub>2</sub>X<sub>n</sub> is a random sample from U(θ, 0) then sufficient statistic of θ</li> <li>If T<sub>1</sub> and T<sub>2</sub> be two unbiased estimator of θ. The estimator T<sub>1</sub> is said to be more efficient than estimator T<sub>2</sub> if</li> <li>If statistic T is unbiased estimator of parameter θ then unbiased estimator of 4θ + 7 is</li> <li>If an Estimator T<sub>n</sub> of population parameter θ converges in probability to θ an n tends to infinity is said to be</li> <li>The denominator in the Crammer-Rao inequality is known as</li> <li>Let 5, 8, 3, 6, 8 are observations from Poisson (λ) then unbiased estimate of λ is</li> </ol>						06
Solv a) b) c) d) e) f) g) h) i)	Defir Defir State Defir distri Defir Defir State Wha	ne a some cone Neyme like ibution ne a some a bone any t are	n with parameter 6 sample and a populoiased estimator all ormation function is	ne example on theorem.  a random volument of the content of the c	ariab estir mete kelihe mator	r $\theta$ . cood Estimator (MLE). c?	16

**Q.2** 

Q.3	A)	<ol> <li>Attempt any Two of the following.</li> <li>Let X<sub>1</sub>, X<sub>2</sub>, X<sub>n</sub> be iid r.v. with Poisson distribution with parameter λ then find Sufficient statistic for λ.</li> <li>Explain the procedure of obtaining the estimate of the parameters by method of maximum likelihood estimator.</li> <li>State and prove sufficient condition for consistency for θ.</li> </ol>	10				
	B)	Let $X_1, X_2, X_n$ be a r.s. from $U(a, b)$ distribution. Find the estimators of $a$ and $b$ by the Method of moments.	06				
Q.4	A) B)	<ol> <li>Obtain the MLE of the parameter θ based on a r.s. of size n from Binomial Distribution.</li> <li>Prove that two distinct unbiased estimators of φ(θ) give rise to infinitely many Unbiased estimators of φ(θ).</li> <li>Let X<sub>1</sub>, X<sub>2</sub>, X<sub>n</sub> be a r.s. from N(θ, σ²) distribution. Show that the sample mean square S² is consistent estimator of σ².</li> </ol>					
Q.5	a) b)	State and prove Crammer - Rao Inequality.  Let $X_1, X_2 X_n$ denote the random sample from exponential distribution with pd $f(x,\theta) = \theta \ e^{-\theta x} \qquad ; \qquad x > 0, \theta > 0$ $0 \qquad \qquad ; \qquad \text{otherwise}$ 1) Obtain expression for likelihood function 2) Find Fisher information $I(\theta)$ .	<b>16</b>				

c) State and prove Uniqueness theorem for UMVUE.

					SLR-GA-	183
Seat No.					Set	P
В.	Sc.	(Sem	nester - V) (New) (CBCS) E GEOLOGY (Specia Economic Geology	al Pa	per - IX)	4
•			day, 12-05-2024 To 06:00 PM		Max. Mark	s: 80
Instru	ctior	2) 3)	All questions are compulsory. Draw neat labeled diagrams who Figures to the right indicate full of Use of log table and calculators	marks	S.	
Q.1	A)	Multi 1)	iple choice questions. The non-metallic minerals asso called a) Non-metallic minerals c) Gangue minerals	b)		10
		2)	Supergene sulphide enrichmen <ul><li>a) Above the water table</li><li>c) Near the ground surface</li></ul>	nt zon b)	e is found Below the water table	
		3)	An assemblage of high tempera minerals in contact metasomati a) Skarn c) Gossans			
		4)	In deposits 'insitu' gravitation its formation.  a) Eluvial c) Hydrothermal	b)	al accumulation is the process  Alluvial  Placer	
		5)	Hydrothermal mineralisation ald a) Stock works c) Ladder veins	_	Saddle reefs	
		6)	Diamond is an example of a) disseminated c) injected		agmatic deposits. segregated none of these	
		7)	The Mn-ore deposits of M.P. ar a) Chorbaoli formation c) Lohangi formation	b)	aharashtra are confined to the: Mansar formation Bochum formation	
		8)	<ul> <li>Chrysolite asbestos result from</li> <li>a) Magmatic liquid</li> <li>b) Alteration of olivine to serp</li> <li>c) Alteration of serpentine</li> <li>d) Hydrothermal solutions</li> </ul>			
		9)	Which of the following ore depodeposits?  a) Chromite c) Diamond		s example of early magmatic Sulphide Asbestos	

		a) Metamorphism b) Metasomatism c) Magmatic crystallization d) Oxidation and supergene enrichment	
	B)	<ol> <li>Fill in the blanks:         <ol> <li>The deposits that have formed simultaneously with the enclosing rock are called</li> <li>The ferric hydroxide is left behind to form a residual deposit at the surface and this is known as a</li> <li> deposits are formed in intruded rocks by fluids given off by intruding igneous magmas.</li> </ol> </li> <li>Copper - Nickle sulphide mineralization is generally associated with the rocks of nature.</li> <li>Laterite and bauxite are the examples of type of deposits.</li> </ol> <li>The Singhbhum copper belt located in state.</li>	06
Q.2	a)	Define Epigenetic ore deposits. Give essential conditions for the placer deposits. Give two examples of hydrothermal deposits. Name two endogenous deposits associated with folded regions. What are non -metalliferous mineral deposits? Name the types of magmatic concentration. Give the Indian examples of copper deposits. Name any two ore deposits from by residual concentration. Define Tenor of ore. Define Syngenetic deposits.	16
Q.3	A) B)	<ol> <li>Attempt any two of the following:         <ol> <li>Explain the oxidation and supergene enrichment processes of ore deposit with Indian example.</li> </ol> </li> <li>What is Magmatic concentration? Explain late magmatic concentration deposits.</li> <li>Discuss the manganese deposits of India.</li> <li>Write short note on contact metamorphism process with suitable</li> </ol>	10
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Explain die formation of residual deposits.</li> <li>2) Discuss the metallogenic epoch and metallogenic provinces.</li> <li>3) Write a note on Kolar gold deposits.</li> </ul>	08
	B)	Describe in brief Hydrothermal ore deposits and its types with suitable diagram.	08
Q.5	a) [ b) [	mpt any two of the following: Describe in brief the coal deposits of India. Discuss in detail the mechanical concentration of ore deposits with suitable example. Explain the concept and need of conservation of minerals, give examples.	16

Seat	Set	P
No.	Set	

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

		•	MICŔÒBIOĹÒGY (Śpecial Paper - IX) Virology (19201539)	
-			unday, 12-05-2024 Max. M M To 06:00 PM	larks: 80
nstı	ructio	2	1) All questions are compulsory. 2) Draw neat labeled diagrams whenever necessary. 3) Figures to right indicate full marks.	
<b>Q.1</b>	A)		write the following sentences by selecting correct answers from en alternatives.  is viral nucleic acid integrated in host genome.  a) Prion  b) Provirus	10
		2)	c) Viriod d) VLP  Outer protein coat of virus is called  a) Capsid b) Capsule	
		3)	c) Protectant d) Cell wall  The viruses that can remain latent for many years are most likely  viruses.  a) Toga b) Entero	
		4)	c) Rhino d) Herpes  Bacteriophages are counted by the process of assay.  a) Diffusion b) Turbidometric  c) Plaque d) Enzymatic	
		5)	The viruses that cause or give rise tumours are called  a) Oncogenic b) Latent c) Avirulent d) Nonpathogenic	
		6)	is helical virus. a) T4 b) Poxvirus c) Herpes d) TMV	
		7)	Infectious RNA particles without protein coat are called  a) Capsid b) Prion c) Viriod d) Virion	
		8)	Cauliflower mosaic virus contains  a) dsDNA b) ssDNA c) dsRNA d) ssRNA	
		9)	Viruses are cultivated by using  a) Nutrient agar b) MacConkeys agar c) Peptone water d) Living cell culture	
		10)	Viruses are connecting link between  a) Bacteria and protozoa  b) Living and non-living c) Rickettsia and actinomycetes	

d) Bacteria and fungi

	В)	<ol> <li>are obligatory intracellular parasites.</li> <li>is host for coliphages.</li> <li>virus is first detected oncogenic virus.</li> <li>Viruses that contain host DNA instead of viral DN A are called</li> <li>The embryonated hens' egg was firstly used for viral cultivation by</li> <li>is first step of infection of bacterial cell by phage.</li> </ol>	<b>06</b> 
Q.2	Solva) b) c) d) e) f) g) h) i)	Define Lytic cycle? Give the two examples of oncogenic viruses? What is chemical composition of Capsid? What are the Temperate Phages? Who discovered virus firstly? Which system is used for classification of Viruses? Which type of nucleic acid is present in Influenza virus. Who described one step growth curve? What is meaning of Virulent phages? Why the viruses cannot multiply their own?	16
Q.3	A)	Attempt any two of the following.  1) General structure of viruses 2) Enumeration of viruses 3) Characteristic of cancerous cells	10
	B)	Describe one step growth curve.	06
Q.4	A)	Attempt any two of the following.  1) Reproduction of Adenoviruses 2) TMV 3) Viral classification	08
	B)	Describe in detail Lytic cycle.	08
Q.5	Atte a) b) c)	Prevention and control of plant viral diseases.  Describe in detail Isolation, cultivation and purification of viruses.  Describe in detail viriods and prions.	16

Seat No.	Set	Р
	•	

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

		Lin	ELECTRONICS (Special Paper- IX) near Integrated Circuits and Applications (19201548)	
•			nday, 12-05-2024 Max. Marks 1 To 6:00 PM	s: 80
Instr	uctio	2	) All questions are compulsory.  2) Draw neat labelled diagrams wherever necessary.  3) Figures to the right indicate full marks.  4) Use of log table and calculators is allowed.	
Q.1	A)	Cho 1)	The component that cannot be fabricated in IC is  a) resistor b) inductor c) capacitor d) diode	10
		2)	circuit called as dc restorer circuit or dc inserter circuit.  a) Peak detector b) Clipper c) Clamper d) S/H	
		3)	The all pass filter is used when  a) phase shift is important  b) high roll of rates is important  c) a rippled stop band is important  d) a rippled pass band is important	
		4)	To have adjustable positive DC voltage, we must use IC. a) 79XX series b) 78XX series c) LM 337 d) LM317	
		5)	of the following frequencies are associated with the IC 565 as a Frequency Shift Keying decoder.  a) 1070 Hz  b) 1270 Hz  c) Both 1070 Hz and 1270 Hz  d) None of these	
		6)	ICLM 331 is a) Comparator b) Frequency to Voltage converter c) Tuned Amplifier d) Multiplier	
		7)	<ul> <li>A voltage regulator is a circuit which</li> <li>a) maintains a constant DC output voltage despite the fluctuations in AC input voltage or load current</li> <li>b) converts the AC voltage into DC voltage</li> <li>c) smoothens the AC variations</li> <li>d) none of these</li> </ul>	

		8)	maximum is called as									
			a) c)	high cut of fi center frequ	requency	,	low cut of frequency none of these					
		9)			ally designed f		mple and Hold purpose.					
			a) c)	LM 324 LF 565		b) d)	LM 741 LF 398					
		10)		processis	used for growir silicon substrate	ng a s	ingle crystal silicon structure					
			a) c)	Oxidation lon Implanta	ation	b) d)	Epitaxial Lithography					
	B)			e following.				06				
		,	•	id IC								
		,		ision rectifier r of filter								
		,		regulation								
		5)		ure Range								
		6)	Activ	e clamper								
Q.2	Sol	Solve any Eight of the following.										
•	a)											
	b)		raw the diagram of full wave precision rectifier.									
	q)			advantages o		ulotor						
	d) e)		•		s of the IC regued	ılator	5.					
	f)	Calcu	ılate	e voltage controlled oscillator. late the value of 100 $\Omega$ / sq. late the value of IC resistance having sheet resistance of 100 $\Omega$ / sq. as aspect ratio L:W=40:1								
	g)											
	h)	,										
	<ul><li>i) Define cut off frequency filter.</li><li>j) Define free running frequency of PLL.</li></ul>											
	J)	Dellil	ene	e running ned	quericy of PLL.							
Q.3	A)	Attempt any Two of the following.  1) Explain Butterworth second order low pass filter.  2) Explain the fabrication process of capacitor in IC.  3) With suitable diagram explain the working of active clipper.						10				
	B)	Desc	ribe f	functional blo	ck diagram of p	hase	look loop.	06				
Q.4	A)	1) E 2) E	Expla Expla	in V to F con	ne following. g of series Op- verter using IC active clipper o	LM33	31.	08				
	B)	Expla	ain th	e functional b	lock diagram o	f volta	age regulator.	08				
Q.5	Atte a) b) c)	Expla With	ain Pl suita	ble diagram e	a frequency mu explain band pa	iss filt		16				

Seat No. Set P
----------------

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

		-	COMPUTER SCIENCE (Special Paper - IX) Visual Programming Using C# (19201543)	
			nday, 12-05-2024 Max. Marks: 80 To 06:00 PM	)
nstr	uctio		All questions are compulsory.  Figures to the right indicates full marks.	
Q.1	A)	<b>Mul</b> 1	tiple choice questions.  What is String.Length in C#?  a) Property  b) Method  c) Constructor  d) Both a and b	0
		2)	By default Priority of thread is a) Highest b) Normal c) above normal d) below normal	
		3)	Two method with same name and same parameters is known  a) Overloading b) Multiplexing  c) Overriding d) Loading	
		4)	C# does not support a) Abstraction b) Polymorphism c) multiple inheritance d) Inheritance	
		5)	Two method with same name but different parameters is known as  a) Overloading b) Multiplexing c) Duplexing d) Loading	
		6)	is necessary condition to implement delegate. a) inheritance b) class declaration c) exception d) multithreading	
		7)	Which of these keywords is not a part of exception handling?  a) try b) throw c) thrown d) catch	
		8)	Choose the keyword which declares the indexer?  a) base b) this c) super d) extract	
		9)	Which of the keyword is used for the block to be examined for exceptions?  a) try b) catch c) throw d) check	
		10)	The are the graphical user interface (GUI) components created for User interaction.  a) Web form b) Window Form c) Application Form d) None of these	

	В)	The blanks.  1) is a collection of similar data which is stored in continuous memory addresses.	06				
		<ul> <li> is used to import namespaces at the top of a source code file in C</li> <li>CTS stands for</li> <li>The block execute whether an exception is thrown or not thrown.</li> <li> parameters are used to pass result back to the calling function.</li> <li> Class of System.IO namespace is used to write text or sequential series of characters into file.</li> </ul>	#.				
Q.2	Solva) b) c) d) e) f) g) h) i)	What is delegate? Write types of Delegate. Write a note of CLR. What is the namespace? What is function parameter? What is menu? What is Assembly? Define inheritance. What is Garbage Collection? What is MDI application? Define Event.	16				
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write program to demonstrate abstract class and abstract method.</li> <li>2) Explain Thread synchronization.</li> <li>3) Write a program for function overriding.</li> </ul>	10				
	B)	Explain types of inheritance.	06				
Q.4	A)	Attempt any Two of the following.  1) Explain multiple catch block with example.  2) What is indexer? Explain with example.  3) Explain multicast delegate with example.	80				
	B)	Explain operator overloading with example.	80				
Q.5	Atte a) b) c)	empt any Two of the following.  Write a program to demonstrate multiple interface.  Explain Button control with example.  Explain dotnet framework in detail.					

			SLR-GA-18	<b>/</b>
Seat No.			Set F	>
E	3.Sc	:. (Se	nester - V) (New) (CBCS) Examination: March/April-2024 PHYSICS (Special Paper - X) Solid State Physics (19201512)	
,			nesday,10-04-2024 Max. Marks: 8 o 06:00 PM	0
Instru	ictio	2) 3)	All questions are compulsory. Draw neat labeled diagram wherever necessary. Figures to right indicate full marks. Use of log table and calculators is allowed.	
Q.1	A)	<b>Mult</b> 1)	ble choice questions.  How much will be nearest neighbour distance in case of BCC structure if its lattice constant 'a' is $\sqrt{3}$ Å?  a) 1.5 Å  b) 2 Å  c) 4.5 Å  d) $\sqrt{3}$ Å	0
		2)	The co-ordination number of face centred cubic (fcc) crystal is  a) 4 b) 6 c) 8 d) 12	
		3)	Monochromatic X-rays of wavelengths 2 Å are diffracted from atomic planes of certain crystal, with angle of diffraction equal to 30°. How much will be interplanar spacing for the crystal?  a) 1 Å b) 2 Å c) 4 Å d) 8 Å	
		4)	Magnitude of reciprocal lattice vector is equal to a) 1 b) 0 c) $d_{hkl}$ d) $\frac{1}{d_{hkl}}$	
		5)	Which of the following relation gives Wiedemann Franz law?  a) $\frac{k}{\sigma} = LT$ b) $\frac{\sigma}{k} = LT$ c) $\frac{k}{\sigma} = \frac{L}{T}$ d) $\frac{\sigma}{k} = \frac{L}{T}$ where $L$ is Lorentz number.	
		6)	Energy of the lowest state of a one-dimensional potential box of ength 'a' is 4 eV. How much will be energy of the lowest state of one-dimensional potential box if length of box is halved?  a) 1 eV b) 4 eV  c) 8 eV d) 16 eV	
		7)	For a semiconductor, energy of conduction band edge (Ec) and valence band edge (Ev) are at 5.2 eV and 4 eV respectively. How much will be band gap (Eg) of the semiconductor?	

b) 9.2 eV d) 0.6 eV

a) 4.6 eV c) 1.2 eV

		8)	Hall a) c)	coefficient is p holes any particle	ositive for		electrons neutrons			
		9)	be it a)	ts magnetic sus 5000		b)	neability of 5000. How much will			
		10)			agnet, such as	d) sup	perconductor, in the interior of the			
			a)	erial $B=0, \psi=0$ $B=1, \psi=-1$			$B = 0, \psi = -1$ $B = 1, \psi = 1$			
	B)						answer/One word answer/	06		
	<ul> <li>Give the name/Predict the product etc.</li> <li>1) For crystal structure, α = b ≠ c and α = β = 90° and γ = 120°</li> <li>2) Bragg's law in terms of reciprocal lattice vector (G) is</li> <li>3) The quantum numbers of an energy state for an electron in a cubical potential box are (2 2 1). This is a fold degenerate energy stated the product of the product of the product of the product of the magnetic material and magnetizing field strength gives</li> <li>6) The permeability of a superconductor is</li> </ul>									
Q.2	Solv a)	Ive any Eight of the following.  Calculate lattice spacing between (221) planes of cubic crystals. (Given								
	b) c) d) e) f) g) h) i)	lattice parameter, a = 0.75 Å).  State any two properties of reciprocal lattice.  State any two assumptions made in the free electron theory of metals.  Define Fermi energy.  Draw band diagram for insulator and metal.  Define retentivity and coercivity in case of ferromagnetic materials.  What is Anti-ferromagnetism?  What is superconductivity?  Explain type I superconductors.  Explain type II superconductors.								
Q.3	A)	1) V 2) E 3) E	Vrite Expla Deter energ	mine the proba $y E_F$ is occupie	r indices. netrical constru bility that an e d by an electro	nerg on.	n of reciprocal lattice. ly level 3kT above the Fermi osolute temperature, T = 300 K]	10		
	B)	Distin	-		onductor and i	nsula	ator from each other on the basis	06		
Q.4	A)	1) S 2) E	State Expla	any two of the and explain the in Hysteresis in is Meissner eff	e Hall effect. i ferromagnetion			80		
	B)	•		ommerfeld's mo lectron in a me		Deriv	ve an expression for the energy	80		

#### Q.5 Attempt any two of the following.

- a) Discuss seven crystal systems of Bravais lattices in three dimensions. Calculate packing fraction for simple cubic (SC) crystal structure.
- b) Draw and explain the experimental arrangement and traces obtained in powder method of X-ray diffraction. In a simple cubic crystal with lattice parameter a = 2.816 Å. the first order diffraction is observed from the plane (1 0 0) using X-rays of wavelength 1.5 Å. Calculate the angle of diffraction.
- c) Discuss classification of magnetic materials.

16

Soot						
Seat No.					Set	Р
B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 CHEMISTRY (Special Paper - X) Inorganic Chemistry (19201507)						
			day, 10-04-2024 6:00 PM		Max. Marks	s: 80
Instruc	tions:	2) Drav 3) Figu	uestions are compulsory.  w neat labeled diagram who res to right indicate full ma of log table and calculators	rks.	•	
Q.1 A	<b>,</b>		e most correct alternative	<b>)</b> .		10
	1)	) Urar a) c)	nium - 238 is a non-radioactive element fertile nuclear fuel	,		
	2)	Nuc a) c)	lear fusion is also known as chain artificial	b)	reaction. thermonuclear projectile capture	
	3)		geometry of deoxyhaemog tetrahedral square planer	b)	s octahedral square planer pyramidal	
	4)	The a)	main function of myoglobir store O <sub>2</sub> transport O <sub>2</sub>		store CO <sub>2</sub> transport CO <sub>2</sub>	
	5)	The a) c)	oxidation of oxalic acid by induced auto	b)	4 is an example of catalysis positive negative	3.
	6)	a)	catalyst used in the manuf Ni Al <sub>2</sub> O <sub>3</sub>	b)	of $H_2SO_4$ by contact process is _ $V_2O_5$ Zn - Cu couple	
	7)	Zinc a) c)	is associated with Iron and proteins pigments	b)	ganese for the synthesis of amino acid chlorophyll	
	8)		fertilizers produced by mixition are known as formicro nitrogenous	ertilizer b)	several nutrients by chemical rs. mixed complex	
	9)	Acc	· ·	,	plexes orbitals are non-	
		a) c)	a <sub>1</sub> g t <sub>2</sub> g	b) d)	t₁u eg	
	10	D) Tetra a) c)	agolal complexes have add tetrahedral square planer	b)	_	

	B)	FIII IN the blanks.	06
	•	1) $\Delta_t = \underline{\qquad} \Delta_0$	
		The isotope emitting radioactivity is called isotope.	
		3) $_{29}\text{Cu}^{63} + \underline{\hspace{1cm}} \rightarrow _{29}\text{Cu}^{64} + \gamma$	
		4) A major metal present in human body is	
		<ol> <li>The reaction in which reactants, catalyst and products are present in gaseous state is called catalysis.</li> </ol>	
		6) Urea contains % nitrogen.	
Q.2	Solva)  b) c) d) e) f) g) h) i)	We any eight of the following.  Give different shapes of d - orbitals.  What are limitations of CFT?  What is negative catalysis? Explain with example.  Give the function of calcium in living being.  What is projectile capture particle emission reaction?  Explain artificial transmutation.  What is chemical investigation using tracer technique?  What are advantages of complex fertilizers?  Mention any four types of fertilizers with example.  What are qualities of ideal fertilizers?	16
Q.3	<b>A</b> )	<ul> <li>Attempt any two of the following.</li> <li>1) What crystal field splitting? Explain splitting in octahedral complexes with suitable example.</li> <li>2) Explain characteristics of catalytic reactions.</li> </ul>	10
		<ol> <li>Describe the nature of oxygen binding curves of haemoglobin and myoglobin.</li> </ol>	
	B)	What is nuclear fission? Explain uncontrolled chain reaction.	06
Q.4	A)	Attempt any two of the following.  1) Explain Jahn-Teller Distortion theorem.  2) What are the factors affecting crystal field splitting?  3) Discuss the process of manufacture of Urea.	08
	B)	What is catalysis? Explain adsorption theory of catalysis. Give any two industrial applications of catalysis.	80
Q.5	Atte a) b) c)	empt any two of the following. Give the function, structure and working of haemoglobin. What is a nuclear reaction? Discuss nuclear fusion reaction in detail. On the basis of MO diagram compare $[C_0(NH_3)_6]^{3+}$ complex with $[Ni(NH_3)_6]^{2+}$ complex.	16

Seat No.	Set	Р
140.		

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

		`	ΒΌΤΑΝΎ (Spe Genetics (		
-			ednesday, 10-04-2024 M To 06:00 PM		Max. Marks: 80
Instr	uctio		1) All questions are compulsory 2) Draw neat labeled diagram w 3) Figures to right indicate full n 4) Use of log table and calculate	/herever narks.	·
Q.1	A)	<b>M</b> u 1)	Itiple choice questions.  When F <sub>1</sub> hybrid is crossed w a) back cross c) both a and b	b)	arent it is called as method. test cross none of these
		2)	The phenotypic ration of Con a) 9:7 c) 9:9:3:1	b)	ary genes is 3:1 All of these
		3)	The phenotypic ration of inhil a) 13:3 c) 3:1:2	b)	nes is 1:3 7:3
		4)	When two or more genes cor linkage. a) complete c) both a and b	-	inherited together is known as incomplete none of these
		5)	Linkage theory proposed by a) 1951 c) 1978	T. H. Mo b) d)	
		6)	Pairing of homologous chron a) synapsis c) translocation		is called as duplication inversion
		7)	The genes present in cytopla called as genes. a) nuclear c) both a and b	b)	extranuclear none of these
		8)	The mitochondrial inheritance fungus like  a) Yeast c) Albugo	b)	en observed in unicellular Mucor Rhizopus
		9)	Neurospora is the example oby a) M. N. Mitchel c) M. M. Mitchel	b)	ondria inheritance was studied M. S. Mitchel M. B. Mitchel

		<ul> <li>10) and Weinberg develop a simple mathematical method of analysing a frequency of alleles in population.</li> <li>a) Hardy</li> <li>b) Nanir</li> <li>c) Singh</li> <li>d) All of these</li> </ul>	
	B)	<ol> <li>Fill in the blanks of the following.</li> <li>Term genetics first time used by Bateson in</li> <li>When F<sub>1</sub> hybrid is crossed with double recessive parent, it is called as</li> <li>When cross is taken in between same type of parent is called as</li> <li>An organism with identical alleles is known as</li> <li>Cross involving more than two pairs of contrasting characters is known as cross.</li> <li>On the basis of dihybrid cross formulated the law of independent assortment.</li> </ol>	
Q.2	Solia) b) c) d) e) f) g) h) i)	ve any eight of the following. What is genetics? Define gene mutation. Write the two examples of chemical mutation. Define colorblindness. What is autosomes? Define linkage. What is coupling? Define holandric gene. What is repulsion? Define genosme.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain the law of independent assortment studied by you.</li> <li>2) Describe the Haemophilia with suitable example.</li> <li>3) Explain the incomplete linkage with suitable example.</li> </ul>	10
	B)	Write short notes. Sex chromosome in man.	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Describe the sex chromosome in drosophila.</li> <li>2) Explain the colorblindness with suitable example.</li> <li>3) Give the inhibitory genes with suitable example.</li> </ul>	08
	B)	<ul><li>Attempt any one of the following</li><li>1) Explain the cytological proof of crossing over.</li><li>2) Write the supplementary genes with suitable example.</li></ul>	08
Q.5	Atte a) b) c)	empt any two of the following.  Describe the Bridge experiment studied by you.  Explain the Inheritance of mitochondrial genes with suitable example.  Describe the Hardy-Weinberg studied by you.	16

Seat	Set	D
No.	Set	

# B.Sc. (Semester-V) (New) (CBCS) Examination: March/April-2024

	D.(	JC. (J	ZOOLOGY (Special	•	JZ <del>4</del>			
			Principles of Genetic	• *				
•			ednesday, 10-04-2023 I To 06:00 PM	Max.	Marks: 80			
Insti	uctio	2	) All questions are compulsory. ) Figures to right indicate full marks. ) Draw neat labelled diagrams where ) Use of log table and calculators is					
Q.1	A)	Sele 1)	is the father of Genetics.	t the correct alternative from the following is the father of Genetics.				
			a) Mendel b c) Tschrmare d	3				
		2)	Hereditary unit is known as a) Genes b c) Allele d	Chromosomes None				
		3)	The linked genes which are middle separated by crossing over is calle a) Incomplete gene b c) Interaction of gene d	as Complete gene	:			
		4)	The phenomenon of phenotypic exgenes & not by a right dominant or	ression of characters by confi				
		5)	Scientist noticed a very inte comb type in fouls.	esting result during inheritance Gardener None of these	of			
		6)	Gene is inherited from parents to the expression this is called  a) Units of Heredity b	e offsprings has phenotypic				
		7)	The phenomenon of inheritance of same Chromosomes togetherly ca a) Linkage b c) Multiple alleles d	ed as Crossing over	on			
		8)	Scientist done the study on a) Bateson And Punnel b c) T.H. Morgon d	Sulton and Bovery				
		9)	When two or more characters are governed by two or more genes caa) Complete gene bc) Interaction of gene d	ed as Incomplete gene				

		<ul> <li>10) Belling's copy choice theory is the theory of</li> <li>a) Crossing over</li> <li>b) Mutation</li> <li>c) Synapsis</li> <li>d) None of these</li> </ul>	
E	B)	Fill in the blanks/Definition/One sentence answer/One word answer /Give the name/Predicate product etc.  1) basic unit of heredity. 2) introduced the theory of inheritance. 3) is the process by which the DNA is copied in cell. 4) cell makes RNA copies. 5) is a set of rules defining code of DNA. 6) small single celled organism.	06
6 6 6 6 7 1 1	Sol <sup>1</sup> a) b) c) d) e) f) h)	ve any Eight of the following. Incomplete Dominance Crossing Over Linkage Transports in Bacteria Transformation Sex determination Mutation Down's Syndrome Klinefelter's Syndrome Turners Syndrome	16
Q.3 /	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe laws of Mendalian Inheritance.</li> <li>2) Mechanism of Crossing Over</li> <li>3) Molecular basis of mutation in relation to UV.</li> </ul>	10
E	B)	Short Notes/Solve. Transduction with example	06
Q.4 A	A)	Attempt any Two of the following.  1) Extra chromosomal inheritance with example.  2) Chromosomal mechanisms of sex determination.  3) Polygenic Inheritance	80
E	B)	Describe/Explain/Solve. Cytological basis of Crossing Over.	08
á	Atte a) b) c)	empt any Two of the following.  Describe in detail Gene Interactions.  Write in detail Supplementary gene with example.  Explain in details Chromosomal Mapping.	16

	1				
Seat No.				Set P	
B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 MATHEMATICS (Special Paper - X) Complex Analysis (19201525)					
•		dnesday, 10-04-20 To 06:00 PM	•	, Max. Marks: 80	
Instruc		All questions are Figures to right in			
Q.1 A	Sele 1)	What is the real p a) $e^x(x \cos y -$	part of function $Ze^z$ in $y \sin y$ by $y \cos y$ d)		
	2)	The families are cap 1 cap 1	orthogonal the produ b) d)	uct of slope is -1 2	
	3)	, , ,	•	$z = \infty$ .	
	4)	a) 2	is said to be s b) e d)	simple pole. greater than one 1	
	5)	passing out of the a) simply conn b) multiply con	e region is called ected nected oly or multiply conne		
	6)	Residue of poles a) zero c) constant	of order $m$ greater to b) d)		
	7)	The curve $z(t) =$ a) simple c) Jordon arc	$t^2$ , $-1 \le t \le 1$ is clob) d)		
	8)	If $u = x^3 - 3xy^2$ i analytic function $z$ a) $z + c$ c) $z^3 + c$	$f(z) = \underline{\qquad}.$ b)	then their corresponding $z^2 + c$ $-z^4 + c$	

9)

a) 
$$\frac{\partial^2 \phi}{\partial x^2} = \frac{\partial^2 \phi}{\partial y^2}$$

The Laplace equation is \_\_\_\_\_.

a) 
$$\frac{\partial^2 \phi}{\partial x^2} = \frac{\partial^2 \phi}{\partial y^2}$$
 b)  $\frac{\partial^2 \phi}{\partial x^2} = -\frac{\partial^2 \phi}{\partial y^2}$ 

c)  $\frac{\partial \phi}{\partial x} = -\frac{\partial \phi}{\partial y}$  d)  $\frac{\partial \phi}{\partial x} = \frac{\partial \phi}{\partial y}$ 

c) 
$$\frac{\partial \phi}{\partial x} = -\frac{\partial \phi}{\partial y}$$

d) 
$$\frac{\partial \phi}{\partial x} = \frac{\partial \phi}{\partial y}$$

- **10)** The singularity of  $f(z) = \frac{z+3}{(z-1)(z-2)}$  are \_\_\_\_.

  a) z = 1,3 b) z = 1,0c) z = 1,2 d) z = 2,3

b) 
$$z = 1, 0$$

c) 
$$z = 1, 2$$

$$d) \quad z = 2.3$$

Fill in the blanks. B)

06

1) If 
$$f(z) = F(g(z))$$
 then  $\frac{d}{dz}f(z) =$ \_\_\_\_\_.

- A conjugate harmonic function of  $u(x, y) = e^x \sin y$  is \_\_\_\_\_.
- The evaluate integral of the type  $\int_{\partial}^{2\pi} f(\cos \theta, \sin \theta) d\theta$  is \_\_\_\_\_.
- The residue of  $f(z) = \frac{z^2}{(z-1)^2(z-2)}$  at z = 1 is \_\_\_\_\_.
- Norm is the \_\_\_\_ number of the numbers of the  $t_1-t_0$ ,  $t_2-t_1$ , ...  $t_n-t_{n-1}$
- A contour is continuous chain of finite number of \_\_\_\_\_
- Solve any eight of the following.

16

- Expand the function  $f(z) = \sin z$  in a Taylors series about z = 0.
- Expand  $f(z) = \frac{1}{(z+1)(z+3)}$  is a Laurent's series valid for the region |z| < 1
- If w = f(z) is analytic in the region R then show that  $\frac{dw}{dz} = \frac{\partial w}{\partial x} i \frac{\partial w}{\partial y}$
- Find the Residue of  $f(z) = \frac{1}{(z^2+1)^3}$  at z = i
- e) Evaluate the residues of  $\frac{z^3}{(z-1)(z-2)(z-3)}$  at z=1,2,3
- Define isolated singularity. f)
- If f(z) and g(z) are analytic function in domain D then show that  $\frac{d}{dz} \left[ \frac{f(z)}{g(z)} \right] = \frac{g(z) \cdot \frac{d}{dz} [f(z)] - f(z) \cdot \frac{d}{dz} [g(z)]}{[g(z)]^2}$
- Show that the function  $u = x^3 3xy^2 3x^2 3y^2 + 1$  is harmonic function.
- $\int \frac{dz}{z-a} \quad \text{where } L \text{ represents a circle } |z-a| = r$ i)
- Construct the analytic function f(z) = u + iv where  $u = y^3 3x^2y$ .
- Attempt any Two of the following. **Q.3**

10

- Show that  $\sin \left\{ c(z + \frac{1}{z}) \right\}$  can be expanded in a series of the type  $\sum a_n z^n + \sum b_n z^{-n}$  in which coefficients of both  $z^n$  and  $z^{-n}$  are  $\frac{1}{2\pi} \int_{-2\pi}^{2\pi} \sin(2c\cos\theta)\cos n\theta \,d\theta$
- If  $\lim_{z\to a}(z-a)f(z)=A$  and c is the arc  $\theta_1\leq \theta\leq \theta_2$  of the circle |z-a|=r, then show that  $\lim_{r\to 0}\int_{c}f(z)dz=iA(\theta_{2}-\theta_{1})$
- Expand  $\frac{1}{z(z^2-3z+2)}$  for the regions
- b) 1 < |z| < 2

16

- **B)** Prove that the polar of Cauchy's Riemanns equations  $\frac{\partial u}{\partial r} = \frac{1}{r} \frac{\partial v}{\partial \theta} \text{ and } \frac{\partial v}{\partial r} = \frac{-1}{r} \frac{\partial u}{\partial \theta} \text{ where } r = \sqrt{x^2 + y^2}, \ \theta = \tan^{-1}\left(\frac{y}{x}\right)$
- Q.4 A) Attempt any two of the following. 08
  - 1) State and prove Cauchy fundamental theorem.  $\frac{2\pi}{d\theta}$
  - 2) Show that  $\int_0^{2\pi} \frac{d\theta}{a + b \cos \theta} = \frac{2\pi}{\sqrt{a^2 b^2}}, a > b > 0$
  - 3) If  $u v = (x y)(x^2 + 4xy + y^2)$  and f(z) = u + iv is an analytic function of z = x + iy find f(z) in terms of z.
  - B) Explain the Milne-Thomson's method for constructing the regular function. 08
- Q.5 Attempt any two of the following.
  - a) State and prove Cauchy Residue Theorem.
     b) Integrate z² along the straight-line OM and also along the path OLM consisting of two straight line segments OL and OM where O is origin, L is

the point z=3 and M the point z=3+i.

- Hence show that the integral of  $z^2$  along the closed path OLMO is zero.
- c) If a function f(z) = u(x, y) + iv(x, y) is analytic and its partial derivates  $u_x, u_y, v_x, v_y$  are satisfy then prove that  $u_x = v_y$  and  $u_y = -v_x$

					OLIN-OA-13	, _
Seat No.					Set	P
i	3.Sc	. (Se	nester - V) (New) (CBCS STATISTICS (Sp Probability Distrib	ecial F	- 1	
-			nesday, 10-04-2024 「o 06:00 PM		Max. Marks:	80
Instru	ıctior	2)	All questions are compulsory. Figures to the right indicate fu Use of statistical tables calcula			
Q.1	A)	<b>Choo</b> 1)	For a standard Laplace distril a) mode < median c) mean = median ≠ mode	bution, v b)	we observe mean > median	10
		2)	For Cauchy distribution a) mean c) variance	exist b) d)	median	
		3)	The variance of standard Lap a) 2 c) 4	blace dis b) d)	stribution is  1 does not exist	
		4)	If a random variable <i>X</i> trunca a) 1 c) 0	ted to th b) d)	ne right above $b$ then $p(x \ge b)$ is 0.5 None of these	
		5)	Let $(X, Y)$ is $BN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \sigma_1^2, \sigma_2^2,	P) and b) d)	are independent then $P = \underline{\hspace{1cm}}$ . 0.25	
		6)	If $X$ is LN (0,1) Then mean is a) 0 c) $e^{\frac{1}{2}}$	b)	- 1 e <sup>2</sup>	
		7)	If $X$ is Cauchy $(\mu, \lambda)$ then its $\alpha$ a) $\lambda$ c) $\mu$	b)	deviation is $\mu + \lambda \ \mu - \lambda$	
		8)	a) $\frac{np}{q}$	b)	on truncated at $x = 0$ is $\frac{np}{1 - q^n}$	
			c) np	d)	$\frac{np}{q^n}$	

Let (X,Y) is BN(3,2,4,9,0.5) then cov(X,Y) is equal to \_\_\_\_\_.

b) 2 d) 0

9)

a) 3 c) 1

		10)	The range of r.v. $X$ following normal distribution truncated left below 0 is  a) $0$ to $\infty$ b) $-\infty$ to $0$	
			c) $-\infty$ to $\infty$ d) $-k$ to $k$	
	b)	Atter 1) 2) 3) 4) 5) 6)	mpt all of the following. Let $X \sim \mathcal{C}(\mu, \lambda)$ state its mean. State p.d.f. of Lognormal distribution. State relation between Standard Cauchy and Student's t-distribution. Give cdf of Lognormal distribution. State expression for $Q_1$ of Laplace distribution. State the variance of truncated Poisson distribution truncated at $X = 0$ .	06
Q.2	Ans a)		any eight of the following. ne Laplace distribution.	16
	b)		is LN (0,1) find mean.	
	c)		e p.m.f. of truncated Poisson distribution at $X = 0$ .	
	d)		w that for $L(\mu, \lambda)$ all odd order central moments vanish.	
	e) f)		$\sim$ C(0,1) find the distribution of $X^2$ . e conditional distribution of $X_1$ given $Y$ of BND.	
	g)		(X,Y) is $BN(3,2,4,9,0)$ find $P(3 < X < 5)$	
	h)	-	e p.m.f. of truncated Binomial distribution.	
	i)		is $C(\mu,\lambda)$ state expression for $Q_1$	
	j)		$\sim\!LN(0,1)$ then write down the relation between mean, mode and median comment on skewness.	
Q.3	A)	1) 2) 3)	mpt any two of the following.  Obtain distribution function of Laplace distribution.  Define Weibull distribution and find its mean.  Obtain mode of Logistic distribution.	10
	B)		ain marginal probability distribution of $X$ from bivariate normal ibution.	06
Q.4	A)	<b>Ansv</b> 1)	wer any two of the following.  Obtain pdf of exponential distribution truncated below "a" and find its mean.	80
		2) 3)	Derive c.d.f. of Cauchy distribution with parameters $\mu \& \lambda$ . Find mean of Laplace distribution.	
	B)	Obtai mear	ain pdf of truncated normal distribution truncated above $\emph{b}$ and obtain its $\emph{n}$ .	80
Q.5	Atte	•	any two of the following.	16
	a)		ne Lognormal distribution and find its mean and variance.	
	b)	If $X$ a	and Y are i.i.d N (0,1) find distribution of $\frac{x}{y}$	
	c)	Defin	ne truncated binomial distribution truncated at $X = 0$ . Find its mean.	

		3LR-GA-193					
Seat No.		Set P					
B.	B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 GEOLOGY (Special Paper – X) Hydrogeology (19201535)  ay & Date: Wednesday, 10-04-2024 Max. Marks: 80						
•		ednesday, 10-04-2024 Max. Marks: 80 To 06:00 PM					
Instruc	2	) All questions are compulsory. Figures to right indicate full marks. Draw neat labeled diagram wherever necessary.					
Q.1 A	-	rite the sentence by filling the blanks with the correct answer the given options.  What quality does Basalt have as an aquifer wrt to its primary porosity?  a) very good b) good c) bad d) excellent					
	2)	Ideally, how is the infiltration rate in crystalline rock terrain as compared to sedimentary rock terrain?  a) Larger b) Greater c) Poor d) Very poor					
	3)	What rate of infiltration does igneous rocks have in comparison to their tectonically disturbed equivalents?  a) Better b) Poor c) Very poor d) Very good					
	4)	What is the climatic condition that does not promote infiltration, though the terrain is a plain ground & rocks are sedimentary?  a) Hot b) Tropical c) Cold d) equatorial					
	5)	What is the runoff rate in sandstone rock terrains?  a) Lesser b) Greater c) Poor d) Very poor					
	6)	What is the topmost zone in vertical distribution of groundwater?  a) Capillary b) Root c) Saturation d) Aeration					
	7)	What porosity features do the shear zones rocks show? a) Effective b) Secondary c) Primary d) Bad					
	8)	What type of aquifer is the Basaltic terrain?  a) Confined b) Idealized  c) Bad d) unconfined					

What geological characteristics do the localities in India like Unhere &

b) Hot springsd) Seepage areas

9)

c)

Tatapani are famous for?
a) Contact springs

Depression springs

		ndia? a) Nuclear c) Geo-thermal b) Hydro-electric	
	B)	<ul> <li>Answer the following.</li> <li>1) What is the process of plants expelling water through their leaves?</li> <li>2) What is pore percent per unit volume of a formation called as?</li> <li>3) What is a piezometric surface?</li> <li>4) Rainwater flowing on the surface of terrain after infiltration is called as</li> <li>5) Groundwater flowing out through pores or fractures of rocks is called as</li> <li>6) Non flowing groundwater just oozing out through pores or fractures of</li> </ul>	<b>06</b> 
		rocks & moistening its surface is called as	
Q.2	Writ a) b) c) d) e) f) g) h) i)	What are indicators for a basin? What is connate water? Give an example. What is juvenile water? Give an example. What is Aquifer? Which common rock is a good aquifer? What is Transmissivity? Which rock is poor in it? What is the purpose of artificial levees? What is a water table? Is it fixed in position? Write a short description of aquifuge? Give an example. What is a hot spring? Give an example.	16
Q.3	A)	Attempt any Two of the following.  1) Describe the permeability of sedimentary rocks & its deciding factors?  2) Explain the sources of Groundwater.  3) Describe types of groundwater basin. Draw appropriate diagram.	10
	B)	Draw and describe the hydrological cycle.	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Describe the factors controlling the depression spring.</li> <li>2) Describe the factors controlling the contact spring.</li> <li>3) Describe the factors controlling the surface runoff of rainwater.</li> </ul>	80
	B)	Mention the relation to runoff with flood & groundwater recharge. Add note on the role of vegetation in groundwater recharge processes.	80
Q.5	Atte a)	What are the different types of structural features that can be identified on the aerial photographs and the satellite imageries? Explain how to use them for the groundwater explorations.	16
	b)	Sketch the diagram & explain the vertical distribution of groundwater in an ideal, unconfined aquifer.	
	c)	Explain the groundwater conditions for the formation of hot springs. Add note on its significance. Draw sketch of geyser.	

Seat	Sot	D
No.	Set	

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

	<b>D</b> .0	J. ( <b>J</b> .	MICROBIOLOGY (S Agricultural Microbio	· · · · · · · · · · · · · · · · · · ·	
			ednesday, 10-04-2024 I To 06:00 PM	Max. Ma	rks: 80
Instr	uctio		) All questions are compulsory. ) Figures to right indicate full mar	ks.	
Q.1	A)		rite the following sentences by en alternatives. Largest particle in soil is called a a) sand	selecting correct answer from the as	10
			c) clay	d) loam	
		2)	<ul><li>is a polymer of glucose</li><li>a) Starch</li><li>c) Cellulose</li></ul>	linked together by $\beta$ 1-4 linkage. b) Lignin d) Hemicellulose	
		3)	organisms are responsi  a) VAM fungi c) Desulfovibrio	ible for absorption of PO <sub>4</sub> from soil. b) PSM d) Nitrosomonas	
		4)	a) C <sub>x</sub> cellulase c) C <sub>1</sub> cellulase	artially degraded cellulose molecule. b) Cellulase d) Glycosidase	
		5)	The size of silt particles in soil ra a) 0.002 to 0.05 c) 0.001 to 0.01	anges from mm. b) 2.5 to 3.5 d) 0.2 to 2.00	
		6)	is commonly used as bi a) Azotobacter c) Bacillus thuringiensis	b) <i>Azolla</i>	
		7)	Water holding capacity of sandy a) highest c) greater than loamy	y soil is b) lowest d) intermediate	
		8)	Ustilago scitaminiae is the causa a) citrus canker c) soft rot of potato	ative agent of disease. b) whip smut of sugar cane d) bacterial blight	
		9)	In carbon cycle is fixed Photoautotrophic bacteria.  a) CO c) CO <sub>3</sub>	d to carbohydrate by plants and some b) CO <sub>2</sub> d) carbohydrate	<b>;</b>
		10)	Release of ammonia from organas a) nitrification	nic nitrogenous compounds is termed  b) nitrogen fixation	I
			c) denitrification	d) ammonification	

	B)	Answer the following.			
	•	1) Name the enzyme responsible for NO <sub>3</sub> reduction.			
		2) is the causative agent of soft rot of potato.			
		3) Growing quickly growing leguminous or non leguminous plant and			
		ploughing it is called			
		4) Give an example of symbiotic association.			
		5) Name the product produced by N <sub>2</sub> fixation.			
		6) A manure prepared using cow dung, litter and urine is called			
Q.2	Solv	ve any Eight of the following.	16		
	a)	Define Phosphate solubilization.			
	b)	Give structure of cellulose.			
	c)	Define canker.			
	ď)	Define Nitrate reduction.			
	e)	Define GM crops.			
	f)	Define commensalism.			
	g)	Name two nitrogen fixing bacteria.			
	h)	Define biofertilizer with example.			
	i) <sup>´</sup>	Define vermicompost.			
	j)	Define soil structure.			
Q.3	A)	Attempt any Two of the following.	10		
	,	1) Give an account of biochemistry of cellulose degradation.			
		2) Discuss about production and application of Rhizobium biofertilizer.			
		3) Give an account of 'Carbon cycle'			
	B)	Explain production and significance of Vermicompost.	06		
0.4	•		20		
Q.4	A)	Attempt any Two of the following.	08		
		1) Discuss about causative agent symptoms and control of 'Soft rot of			
		potato'.			
		2) Discuss sulphur cycle.			
		3) Farm Yard Manure.			
	B)	Give an account of beneficial and harmful interactions in soil.	80		
Q.5	Atte	mpt any Two of the following.	16		
	a)	Describe in detail 'Lignin degradation'.			
	b)	Give an account of biopesticides, their production and application.			
	c)	Give an account of Nitrogen cycle.			

			3LR-GA-195
Seat No.			Set P
E	3.Sc	c. (Se	mester - V) (New) (CBCS) Examination: March/April-2024 ELECTRONICS (Special Paper – X) Fundamentals of Microcontroller (19201549)
-			dnesday, 10-04-2024 Max. Marks: 80 To 06:00 PM
Instru	ıctio	2	All questions are compulsory. Draw neat labeled diagram wherever necessary. Figures to right indicate full marks. Use of log table and calculators is allowed.
Q.1	A)		ple choice questions.  Microcontroller uses memory architecture.  a) Von Neumann b) Harvard  c) RISC d) CISC
		2)	The first address of Bank-2 registers is  a) 08 H b) 0F H c) 10 H d) 1F H
		3)	Which one of these pins of $\mu$ C 8051 is used to access external ROM? a) $\overline{EA}$ b) ALE c) $\overline{PSEN}$ d) RESET
		4)	To configure the parallel port as an input port, is sent to the port.  a) 00 H  b) 55 H  c) AA H  d) FF H
		5)	What is the address range of SFR registers?  a) 00 – 2F H  b) 30 – 7F H  c) 00 – 7F H  d) 80 – FF H
		6)	How many bit addressable RAM bits are present in $\mu$ C 8051? a) 128 b) 64 c) 32 d) 8
		7)	If the data value 38H is ANDed with 59H, the result is  a) 18H  b) 79H  c) 61  d) C7H
		8)	Which one of these figures is a standard baud rate? a) 512 b) 1024 c) 2048 d) 4800
		9)	What is the maximum delay generated by the timer having 12 MHz crystal frequency and operating in Mode-1?

b)  $256 \,\mu S$ 

10) Which one of these instructions should be used for copying the

accumulator data to the external memory?

d) 65536 *μS* 

b) MOVX @DPTR,A

d) MOVC A, @PC

a)  $128 \mu S$ 

c)  $512 \mu S$ 

a) MOVX A, @DPTR

c) MOVC A, @A+DPTR

Page **1** of **2** 

	B)	Answer in short / Fill in the blanks.  1) Write a short jump instruction used in microcontroller 8051.  2) Which control bits are used to start or stop the timer/counter are?  3) MOVX A, @DPTR is how many byte instruction?  4) If Accumulator A=49 H, the result after executing the instruction RL A will be  5) To configure port pin P1.5 as an input pin, the instruction used will be  6) Draw the flowchart symbol used for decision making.	
Q.2	a) b) c) d) e) f) g) h) i)	Power on RESET in $\mu$ C8051. Give the significance of ALE pin. State the function of RI and TI flags in $\mu$ C 8051. Write any two logical instructions and explain. Explain with suitable example the SWAP instruction. Explain the relationship between Timer Clock frequency and Crystal frequency. Justify, why the crystal oscillator frequency in $\mu$ C 8051 is chosen to be 11.0592 MHz. Draw the data format of TCON register and explain. List the interrupt sources in $\mu$ C 8051. Give the difference between bit-addressable and byte-addressable SFR.	6
Q.3	A) B)	<ol> <li>Draw the Clock and RESET circuit diagram for μC 8051 and explain.</li> <li>List the SFRs available in μC 8051 with their function.</li> <li>Write an assembly language program to multiply two 8-bit numbers and save the result.</li> </ol>	0
Q.4	A) B)	<ol> <li>Explain the important features of μC 8051.</li> <li>Draw the structure of PORT-1.</li> <li>Explain the data addressing modes of μC 8051 with one example for each.</li> </ol>	8
Q.5	Attea) b) c)	mpt any two of the following.  Discuss the classification of instruction set of $\mu$ C 8051 with suitable example for each.  Write an assembly language program to generate 5KHz square-wave using timer on port pin P1.5. Assume a crystal frequency of 12 MHz.  Explain Mode-1 of serial communication and write an ALP to transfer serially 8-bit data received from PORT-1 at a standard baud rate of 9600.	6

	_	
Seat	Sat	D
No.	Set	

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 COMPUTER SCIENCE (Special Paper - X) Core Java (19201544)

			COMPUTER SCIENCE (Special Paper - X)  Core Java (19201544)			
•	ay & Date: Wednesday 10-04-2024 Max. Marks: 80 ime: 03:00 PM To 06:00 PM					
Instru	uctior	2) 3)	All questions are compulsory. Figures to the right indicate full marks. Draw neat labelled diagrams wherever necessary. Use of log table and calculators is allowed.			
Q.1	A)	Cho 1)	ose correct alternatives. JVM stands for Java Virtual Method. a) True b) False	10		
		2)	is a feature of a Java.  a) architecture natural b) dynamic c) object oriented d) All of these			
		3)	Which keyword is used for accessing the features of a package?  a) package b) import c) extends d) None of these			
		4)	Java source files are compiled and converted to code. a) object b) byte c) machine d) executable			
		5)	is base class of Arithmetic Exception. a) IOException b) SQLException c) Runtime Exception d) None of these			
		6)	is extension of java source code. a) .cpp b) .class c) .java d) all of these			
		7)	Which of the following is not an OOPS concept in Java?  a) inheritance b) polymorphism c) compilation d) Encapsulation			
		8)	<ul><li>Keyword is used to define interface.</li><li>a) extend</li><li>b) implements</li><li>c) class</li><li>d) interface</li></ul>			
		9)	<ul><li>Keyword is used to create virtual method in java.</li><li>a) static</li><li>b) abstract</li><li>c) virtual</li><li>d) none of these</li></ul>			
		10)	keyword is used to extend the interface.  a) super b) final c) extends d) implements			

	B)	Fill in the Blanks. 06				
		1) keyword is used for declaring a package in java.				
		2) In java contain only public abstract methods.				
		3) Statement is used to throw custom exception.				
		4) keyword is used to call base class constructor in derived				
		class constructor.				
		5) In swing A control is a dialogue window that allows the				
		user to pick a file?				
		6) The block is executed whether an exception is handled or no	t.			
Q.2	Ans	wer the followings. (Any Eight)	16			
	a)	Write a note on ArrayList and HashMap.				
	b)	What is Runnable interface?				
	c)	What is file reader and file writer?				
	d)	Write a note on single inheritance.				
	e)	What is use of extends keyword in java?				
	f)	What is abstract method?				
	g)	Write a note on while loop.				
	h)	Write a note on JRE.				
	i)	Write different data types in Java.				
	j)	Write application of Java programming language.				
Q.3	A)	Answer the followings. (Any Two)	10			
		1) Write a program to extend one interface in anther interface.				
		2) What is use of 'this' keyword? Explain with example.				
		3) Explain if else statement with example.				
	B)	Write a note on collection classes.	06			
Q.4	•					
Q.4	B) A)	Answer the followings. (Any Two)	06 08			
Q.4	•	Answer the followings. (Any Two)  1) Write a program to copy content of one file into another file.				
Q.4	•	Answer the followings. (Any Two)				
Q.4	<b>A</b> )	Answer the followings. (Any Two)  1) Write a program to copy content of one file into another file.  2) Explain method overriding with example.  3) Write a difference between AWT and swing.	08			
Q.4	•	<ul> <li>Answer the followings. (Any Two)</li> <li>Write a program to copy content of one file into another file.</li> <li>Explain method overriding with example.</li> </ul>				
Q.4 Q.5	A) B)	Answer the followings. (Any Two)  1) Write a program to copy content of one file into another file. 2) Explain method overriding with example. 3) Write a difference between AWT and swing. What is use of thread class? Explain methods of thread class.  wer the following. (Any Two)	08			
	A)  B)  Ans: a)	Answer the followings. (Any Two)  1) Write a program to copy content of one file into another file. 2) Explain method overriding with example. 3) Write a difference between AWT and swing. What is use of thread class? Explain methods of thread class.  wer the following. (Any Two) What is thread synchronization? Explain with example.	08			
	A)  B)  Ans: a) b)	Answer the followings. (Any Two)  1) Write a program to copy content of one file into another file.  2) Explain method overriding with example.  3) Write a difference between AWT and swing.  What is use of thread class? Explain methods of thread class.  wer the following. (Any Two)  What is thread synchronization? Explain with example.  What is user defined exception? Write a program for implement it.	08			
	A)  B)  Ans: a)	Answer the followings. (Any Two)  1) Write a program to copy content of one file into another file. 2) Explain method overriding with example. 3) Write a difference between AWT and swing. What is use of thread class? Explain methods of thread class.  wer the following. (Any Two) What is thread synchronization? Explain with example.	08			

		OLIN-OA	-131
Seat No.		Se	t P
B.Sc.	(Semester - V) (New) (CBCS PHYSICS (Spe Classical Mecha	- <i>-</i>	<b>:4</b>
•	Friday, 12-04-2024 PM To 06:00 PM	Max. Ma	rks: 80
Instructions	<ul><li>s: 1) All questions are compulsory.</li><li>2) Figures to the right indicate full</li><li>3) Use of log table and calculate</li></ul>	ıll marks.	
•	Multiple choice questions.  I) Any rigid body having large n of freedom.  a) 2 c) 5	umber of particles has degrees b) 3 d) 6	10
2	In conservative force field     a) Linear momentum     c) Energy	remains constant. b) Angular momentum d) Both (a) and (b)	
3	<ul><li>In northern hemisphere, due towards</li><li>a) North</li><li>c) East</li></ul>	to Coriolis's force, cyclone deflects b) South d) West	
2	In absence of resistance; the a) 2uv/g c) uv/2g	range of projectile is b) uv/g d) 2v/g	
ξ	Acceleration of Atwood's made a) $\ddot{x} = \frac{(M1 - M2)g}{(M1 + M2)}$ $c)  \ddot{x} = \frac{(M1 + M2)g}{(M1 - M2)}$	chine is b) $\ddot{x} = -\frac{(M1 - M2)g}{(M1 + M2)}$ d) $\ddot{x} = \frac{(M1 - M2)}{(M1 + M2)}$	
6	<ul><li>In the symmetric mode of osc</li><li>a) In phase</li><li>c) with constant phase</li></ul>	cillations, the particles are always b) out of phase d) in opposite phase	<u>.</u> -
7	7) Hamilton's principle is a) differential c) integral	principle. b) calculus d) extreme	
3	<ul><li>In rigid body motion, the quar</li><li>a) Moment of inertia</li><li>c) measured inertia</li></ul>	ntities $I_{xy,}$ $I_{yz,}$ $I_{zx}$ are called b) Product of inertia d) tensor	
Ş	The principle of virtual work is a) $\Sigma Fi^a$ . $\delta ri = 0$ c) $\Sigma Fi$ . $\delta ri = 0$	b) $\Sigma fi. \delta ri = 0$ d) $\Sigma Fi^a. \delta ri + \Sigma fi. \delta ri = 0$	

10) The energy transfer from an oscillator to its coupled partner is periodic and takes place with the period \_\_\_\_\_.

a)  $T = \frac{2\pi}{\omega_1 - \omega_2}$  b)  $T = \frac{3\pi}{\omega_1 - \omega_2}$ c)  $T = \frac{5\pi}{\omega_1 - \omega_2}$  d)  $T = \frac{4\pi}{\omega_1 - \omega_2}$ c)  $T = \frac{5\pi}{\omega_1 - \omega_2}$ Define the following. 06 Linear momentum Centripetal force 2) 3) Pseudo force 4) Coriolis force 5) Rigid body Centre of mass 6) Solve any EIGHT of the following. 16 What are coupled oscillations? Define symmetric and antisymmetric mode of oscillations. Define degree of freedom. State Hamilton's principle. Define time of flight of projectile. What are constraints? State Euler's theorem. State conservation theorem for angular momentum of a particle. Application of Lagrangian equation for Simple harmonic oscillator. Attempt any TWO of the following. 10 Show that the shortest distance between two points in space is a 1) straight line. 2) State and prove Brachistochrome problem. Explain the effect of Coriolis's force on formation of cyclones and flight of missile. Write short note on, "Minimum surface of revolution". 06 Attempt any TWO of the following. 80 Explain the energy transfer mechanism in coupled oscillatory system. 2) State and prove the conservation theorem for energy of a system of particles. Obtain angular momentum of a rigid body. Describe normal modes and normal coordinates. 80

#### Attempt any TWO of the following. Q.5

B)

a) b)

c)

d)

e)

f)

g) h)

i)

A)

B)

A)

B)

Q.3

Q.4

16

- Derive an expression for time of flight and range of projectile in resistive a) medium.
- Derive the Euler-Lagrange's equation of motion using Hamilton's principle. b)
- Show that the angular acceleration is the same in fixed and rotating C) coordinate system.

Seat No.	t			Set	Р
	B.S	6c. (S	Semester - V) (New) (CBCS) Examination: March/April- CHEMISTRY (Special Paper - XI) Organic Chemistry (19201508)	2024	
•			riday, 12-04-2024 Max M To 06:00 PM	k. Marks:	: 80
Instr	uctic	2 3	<ol> <li>All questions are compulsory.</li> <li>Figures to right indicate full marks.</li> <li>Draw neat diagram and give equations wherever necessary.</li> <li>Chart of spectroscopic data supplied by university is allowed.</li> </ol>		
Q.1	A)	<b>Cho</b> 1)	oose the most correct alternative.  Which of the following reagent is used in Wittig reaction?  a) Al-ter-butoxide b) Zinc/ether  c) Al-isopropoxide d) Phosporous ylide		10
		2)	The m/e of methanol is observed at a) 16 b) 32 c) 48 d) 12		
		3)	In chair conformation of cyclohexane, all the axial C-H bonds are position.  a) staggered b) elipsed c) skew d) all of these	in	
		4)	The MPV reduction occurs through the shift of ion.  a) OH <sup></sup> b) hydride ion c) Proton d) AI <sup>+3</sup>		
		5)	Among the following is a magnetic nucleus		

a) ₁H¹ c) <sub>2</sub>He<sup>4</sup>

a) 4-methyl uracil

c) barbituric acid

6)

7)

8)

b)

b) 6C<sup>12</sup>

d)

Name of the following reaction is \_\_\_\_\_.

antipyrine

		9)	Cis 2-butene on addition with bromine gives  a) racemic mixture b) I-isomer  c) d-isomer d) none of these	
		10)	In boat conformation of cyclohexane, the distance between two flagpole hydrogen atoms is  a) 0.83 A <sup>0</sup> b) 1.83 A <sup>0</sup> c) 1.20 A <sup>0</sup> d) 1.54 A <sup>0</sup>	
	B)	Fill i 1) 2) 3) 4) 5)	In spectroscopy, gaseous organic molecule is bombarded with electron at elevated temperature and reduced pressure. In cyclohexane, conformation is most stable.  Number of set of equivalent protons in propionaldehyde is/are In Hofmann Rearrangement, benzamide is converted into In case of CO <sub>2</sub> molecule, number of fundamental modes of vibrations is/are  According to Baeyer strain theory, is more stable among cycloalkane.	06
Q.2	Solva) b) c) d) e) f) g) h) i)	Give Defir 1) 2) Wha Expl Give Expl Wha State Defir 1)	following. (Any Eight) the synthesis of crotonic acid form aceto acetic ester. he the terms: Coupling constant Magnetic nuclei It are the types of ions produced in mass spectroscopy? ain the principle of mass spectroscopy. It the synthesis of succinic acid from aceto acetic ester. It is Wittig reagent? How it is prepared? It is Wittig reagent? How it is prepared? It is wittig reaction It the terms: Stereoselective reaction Stereospecific reaction Stereospecific reaction It the product and name to following reaction.	16
Q.3	A)	Atte	mpt any Two of the following.	10

- 1) What is basic principle of IR spectroscopy? Draw schematic diagram of double beam IR spectrophotometer.
- 2) What is active methylene compound? Explain with mechanism preparation of ethylaceto acetate by Claisen Condensation.
- 3) Complete the following reaction, name it and suggest mechanism.

$$CH_2$$
—OH  $Conc. H_2SO_4$  ?

06

	B)	An organic compound A[C <sub>8</sub> H <sub>8</sub> O] shows IR absorption at 1700 cm <sup>-1</sup> . It gives sooty flame but do not reduce Tollen's reagent. This compound A on condensation with dialkyl succinate B[C <sub>8</sub> H <sub>14</sub> O <sub>4</sub> ] in presence of potassium ter butoxide gives compound C[C <sub>9</sub> H <sub>13</sub> O <sub>4</sub> K]. What are A, B and C? Write reaction and name it.	06
Q.4	<b>A)</b>	<ul> <li>Answer the following. (Any Two)</li> <li>1) Discuss applications of mass spectroscopy.</li> <li>2) Determine the structure from following data.  Molecular formula - C<sub>4</sub>H<sub>8</sub>O, IR - 1720 cm<sup>-1</sup>,  NMR: δ 1.0 (triplet, 3H), δ 1.2 (sextet, 2H), δ 2.2 (quartet, 2H), δ 9.8 (triplet, 1H).</li> <li>3) How will you synthesize:  a) cinnamic acid  b) 2-methyl propanoic acid by using diethyl malonate?</li> </ul>	08
	B)	Discuss the terms: 1) Spin-spin splitting 2) Coupling constant	08
Q.5	Attera) b) c)	mpt any Two of the following.  Explain Reformatsky reaction with mechanism and synthetic applications.  Discuss confirmations and stability of cyclohexane in detail.  Explain PMR spectra of:  1) Acetaldehyde  2) Ethanol	16

TABLE - 1 d
Characteristic Infrared Absorptions of Functional Groups

	GROUP			REQUENCY ANGE cm <sup>-1</sup>	INTENSITY
A.	Alkyl				
	C - H (stretching)			2853 - 2962	(m-s)
	Isopropyl - CH(CH <sub>3</sub> ) <sub>2</sub>			1380 - 1385	(s)
	10 00 pt 10		and	1365 - 1370	(8)
	tert - Butyl - C (CH <sub>3</sub> ) <sub>3</sub>			1385 - 1395	(m)
	TO THE STATE OF THE PROPERTY OF THE STATE OF			and - 1365	(s)
B.	Alkenyl				
	C-H (stretching)			3010 - 3095	(m)
	C = C (stretching)			1620 - 1680	(v)
	$R - CH = CH_2$			985 - 1000	(s)
			an	d 905 - 920	(s)
	$R_2 C = CH_2$	(out of plane		880 900	(s)
	cis - RCH = CHR	C-H bendings)		675 - 730	(s)
	trans - RCH = CHR			960 – 975	(s)
2.	Alkynyl				
	≡ C - H (stretching)			- 3300	(s)
	C ≡ C (stretching)			2100 - 2260	(v)
),	Aromatic				
	Ar - H (stretching)			- 3030	(v)
	Aromatic substitution	type			
	(C-H out-of-plane ber	dings)			
	Monosubstituted			690 - 710	(very s)
			and	730 – 770	(very s)
	o - Disubstituted			735 - 770	(s)
	m - Disubstituted			680 - 725	(s)
			and	750 - 810	(very s)
	p - Disubstituted			800 - 840	(very s)
E.	Alcohols, Phenols, Car	rboxylic Acids			
	OH (alcohols, phenols	, dilute solutions)		3590 - 3650	(sharp v)
	OH (alcohols, phenois			3200 - 3550	(broad s)
	OH (carboxylic acids,	hydrogen bonded)		2500 - 3000	(broad v)
F.	Aldehydes, Ketones, E	sters and			
	Carboxylic Acids				
	C = O stretch	1720		1630 - 1780	(s)
	aldehydes - 1720 (Str	e 2700 - 2900		1690 - 1740	(s)
	ketones			1680 - 1750	(s)
	esters			1735 - 1750	(s)
	carboxylic acids			1710 - 1780	(s)
	amides			1630 – 1690	(s)
G.	Amines N – H			3300 - 3500	(m)
Н.	N - H Nitriles			2300 - 2300	(111)
	C ≡ N			2220 - 2260	(m)

TABLE - 2 Approximate Proton Chemical Shifts in NMR

TYPE OF PROTON	CHEMICAL SI	HIFT, DELTA, PPM (δ)
1° Alkyl, RCH <sub>3</sub> 2° Alkyl, RCH <sub>2</sub> R 3° Alkyl R <sub>3</sub> CH Allylic, R <sub>2</sub> C = C - CH <sub>3</sub>	0.8 - 1.0 $1.2 - 1.4$ $1.4 - 1.7$ $1.6 - 1.9$	O         Ester R - C - O - CH <sub>2</sub> - R 4 to 4.5   N - CH <sub>3</sub> 2.3
Benzylic, ArCH <sub>3</sub> Alkyl chloride, RCH <sub>2</sub> Cl Alkyl bromide, RCH <sub>2</sub> Br Alkyl iodide, RCH <sub>2</sub> I Ether, ROCH <sub>2</sub> R Alcohol, HOCH <sub>2</sub> R Ketone, RCCH <sub>3</sub>	2.2 - 2.5 3.6 - 3.8 3.4 - 3.6 3.1 - 3.3 3.3 - 3.9 3.3 - 4.0 2.1 + 2.6	
Aldehyde, RCH	9.5 - 9.6	
Vinylic, $R_2C = CH_2$ Vinylic $R_2C = CH$	4.6 - 5.0 5.2 - 5.7	
Aromatic, ArH Acetylenic, RC = CH Alcohol hydroxyl, ROH Carboxylic, RCOH	$6.0 - 9.5$ $2.5 - 3.1$ $0.5 - 6.0^{a}$ $10 - 1.3^{a}$	
Phenolic, ArOH Amino R- NH <sub>2</sub>	4.5 - 7.7 <sup>a</sup> 1.0 - 5.0	

<sup>&</sup>lt;sup>a</sup>The chemical shifts of these groups vary in different solvents and with temperature and concentration.

#### TABLE - 3 U.V. Absorption rules for Diene Chromosphores

1)	Parent	215 nm					
2)	Each extra conjugation	30 nm					
3)	Homoannular	39 nm		62			
4)	Exocylic double bond	05 nm	- OH	- OR. (	OR, Cl, Br		
5)	Each alkyl (R) substituent directly attached to double bonded carbon	05 nm	-SR,	(30 nm) (60 nm		5 (nm	
	U.V. Absorption rules for End	ne System		Ct,	β	γ	
1)	Parent	215 nm	Cl	15	12		
2)	Each extra conjugation	30 nm	OH, OR	35	30	1	
3)	Homoannular	39 nm	SR		85		
4)	Substituents		NR,		95		
	a) Alkyl group at α	10 nm	0		75	100	
	b) Alkyl group at β	12 nm	Acyl	6	6	6	
	c) Alkyl group at γ, δ	18 nm					

						SL	R-GA-1	99
Seat No.							Set	P
I	B.Sc	:. (S€	emester -	BOTANY	(Special I	camination: March/A Paper - XI) (19201503)	pril-2024	
•			lay,12-04-2 To 06:00 P				Max. Marks	s: 80
Instru	ıctioı	2) 3)	Draw neat Figures to	ns are compu diagrams who right indicate table and cal	erever nece full marks.	•		
Q.1	A)	Mult 1)			ain polyme b) d)			10
		2)	of a) Two n	s contain the ucleotide nucleotide	b)	n coding for one amino ac Four nucleotide one nucleotide	id consist	
		3)	Left hande a) A-DNA c) Z-DNA	4	 b) d)	B-DNA C-DNA		
		4)		is composed c acids and pr ns only	rotein b)	nucleic acids only none of these		
		5)	Functional a) Lysoso c) Dictyo		n synthesis b) d)	is Peroxisome Polysome		
		6)	a) DNA li	agments are j gase oolymerase II	oined by _ b) d)	DNA polymerase II DNA helicase		
		7)	In which of a) Replic c) Transl	ation <sup>.</sup>		directly involved? Transcription Transformation		
		8)	A nucleic a codons a) promo c) termin	ter	with a rea b) d)	ding frame that contains open reading frame regulatory gene	no stop	
		9)	RNase P is molecule. a) Exonu c) Primas	clease	omposed of b) d)	one RNA molecule and control Endonuclease telomerase	one protein	
		10)	Ribosomal	RNA is active	,	ized by Nucleolus Ribosomes		

	B)	Fill in the blanks.	06
		The nitrogen bases of one polynuleotide chain is joined to complementary     shair by	
		chain by	
		2) Gene transformation experiments were demonstrated by  3) Okazaki fragments in DNA replication are injude by	
		Okazaki fragments in DNA replication are joined by      The dauble belief model of DNA was proposed by	
		4) The double helical model of DNA was proposed by	
		5) The termination codon is	
		6) The endonuclease enzyme work at	
Q.2	Sol	ve any Eight of the following.	16
	a)	What is nucleoside?	
	b)	What is TATA box?	
	c)	Define genetic code.	
	d)	What is transformation?	
	e)	What is transcription?	
	f)	What is termination?	
	g)	What is consensus sequence?	
	h)	What is satellite DNA?	
	i)	What are nonsense codons?	
	j)	What is promoter?	
Q.3	A)	Attempt any Two of the following.	10
۵.0	2 1,	Explain the organization of gene in prokaryotes.	
		2) Write note on RNA splicing.	
		3) Explain any two posttranslational modification.	
	B)	Explain the process of DNA denaturation with its importance in DNA	06
	D)	analysis.	UO
		analysis.	
Q.4	A)	Attempt any Two of the following.	80
	,	1) Describe the structure of B - DNA molecule.	
		2) Describe the structure of tRNA with suitable diagram.	
		3) Explain the Griffith experiment with suitable diagram.	
	B)	Explain the mechanism of DNA replication in prokaryotes.	08
0.5	A 44	ament and Tura of the fellowing	4.0
Q.5		empt any Two of the following.	16
	a)	Explain the Lac operon with suitable diagram.	
	b)	Give the difference between Prokaryotic and eukaryotic replication.	
	c)	Explain the process of translation.	

	_	
Seat	Cat	D
No.	Set	F

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

				OGY (Specia ocrinology ( <i>′</i>		-	
•			ay,12-04-2024 To 06:00 PM			Ма	x. Marks: 80
Instr	uctio	2) 3)	All questions are of Draw neat labeled Figures to right incure of log table at	l diagrams wher dicate full marks	<b>3</b> .	•	
Q.1	A)	1)	ple choice questi Melatonin is secre a) skin c) pineal body	eted by	ď)	pituitary gland Thyroid	10
		2)	<ul><li>Chemically hormo</li><li>a) proteins only</li><li>b) steroids only</li><li>c) proteins, stero</li><li>d) biogenic amin</li></ul>	oids and biogen		nines	
		3)		tes contraction of	of th	the posterior lobe of the p e uterus during labor? Oxytocin Prolactin	ituitary
		4)	Graffian follicles a a) Testis c) Pituitary gland			Adrenal gland Ovary	
		5)	Insulin is secreted a) Adrenal c) Pancreas	by gland.	b) d)	Thymus Posterior lobe of pituitary	,
		6)	, , , , , , , , , , , , , , , , , , , ,	amic-pituitary-ad	ial <i>P</i>		
		7)	Addison's disease a) Deficiency Ad c) Deficiency of	renocortical	b) d)	Deficiency of Insulin Deficiency of Estrogen	
		8)	The gland which is a) Thymus gland c) Parathyroid gl	H	r the b) d)	e body's circadian rhythm Pineal gland Pituitary gland	is the:
		9)	Hypo-secretion of a) Gigantism c) Goitar	GH leads to	b) d)	Dwarfism Diabetes	

		<ul> <li>These cells of the testes secrete testosterone</li> <li>a) Cells of Leydig or interstitial cells</li> <li>b) Sertoli cells</li> <li>c) cells of germinal epithelium</li> <li>d) secondary spermatocytes</li> </ul>	
	B)	Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc.  1) Define endocrine gland. 2) Structure of placenta 3) HPA stands for 4) Define Adenohypophysis. 5) Hydrocele is the disorder of 6) Sleep disorders is caused by the deficiency of	06
Q.2		Leydigs cells Neurohormone Hormonal regulation of ovary FSH Pars nervosa Progesterone GH Gigantism Acromegaly Rhinitis	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe the structure of ovary with the hormonal secretion and their functions.</li> <li>2) Describe feedback mechanism of hormonal regulation.</li> <li>3) Describe the structure of pineal gland and its role in biological rhythm.</li> </ul>	10
	B)	Short note/Solve.  Describe hormones secreted by anterior lobe of pituitary gland.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe the structure and hormones of placenta.</li> <li>2) Describe the structure and hormones secreted by testis.</li> <li>3) History of endocrinology.</li> </ul>	80
	B)	Describe hypothalmo-hypophysial portal system.	80
Q.5	Atte a) b)	mpt any Two of the following.  Describe the structure, functions and disorders of pituitary gland.  Explain the +ve feedback and -ve feedback mechanism of hormonal regulation with any suitable example.  Describe classification of hormones on the basis of chemical nature. Add a	16
	٠,	note on mechanism of hormonal action	

	_	
Seat	Set	D
No.	Set	

#### B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS (Special Paper - XI) Real Analysis (19201526)**

Day & Date: Friday, 12-04-2024	Max. Marks: 80
Day & Date: 1 Haay, 12-04-2024	Max. Marks. 00

Time: 03:00 PM To 06:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to right indicate full marks.

<b>Q.1</b>	A)	Select the correct alternative from the following.
------------	----	--

10

- 1) If A and B are two sets such that A - B = B - A then which one of the following is correct?
  - a)  $A = \phi$

b)  $A \cap B = \phi$ 

c) A = B

- d)  $B = \phi$
- 2) Which one of the following is empty set?
  - a)  $\{x/x \text{ is real number and } x^2 1 = 0\}$
  - b)  $\{x/x \text{ is real number and } x^2 + 1 = 0\}$
  - c)  $\{x/x \text{ is real number and } x^2 9 = 0\}$
  - d)  $\{x/x \text{ is real number and } x^2 = x + 2\}$
- 3) Every infinite set has a
  - a) Countable subset
  - b) Uncountable subset
  - c) Countable and Uncountable subset
  - d) None of these
- The sequence  $\delta_n = \{1 + (-1)^n\}$  has \_\_\_\_\_. 4)
  - a) Exactly one constant subsequence
  - b) Exactly two constant subsequence
  - c) Exactly three constant subsequence
  - d) Exactly four constant subsequence
- Which of the following inequality is false? 5)
  - a)  $\underline{\lim} s_n + \overline{\lim} t_n \le \overline{\lim} s_n + \overline{\lim} t_n$
  - b)  $\lim s_n + \overline{\lim} t_n \le \underline{\lim} (s_n + t_n)$
  - c)  $\lim s_n + \overline{\lim} t_n \le \lim s_n + \lim t_n$
  - d)  $\lim s_n + \overline{\lim} t_n \ge \lim s_n + \lim t_n$
- i) Every convergent sequence is bounded 6)
  - ii) Every bounded sequence is convergent a) i) is true, ii) is false
- b) ii) is true, i) is false
- c) Both i) and ii) true
- Both i) and ii) false d)

Let sequence  $\{a_n\}_{n=1}^{\infty}$  and  $\{b_n\}_{n=1}^{\infty}$  converges to A and B respectively, 7) then  $\left\{\frac{a_n}{b_n}\right\}_{n=1}^{\infty}$  converges to  $\frac{A}{B}$  if \_\_\_\_\_. a)  $b_n \neq 0$  for all n and B = 0b)  $b_n \neq 0$  for some nc)  $b_n \neq 0$  for all n and  $B \neq 0$ d)  $b_n = 0$  for all nThe series  $\sum_{n=1}^{\infty} (-1)^n$  is \_\_\_\_\_. 8) b) Convergentd) Not oscillating a) Divergent c) Unbounded The series  $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots$  is convergent for \_\_\_\_\_. 9) b) |x| < 1 only d)  $-1 < x \le 1$ a) All real values of x c)  $|x| \le 1$ 10) For positive term series the ratio test states that \_\_\_\_\_. a) The series convergent if  $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| > 1$ b) The series convergent if  $\lim_{n\to\infty}\left|\frac{a_{n+1}}{a_n}\right|<1$ c) The series divergent if  $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| = 1$ d) The series divergent if  $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| < 1$ B) Fill in the blanks of the following 06 If A and B are two subsets of universal set X then  $A \cap (A \cup B)' =$ 2) If *X* and *Y* are any two non-empty sets then  $(X - Y)' = \underline{\hspace{1cm}}$ . The set of all distinct element of sequence is called \_\_\_\_\_. If  $\{s_n\}_{n=1}^{\infty}$  is decreasing and bounded then  $\{s_n\}_{n=1}^{\infty}$  is = \_\_\_\_\_. 3) A series  $\sum_{n=1}^{\infty} a_n$  converges then the sequence  $\{a_n\}_{n=1}^{\infty}$  is \_\_\_\_\_. The series  $\sum a_n$  is said to be conditionally converges if \_\_\_\_\_. Q.2 Solve any Eight of the following. 16 If  $\sum a_n$  is convergent series then  $\lim_{n\to\infty} a_n = 0$ Prove that  $\sum_{n=1}^{\infty} \frac{(2n^2 - 1)^n}{(2n)^{2n}}$  is convergent. b) Discuss the series  $\sum_{n=0}^{\infty} \frac{n^n}{n!}$  is Cgs or divergent. c) d) Show that the product  $N \times N$  is countable. To prove that  $F^{-1}(X^1) = [F^{-1}(X)]^1$ e) The function  $F(x) = \log x$  for  $x \in (0, \infty)$ , if A = [0,1] find  $F^{-1}(A)$ f) To prove that  $(A \cap B) \cap C \subset A \cap (B \cap C)$ g) If  $s = \left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots\right\}$  and  $\delta(i) = 2^i$  Find  $so\delta$ h)

- i) Find the limit of  $\left\{\frac{(n+1)^n}{n^{n+1}}\right\}$
- **j)** Find limit sup  $(s_n)$  and limit inferior  $s_n$ , where  $\{s_n\} = \left\{\cos\left(\frac{n\pi}{4}\right)^{(-1)^n}\right\}$
- Q.3 A) Attempt any Two of the following.

10

- 1) If  $f: A \to B$  and  $X \subset A, Y \subset A$  then  $F(X \cup Y) = f(X) \cup f(Y)$
- 2) A monotonic increasing sequence which is bounded above, then it is convergent.
- 3) If  $\sum_{n=1}^{\infty} a_n$  converges to A and  $\sum_{n=1}^{\infty} b_n$  Converges to B, then  $\sum_{n=1}^{\infty} (a_n + b_n)$  converges to A + B. Also if  $C \in R$  then  $\sum_{n=1}^{\infty} Ca_n$  Converges to CA
- **B)** If  $\lim_{n\to\infty} S_n = L$  and  $\lim_{n\to\infty} t_n = M$ , if  $\{S_n\}_{n=1}^\infty$  and  $\{t_n\}_{n=1}^\infty$  are sequence of real number, then  $\lim_{n\to\infty} S_n t_n = LM$
- Q.4 A) Attempt any Two of the following.

08

- 1) If  $A_1, A_2, A_3, ...$  are countable sets, then  $\bigcup_{n=1}^{\infty} A_n$  is countable.
- 2) If  $\sum_{n=1}^{\infty} a_n$  is dominated by  $\sum_{n=1}^{\infty} b_n$  and if  $\sum_{n=1}^{\infty} b_n$  converges absolutely, the  $\sum_{n=1}^{\infty} a_n$  is converges absolutely.
- 3) If 0 < x < 1, then  $\{x^n\}_{n=1}^{\infty}$  converges to zero.
- **B)** If  $\{a_n\}_{n=1}^{\infty}$  is a sequence of positive number such that

08

- 1)  $a_1 \ge a_2 \ge a_3 \ge \cdots \ge a_n \ge a_{n+1} \ge \cdots$  and
- 2)  $\lim_{n\to\infty} a_n = 0$ , then the alternating series  $\sum_{n=1}^{\infty} (-1)^{n+1} a_n$  is convergent.
- Q.5 Attempt any Two of the following.

16

a) For each  $n \in I$  let  $I_n = [a_n, b_n]$  be a nonempty closed bounded interval of real number such that

Then  $\bigcap_{n=1}^{\infty} I_n$  contains precisely one point

- If  $\lim_{n\to\infty} \sup \sqrt[n]{|a_n|} = A$ , then the series of real number  $\sum_{n=1}^{\infty} a_n$ 
  - i) Converges absolutely if A < 1
  - ii) Diverges if A > 1, which includes the case A becomes  $\infty$
  - iii) If A = 1 the test fails
- c) If A and B are subsets of s, then prove that
  - i)  $(A \cup B)' = A' \cap B'$
  - ii)  $(A \cap B)' = A' \cup B'$

	_	
Seat	Cot	D
No.	Set	

	B.Sc	c. (Se	mes	ster - V) (New) (CBCS) STATISTICS (Spec Sampling Techniq	cial P	aper - XI)	pril-2024	
•			•	12-04-2024 6:00 PM	•	,	Max. Marks: 80	
Instr	uctio	2)	Figu	uestions are compulsory. res to the right indicate full r of log table and calculators				
Q.1	A)	Choo 1)		the correct alternative. Cular systematic sampling is N is a multiple of n N is not divisible by n	b)	when N is a whole number None of the above	10	
		2)	kno	e discrepancy between estin wn as Human error Non-sampling error	nate a b) d)		ter is	
		3)	stra	der proportional allocation th tum depends on Total sample size Population size		Size of the stratum	ach	
		4)		e total number of possible sa oulation size N by SRSWOR N NCn		s of size n, drawn from  N N <sup>n</sup>	r	
		5)	In p a) c)	resence of linear trend Stratified SRSWOR	me b) d)	Systematic		
		6)	Systematic sampling means  a) Selection of n contiguous units  b) Selection of n units situated at equal distances  c) Selection of n largest units  d) Selection of n middle units in a sequence					
		7)	Pro a) c)	bability of selection of varies SRSWOR both (a) and (b)	s at ea b) d)	SRSWR	n	
		8)	Hov a) c)	v many types of allocation a one three	re in d b) d)	common use? two four		
		9)	In L a) c)	inear systematic sampling t N n	otal nı b) d)	umber of possible sam k N!	iples	

		10) Sa a) b) c) d)	selecting a sample of adequate size using a suitable formula for estimation	
	B)	<ol> <li>Qu</li> <li>Noi</li> <li>Sai</li> <li>Sai</li> <li>Poi</li> </ol>	the following. ota sampling n-Random sampling mple mpling frame pulation Unit xiliary variable	06
Q.2	Solv a) b) c) d) e) f) g) h)	State ar Give a r State ra Give a r Define r What is Give rea State the	ight of the following.  The systematic sampling is used.  The situation where Systematic sampling is used.  The situation where stratified random sampling is used.  The situation where stratified random sampling is used.  The situation where stratified random sampling is used.  The situation where cluster sampling is used.  The situation where stratified random sampling is used.	16
Q.3	A)	1) Exp por 2) Des	t any Two of the following.  plain sampling for proportion, obtain its unbiased estimator for pulation proportion.  scribe, in brief the cluster sampling.  Indicate the under what condition ratio estimate is more efficient than SRS.	10
	B)	Write a	short note on a stratified random sampling.	06
Q.4	A)	1) Coi 2) Des	t any Two of the following. mpare regression estimator over ratio estimator. scribe the idea of two-stage and multistage sampling in details. ow that ratio estimator is biased.	08
	B)	Describe	e systematic sampling procedure.	80
Q.5	a)	With usu than pro better p	Two of the following.  ual notations prove that Neyman's allocation has better precision  portional allocation; and also prove that proportional allocation has recision than SRS.	16
	b) c)	In prese	in details about the determination of the sample size. ence of linear of the from $Yi = a + bi$ ; $i = 1,2,N$ , compare DR, stratified random sampling and systematic sampling.	

Seat No.				Set	Р
_	 	 	 	 	

	B.50	c. (S	emester - v) (New) (CBCS) GEOLOGY (Spec	Examination: March/April-2024	ŀ
		ļ	applied Geology – Enginee	- <i>'</i>	
_		e: Fr	day, 12-04-2024 To 06:00 PM	Max. Mar	ks: 80
Insti	ructio		) All questions are compulsory. ) Figures to the right indicate full	marks.	
Q.1	A)	Fill 1)	in the blanks. Which of the following has defini a) Flowage c) Sliding	te surface of failure? b) Subsidence d) All of these	10
		2)	Rock types and geological struct a) electrical resistivity c) geophysical survey	ures can be studied using  b) rock core drilling d) field mapping	
		3)	A subsurface rock body of light of a) High/positive c) neutral	lensity gives gravity anomaly. b) low/negative d) none of these	
		4)	Geophones are used in ge a) Gravity survey c) Seismic survey	b) Magnetic survey	
		5)	geologically weaknesses at b) The geologists perform core c) The geologists perform geo	phic, geological features and the site e logging	
		6)	What is the maximum compress which a stone can withstand with a) Shear strength c) Crushing strength	ve force expressed per unit area, nout rupturing? b) Tensile strength d) Bending strength	
		7)	Pick the rock which is objectiona a) Granite c) Gabbro	ble for use in moist conditions. b) Marble d) Limestone	
		8)	Gradation of soil occurs in a) residual c) both (a) and (b)	soils. b) Transported d) neither (a) nor (b)	
		9)	Type of dam where the forces act the abutment rocks is a) Gravity dam c) Geotechnical dam	cting on the dam are transmitted onto b) Arch dam d) Embankment dam	

		<ul> <li>10) Lithology does not effects on which parameter?</li> <li>a) Type of tunnel</li> <li>b) Method of tunneling</li> <li>c) Strength and extent of lining</li> <li>d) Cost of the project</li> </ul>	
	B)	<ul> <li>Answer the following questions in one sentence.</li> <li>1) At which stage of the civil engineering project, a special purpose (Thematic) geological maps are prepared?</li> <li>2) What is subsidence?</li> <li>3) What is the type of soil found in Indo-Gangetic plains?</li> <li>4) In which type of survey Current electrodes and potentiometer are used.</li> <li>5) Which type of geological structure can be rectified by grouting for tunnelin "Schistosity dipping towards downstream of the river". Is this condition being favorable for dam construction?</li> </ul>	<b>06</b> g?
Q.2	Solv a) b) c) d) e) f) g) h) i)	Name the types and sub types of flowages in landslides. What are the characteristics of glacial soil? What is modulus of elasticity? What is invert in tunnel? What is the use of gallery of the dam? What is reservoir of the dam? Which soil occurs at deep sea? What are the two types of clay structure? What is geophone? What is the agent of mass movement?	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Give various methods to control landslides?</li> <li>2) Describe masonry dam?</li> <li>3) Write a note on "Engineering geological work at construction stage."</li> </ul>	10
	B)	Write a note on selection of site for tunnel construction in folded region.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain sliding in mass movement.</li> <li>2) Describe 1:1 and 2:1 layer in clays with appropriate figures.</li> <li>3) Describe magnetic survey method for site investigation?</li> </ul>	08
	B)	Explain uniaxial compressive strength.	08
Q.5	Atte a) b)	mpt any Two of the following.  Earthen and rock-fill dams.  What types of precautionary measures one should take during the construction of tunnels in hard and soft rocks?	16
	c)	Engineering classification of soil.	

Seat No.	Set P
-------------	-------

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

		(-		MICROBIOLOGY (Sp Immunology (1		-
•			•	12-04-2024 06:00 PM		Max. Marks: 80
Instr	uctio	2	2) Fig	questions are compulsory. ures to right indicate full mark aw neat diagrams and give eq		ns wherever necessary.
Q.1	A)	<b>Cho</b> 1)	MH( a)	correct alternative and write is present in only human human & mouse		only mouse
		2)	a) b) c)	amine is Primary mediator of anaphyl secondary mediator of anapl atopen allergen		s
		3)	a)	antibodies play role in anaphylaxsis Arthus reaction	b)	serum sickness contact dermatitis
		4)	a)	C class II molecules are enco HLA – A, HLA – B, HLA – C C4, C2, BF	b)	y the genes HLA - DP, $HLA - DQ$ , $HLA - DRHLA - TNF\alpha, HLA - TNF\beta, HLA C4$
		5)	a)	ells carry as BCR. lgD & lgM Only lgM	,	lgA & lgB lgA & lgD
		6)	a) b)	protects the body from Intracellular Extracellular Both intracellular & extracellular None of these		nogen.
		7)	a)	graft rejection involves mast cytotoxic cells	cells b) d)	
		8)	to _	hypersensitivity	en sel b) d)	f-cells and non-self-cells may lead auto-immune diseases tolerance
		9)	Hyb a) b) c) d)	ridoma cells are selected by o Adenine, guanine, cytosine a Adenine, guanine, cytosine a Hypoxanthine, aminopterin a Hypoxanthine, aminopterin a	and th and u and th	racil ymine

		<ul> <li>10) C1 component of classical complement pathway is made up of</li> <li>a) Complements 1q and 1r</li> <li>b) Complements 1q and 1s</li> <li>c) Complements 1r and 1s</li> <li>d) Complements 1q, 1r and 1s</li> </ul>	
	B)	Answer in One sentence  1) What is atopy?  2) Mention the antibodies involved in serum sickness.  3) Mention the non organ specific autoimmune diseases  4) Which blood group is universal acceptor?  5) Define autograft.  6) What is complement?	06
Q.2	Ansv a) b) c) d) e) f) g) h)	Wer in short (Any Eight) Write the function of MHC class II molecules. Name any four blood transfusion reaction complications. What is Myasthenia gravis? What is the composition of MHC Class I molecules? Write any two differences between humoral and cell mediated immune response Which are the activators of Alternate complement activation pathway? What is primary immune response? What is the function of dendritic cells? What is the function of macrophages?	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe the biological effects of complement activation.</li> <li>2) Write a note on Arthus reaction.</li> <li>3) Write a note on NK cells.</li> </ul>	10
	B)	Describe in detail about Rh blood group system.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write a note on T lymphocytes.</li> <li>2) Discuss on applications of monoclonal antibodies.</li> <li>3) Write a note on cytokines.</li> </ul>	08
	B)	Write an essay on "Hybridoma technology for monoclonal antibody production".	80
Q.5	Attera) b) c)	mpt any Two of the following. Discuss in detail about anaphylaxsis. Discuss in detail about mechanism of autoimmunity. Describe the structure and function of primary lymphoid organs.	16

Seat	Set	D
No.	Set	

	B.S	c. (S	Seme	ster - V) (New) (CI ELECTRONICS Sensors and Tr	S (Specia	- /	
•			•	12-04-2024 06:00 PM		Max. Marks: 8	80
Instr	uctio		2) Figı 3) Dra	questions are compuls ures to right indicate fo w neat labelled diagra e of log-tables and cald	ıll marks. ms wherev		
Q.1	A)	1)	În ca a) c)	Material of the plate Specific Inductance	b) d)	is varied by changing Distance between the plates Specific resistance	10
		2)	resp	ond is sensitivity	neasured v b) d)	ariable to which an instrument will resolution precision	
		3)	,	is the passive trans LVDT Photo-voltaic cell	ducer from b) d)	the given transducers. Thermocouple Piezo-electric transducer	
		4)	a)	principle of operation Self inductance Reluctance	of an LVDT b) d)	is based on variation of Mutual inductance Conductance	
		5)	elec a)	piezo-electric transdud tric property, Rochelle-salt Quartz	cer, formed b) d)		
		6)	resis	stance Decreases	ducers, if le b) d)	ngth of conductor is increases, then  No change  Doubles	
		7)	a)	deviation of the true vo Sensitivity Error	b)	ne desired value is Resolution Expected value	
		8)	inpu	behaviour of a measu t quantity is called fidelity dynamic response	b)		
		9)		photoconductive mate gallium arsenide cadmium sulphide		gallium phosphide	

		<ul> <li>10) In electromagnetic relay, the moving arm is</li> <li>a) yoke</li> <li>b) pivot</li> <li>c) NC or NO contacts</li> <li>d) armature</li> </ul>	
	B)	Answer the following questions.  1) What is the basic needs of measurement?  2) Write the definition of Sensor.  3) What is actuator?  4) Define accuracy.  5) What is Photoelectric Transducers?  6) Give two examples of Active Transducers.	06
Q.2	Solva) b) c) d) e) f) g) h) i)	List the important specifications of LM35 sensor. Compare Active and Passive Transducers. What is need of system calibration? Explain the principle of operation of Resistive Transducers. Draw circuit symbol of Photodiode and phototransistor. Draw Block Diagram of measurement system. Enlist the temperature transducers. Draw diagram of optocouplers. Give the principle of operation of capacitive transducer. What are differential Inductive Transducers	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain Capacitor microphone.</li> <li>2) Write a note on solenoid.</li> <li>3) Explain the principle, construction and operation of Hall effect transducer.</li> </ul>	10
	B)	Write a note on LVDT.	06
Q.4	A)	Attempt any Two of the following.  1) Explain Electromagnetic Relay. 2) Write a note on RTD. 3) Explain with Diagram LDR.	80
	B)	Explain the principle, construction and operation of Thermocouple.	80
Q.5	Atte a) b) c)	mpt any Two of the following. What are Pyrometers? Explain in Brief. Explain the principle, construction and operation strain gauge. Give brief account of static and dynamic characteristics of instrument.	16

	<u>-</u>	
Seat	Sat	D
No.	Set	<u> </u>

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

	<b>D</b> .0	o. (O	COMPUTER SCIENCE	(Spe	ecial Paper – XI)
D-11	0 D-4	F.:	Operating Syste	m (1	,
•			day, 12-04-2024 To 06:00 PM		Max. Marks: 80
Instr	uctio	2	All questions are compulsory. Figures to right indicate full mark Draw neat labeled diagrams who		er necessary.
Q.1	A)	<b>Mult</b> 1)	iple choice questions is also known as PAGE-0 a) Process c) Paging	DUT ( b) d)	
		2)	CPU can execute only programs <ul><li>a) Ready Queue</li><li>c) Main queue</li></ul>	which will be seen to b	
		3)	<ul> <li>A page fault occurs when</li></ul>	· ·y	
		4)	Dining Philosophers problem car solutions. a) True	n NC b)	T be solved using Two Process  False
		5)	The process affects on another a known as independent process a) True	and a	affected by another process is  False
		6)	provides the interface bet a) System Process	weeı b)	n a running program and O.S. Overlays system calls
		7)	<ul><li>is a process synchronizat</li><li>a) Socket</li><li>c) Writer</li></ul>	ion to b) d)	ool operates on two atomic operations. Reader Semaphore
		8)	Single level directory structure is a) True	suit b)	able for Multiuser System. False
		9)	<ul><li>if time slice is too short in RR sc</li><li>a) High waiting time</li><li>c) High Context Switch time</li></ul>	hedu b) d)	
		10)	For non sharable resources like a) Ture	•	nter, mutual exclusion must exist False

	В)	1) 2) 3) 4) 5)	ne the following PCB stands for LRU stands for Waiting Time System Call Dynamic Loadir Boot Block	-	•					06
Q.2	Sol a) b) c) d) e) f) g) h) i)	Defir Defir Defir List of State Wha Defir Defir	r Eight of the forme Pre-emptive State Context Switch Bad Block. Out any FOUR former of Short is Concurrent Fine I/O Bound prome Rotational Lance seek time.	Scheduliching with unctions ort Term Process' ocess.	ing. th its Dra of Opera Schedul	ating Sys	stem.			16
Q.3	A)	1) 2) 3)	mpt any Two of Explain Multipro Write Note on P Consider Follow Process Arrival Time CPU Burst Priority Prepare Gantt of Turnaround Time	grammi aging. ving Sys A 0 8 1 hart and e using,	ng OS.  tem Sna  B 1 20 3 d calculate Priority	C 2 3 2 te Avera Schedul	ing Algo	orithm.	J	10
	-					ary conc	aidons d	occur L	Caulock.	
Q.4	A)	1) 2) 3)	mpt any Two of Define Semapho List out differend Draw RAG for fo P1 → R1, R2 →	ore with ces betwollowing	its Oper veen Use System	er Thread scenario	),			08
	B)	Expl	ain PCB with Dia	agram.						08
Q.5	a)	Explai Explai Calcul Frame 1) F 2) L	ny Two of the find Producer Connindexed File All late Number of File Size = 4 using FIFO RU Optimal 1,2,3,4,2,1,5,6,2	sumer F Allocation Page Fa	Problem. n Method ult Rate	for follov	ving Rei	ference S	String with	16

Seat No.	Set	P
----------	-----	---

	В.5	ic. (S	emester	PHYSICS (Sp	ecial Pa	• •	Aprii-2024
•			turday, 13- To 06:00 I		sics (19	201514)	Max. Marks: 80
Instr	ructio	2	) Figures to ) Neat diag	ons are compulsor the right indicate grams must be dra g table and calcula	full marks wn where	ver necessary.	
Q.1	A)	Cho 1)	Shape of a) sph	orrect alternative. nucleus is nerical nicircular		circular cubic	10
		2)	distributio a) circ	al quadruple mome n of nucleus is cular ate spherical	b)	ter than zero then cha spherical prolate spherical	arge
		3)	a) pot	rator is used for ir ential energy ding energy	b)	of a charged pa kinetic energy excitation energy	articles.
		4)	a) iso	g reaction produc mers topes	_	et nuclei are isobars monomers	
		5)		sitive		Q value should be negative infinity	<u></u> .
		6)	a) Em b) visi c) me	er works on the price of the pr			
		7)	particles s a) pho	ance which emits strikes on it is calle osphor itter	_	ht when high energe  collector absorber	tic charge
		8)	a) inc	on time for semicir reases astant	•	of ion is for evidecreases zero	ery revolution.
		9)	-	means ermediate avy	b) d)	bulky light in weight	
		10)	a) pos	es are sitrons tons	b) d)	electrons neutrons	

	B)	Fill in the blanks.	06
	•	The betatron accelerates lons.	
		2) Neutrino has charge.	
		3) The time at which GM tube unable to count pulse is called	
		4) In nuclear reaction the bombarding particle is called	
		5) Antiparticle of electron is	
		6) Neutron was discovered by	
Q.2	Sol	ve any Eight of the following.	16
	a)	Define binding energy	
	b)	What is stripping reaction?	
	c)	Explain exothermic reaction.	
	d)	Define threshold energy of nuclear reaction.	
	e)	What is need of accelerator?	
	f)	State principle of scintillation counter.	
	ġ)	Define recovery time of GM counter.	
	h)	What is continuous $\beta$ - ray spectrum.	
	i)	Give two properties of Photons.	
	j)	What is nuclear Interaction?	
	•		
Q.3	A)	Attempt any Two of the following.	10
		Calculate Q – value of the following reaction and indicate type of	
		reaction.	
		$_{2}\text{He}^{4} +_{7}\text{N}^{14} \longrightarrow _{8}\text{O}^{17} +_{1}\text{H}^{1}$	
		Given: Mass of ${}_{2}\mathrm{He}^{4} = 4.0038727$ a.m.u.	
		Mass of $_{7}N^{14} = 14.003074$ a.m.u.	
		Mass of $_80^{17} = 16.999133$ a.m.u.	
		Mass of $_{1}H^{1} = 1.007825$ a.m.u.	
		1 a.m.u = 931 MeV.	
		2) Show that $Q\alpha = E\alpha [1 + M_{\alpha}/M_{Y}]$	
		3) Explain the classification of elementary.	
	D١	•	06
	B)	Obtain betatron condition and explain the construction and working of betatron.	06
		belation.	
Q.4	A)	Attempt any Two of the following.	08
<b>ч</b> .т	~,	Explain electrical quadrupole moment.	00
		Explain electrical quadrupole moment.     Explain liquid drop model of nucleus.	
		3) What are quarks? Explain different types of quarks.	
	σ,	, , , , , , , , , , , , , , , , , , , ,	00
	B)	Explain construction and working of cyclotron. What are the limitations of	80
		cyclotron?	
Q.5	A ++ /	empt any Two of the following.	16
Q.J		Explain properties of elementary particles.	10
	a) b)	· · · ·	
	b)	Explain experimental study of $\beta$ - decay. Explain Pauli's neutrino hypothesis. Explain construction and working of GM counter. Hence explain Geiger	
	c)	· · · · · · · · · · · · · · · · · · ·	
		plateau region.	

						SLR-GA-208	
Seat No.						Set P	
В		-	CI	HEMISTRY (Spec	ial P	nination: March/April-2024 aper - XII) Chemistry (19201509)	
•			urday, 13-04 To 06:00 Pl			Max. Marks: 80	)
Instru	ction	2) 3)	Draw neat Figures to	ns are compulsory. labelled diagrams wh the right indicate full r table and calculators	narks		
Q.1 /	A)	<b>Mult</b> 1)	•		b) d)	transmittance	)
		2)	Unit of the a) cm <sup>-1</sup> c) cm <sup>2</sup>	cell constant is	 b) d)	cm/s All of these	
		3)	EMF of the a) $E_{cell} = c$		b)	$E_{cell} = E_R + E_L$ all of these	
		4)	a) Cu c) Li	sed as internal standa	ord in t b) d)	flame photometry. Na All of these	
		5)	Reciprocal a) potent c) absor		alled a b) d)	as conductance All of these	
		6)	The potenti a) 1.18 v c) 0.34 v		ed at <sub>_</sub> b) d)	1.018 volt	
		7)	•	in the flame. d	b) d)	_ light, when sample is absorbed all of these	
		8)		process of anodizing uric acid acid	is also b) d)		
		9)	When anoc in metal ior a) rich c) nil	•	e effic b) d)	poor none of these	

10) The device used to measure the response of photocell is called as \_\_\_\_.
a) voltmeter b) conductometer
c) galvanometer d) all of these

	B)	<ul> <li>Fill in the blank/Definition/One sentence answer/One word answer etc.</li> <li>Define current density.</li> <li>Define specific conductance.</li> <li> % sample is used in case of laminar flow burner.</li> <li>Give statement of Faraday's first law.</li> <li>What is second derivative plot in potentiometer?</li> <li>Define transmittance.</li> </ul>	06
Q.2	Solva) b) c) d) e) f) g) h) i)	Give the statement of Lambert's law. Give advantages of potentiometric titration. Sketch the block diagram of flame photometer. State the Faraday's second law of electrolysis. Give the advantage of conductometric titrations. What is equivalent conductance? Give the advantages of glass electrode. What is bright deeping? Sketch the graph of strong acid versus strong base in conductometry. Define molar extinction coefficient.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain types of conductivity cell.</li> <li>2) Explain Acid - base titration in potentiometry.</li> <li>3) Describe qualitative and quantitative applications of flame photometry.</li> </ul>	10
	B)	Describe factors affecting the electroplating.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Sketch and explain the quinhydrone electrode.</li> <li>2) Explain weak acid versus strong base titration in conductometry.</li> <li>3) Cleaning of the article.</li> </ul>	08
	B)	Write precise note on Beer's law.	08
Q.5	Atte a) b) c)	mpt any Two of the following. Explain electroplating of Nickel. Explain single cell photoelectric colorimeter. Discuss general principles of flame photometry.	16

	_	
Seat	Cat	D
No.	Set	Г

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

		`		•	Specíal Pa <sub>l</sub> eding (192	•	
•			turday, 13 I To 06:00	3-04-2024 PM		Max. Marks	s: 80
Instr	uctio	2	) Draw ne ) Figures	tions are compu eat labelled diag to the right indic og table and cal	rams whereve cate full marks	S.	
Q.1	A)	<b>Mul</b> 1)	In 1950 to	1970. xico	duction increa b) d)	sed by about 10 times between India America	10
		2)	_	e crop yield. 70	ointed a comm b) d)	nission in for possibility to 1960 1950	
		3)		ery of mendelia 00		rapid development after  1700 1600	
		4)		ara	ctre yield in th b) d)	ne crop like paddy all of these	
		5)	v a) ear	ortant objective ariety. ly maturity h a and b	s of plant bree b) d)	eding programme is to obtain late maturity none of these	
		6)	a) kha	a crop. arif h a and b	b) d)	rabi none of these	
		7)	a) Gre b) Re c) Re	nt breeding techeater responsive sistance to lodg sistance to dise of these	eness to fertili ing	ety can be obtained such as zers	
		8)	a) ger	ural resistance t netical vsiological	hrough the b) d)	characters is stable. cytological ecological	

		<ul> <li>Some plants are tropical, some are temperate, some require specific</li> <li> condition.</li> <li>a) soil</li> <li>b) temperature</li> </ul>	
		c) humidity d) All of these  10) The main object of the plant breeding is to produce the varieties. a) new crop b) old crop c) mixed crop d) none of these	
	B)	Give the one sentence answer of the following.  1) Who studied the primary centre of origin of cultivated crops in 1936?  2) Write the one name of crop that is origin in the China centre.  3) Give the botanical name of Tur.  4) The Central Asia Centre of Origin is also known as.  5) Write the scientific name of wheat.  6) Give the botanical name of onion.	)6
Q.2	Solva) b) c) d) e) f) g) h) i)	Write scientific name of carrot and cabbage. Give the two morphological characters of sorghum. Write the two examples of crops of Mediterranean Centre of Origin. What is mean by domestic? What is hybridization? Write the definition of primary introduction. Write two objective of plant introduction. What is mean by acclimatization? Define self pollination. What is selection.	16
Q.3	A)	Attempt any two of the following.  1) Explain the objective of plant breeding. 2) Give the scope of plant breeding. 3) Describe the pureline selection studied by you.	10
	B)	Write short note of following. Role of mutation	)6
Q.4	A)	Attempt any two of the following.  1) Explain the merit and demerit of clonal selection. 2) Give the general character of centre of origin. 3) Describe the advantage and disadvantages of IPR.	8(
	B)	Attempt any one of the following.  1) Describe the Role of biotechnology in crop improvement.  2) Explain the national institutes studied by you.	8(
Q.5	Atte a) b) c)	mpt any two of the following.  Give the forms of IPR.  Explain the international institutes studied by you.  Describe the Hybridization in cross pollinated crop plants.	16

Seat No.		Set	F	P
В	Sc (Semester - '	V) (New) (CBCS) Examination: March/Δpril-2024		

	2.00	). (O		BOTANY (Spe Economic Bo	ecial Pap	•	.p 202 +
-			turday, 13-0 l To 06:00 F				Max. Marks: 80
Instr	uctio	2	) Draw nea	ons are compulsor t labelled diagrams o the right indicate	s whereve	<del>-</del>	
Q.1	A)	Mult 1)	Chick pea a) Beng	e Questions. is also called gal gram en gram	 b) d)	Red gram Black gram	10
		2)	a) <i>Arac</i>	iical name of Red his hypogea r arietinum	b)	eon pea) is <i>Cajanus cajan</i> <i>Medicago sativa</i>	
		3)	Commerc a) epica c) endo	arp	uit of cocor b) d)	nut is obtained from _ mesocarp seed coat	
		4)	Cotton is c a) Stem c) Seed		of ( b) d)		
		5)	a) Sem	oil is oil. i-drying drying	b) d)	Drying Essential	
		6)	a) <i>Arac</i>	name of Ground n his hypogea r arietinum	b)	 Brassica juncea Medicago sativa	
		7)		source of Adhatod			
		8)	a) Tino	name of ginger is spora cordifolia vera	 b) d)	Rauvolfia serpentina Zingiber officinale	3
		9)	a) Dye	obtained from <i>Aza</i> o ral insecticide	dirachta in b) d)	<i>dica.</i> Rubber Fibre	
		10)	a) Euph	source of natural norbia sps	rubber is _b)	Parthenium argetan	tum

<ul> <li>a) What is mean by fodder legume? Give its two examples.</li> <li>b) Give the botanical name, family, and source of cotton.</li> <li>c) State the botanical name and source of drug of Ashwagandha.</li> <li>d) State the botanical name and source of drug of Gulvel.</li> <li>e) State the botanical name and source of drug of Ginger.</li> <li>f) What are plant dyes?</li> <li>g) Give the botanical name of plant insecticides.</li> <li>h) What is mean by natural dyes?</li> <li>i) Give the botanical name of Heena.</li> <li>j) Give the botanical name of Manjista.</li> </ul> Q.3 A) Attempt any Two of the following. <ul> <li>1) Give the botanical name, source and economic importance of Bengal gram.</li> <li>2) Give economic importance of coir.</li> <li>3) Give the economic uses of Groundnut.</li> </ul> B) Short note/Solve. <ul> <li>Give a brief account of drugs obtained from rhizome, state botanical name, chief chemical constituents.</li> </ul> Q.4 A) Attempt any Two of the following. <ul> <li>1) Give the botanical name, and economic importance of Cajanus cajan.</li> <li>2) Give the botanical name, and economic importance of Coir.</li> <li>3) Give the botanical name, and economic importance of Soybean.</li> </ul> B) Describe/Explain/Solve. <ul> <li>Give a brief account of drugs obtained from fruit, state botanical name, chief chemical constituents.</li> </ul>		В)	Answer the following questions.  1) What is mean by pulse legumes?  2) What are Textile fibres?  3) Give the source of Soybean oil plants.  4) State the botanical name Palas.  5) State the source of drug of Clove.  6) What are plant insecticides?	06
1) Give the botanical name, source and economic importance of Bengal gram. 2) Give economic importance of coir. 3) Give the economic uses of Groundnut.  B) Short note/Solve. Give a brief account of drugs obtained from rhizome, state botanical name, chief chemical constituents.  Q.4 A) Attempt any Two of the following. 1) Give the botanical name, and economic importance of Cajanus cajan. 2) Give the botanical name, and economic importance of Coir. 3) Give the botanical name, and economic importance of Soybean.  B) Describe/Explain/Solve. Give a brief account of drugs obtained from fruit, state botanical name, chief chemical constituents.  Q.5 Attempt any Two of the following. a) Give a general account of plant insecticides with suitable examples and their advantages. b) Give a brief account of rubber plant sources and their importance. c) Give a general account of dyes obtained from different plants. Add a note	Q.2	a) b) c) d) e) f) g) h)	What is mean by fodder legume? Give its two examples. Give the botanical name, family, and source of cotton. State the botanical name and source of drug of Ashwagandha. State the botanical name and source of drug of Gulvel. State the botanical name and source of drug of Ginger. What are plant dyes? Give the botanical name of plant insecticides. What is mean by natural dyes? Give the botanical name of Heena.	16
Give a brief account of drugs obtained from rhizome, state botanical name, chief chemical constituents.  Q.4 A) Attempt any Two of the following.  1) Give the botanical name, and economic importance of Cajanus cajan. 2) Give the botanical name, and economic importance of Coir. 3) Give the botanical name, and economic importance of Soybean.  B) Describe/Explain/Solve. Give a brief account of drugs obtained from fruit, state botanical name, chief chemical constituents.  Q.5 Attempt any Two of the following. a) Give a general account of plant insecticides with suitable examples and their advantages. b) Give a brief account of rubber plant sources and their importance. c) Give a general account of dyes obtained from different plants. Add a note	Q.3	A)	<ol> <li>Give the botanical name, source and economic importance of Bengal gram.</li> <li>Give economic importance of coir.</li> </ol>	10
<ol> <li>Give the botanical name, and economic importance of Cajanus cajan.</li> <li>Give the botanical name, and economic importance of Coir.</li> <li>Give the botanical name, and economic importance of Soybean.</li> </ol> B) Describe/Explain/Solve. Give a brief account of drugs obtained from fruit, state botanical name, chief chemical constituents. Q.5 Attempt any Two of the following. <ol> <li>Give a general account of plant insecticides with suitable examples and their advantages.</li> <li>Give a brief account of rubber plant sources and their importance.</li> <li>Give a general account of dyes obtained from different plants. Add a note</li> </ol>		B)	Give a brief account of drugs obtained from rhizome, state botanical name,	06
Give a brief account of drugs obtained from fruit, state botanical name, chief chemical constituents.  Q.5 Attempt any Two of the following. a) Give a general account of plant insecticides with suitable examples and their advantages. b) Give a brief account of rubber plant sources and their importance. c) Give a general account of dyes obtained from different plants. Add a note	Q.4	A)	<ol> <li>Give the botanical name, and economic importance of <i>Cajanus cajan</i>.</li> <li>Give the botanical name, and economic importance of Coir.</li> </ol>	80
<ul> <li>a) Give a general account of plant insecticides with suitable examples and their advantages.</li> <li>b) Give a brief account of rubber plant sources and their importance.</li> <li>c) Give a general account of dyes obtained from different plants. Add a note</li> </ul>		B)	Give a brief account of drugs obtained from fruit, state botanical name, chief	80
	Q.5	a) b)	Give a general account of plant insecticides with suitable examples and their advantages.  Give a brief account of rubber plant sources and their importance.  Give a general account of dyes obtained from different plants. Add a note	16

Seat No.

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS (Special Paper - XII)** Partial Differential Equations (19201527 - A)

Day & Date: Saturday, 13-04-2024

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks

### Q.1 A) Select the correct alternative for each of the following.

- The solution of auxiliary equation  $yzp + z \times q = xy$  is
- a)  $\phi(x^2 y^2, x^2 z^2) = 0$  b)  $\phi(x^3 y^3, x^2 \overline{z^2}) = 0$ 
  - c)  $\phi(x^2 + y^2, x^2 z^2) = 0$
- d) None of these
- 2) In a first order partial differential equation f(x, y, z, p, q) = 0 is linear in p and q then the equation is known as
  - a) Linear equation
- b) Semi linear equation
- c) Quasi linear equation
- d) Non linear equation
- 3) When number of arbitrary constant is equal to the number of independent variables then by eliminating arbitrary constant are get
  - a) more than one partial differential equation of order one
  - unique partial differential equation of order one
  - c) partial differential equation of order greater than one
  - d) unique partial differential equation of order greater than one
- 4) The equation  $P_p + Q_q = R$  is known as \_\_\_\_\_.
  - a) Charpit's equation
- Bernoulli's equation b)
- c) Lagrange's equation
- Clairaut's equation d)
- The standard form II of non linear partial differential equation of order 5) one is \_\_\_\_\_.
  - a) z = px + qy + f(p,q) b) z = f(p,q)
  - c)  $z = px + q^2y + f(p,q)$
- d) z = px qy f(p,q)
- 6) The integral which does not contains an arbitrary constant is called ...
  - a) complete integral
- b) singular integral
- c) general integral
- particular integral d)
- The complete integral of pq = k is \_\_\_\_ 7)
  - a)  $z = ax \frac{k}{a}y + c$
- $b) z = ax \frac{a}{k}y + c$
- c) z = ax + k/ay + c d)  $z = ax + \frac{a}{b}y + c$
- In f(DD') if roots are repeated twice times then C.F. = 8)
  - a)  $z = \Psi_1(y + mx) + \Psi_2(y + mx)$
  - b)  $z = \Psi_1(y + mx) + x\Psi_2(y + mx)$
  - c)  $z = \Psi_1(y + mx) + \Psi_2(y + mx) + \dots + \Psi_n(y + mx)$
  - d) None of these

The meaning of  $\frac{1}{D'}(x^4y^3) = \underline{\hspace{1cm}}$ 9) a)  $x^4y^4$  b)  $\frac{x^4y^4}{4}$ c)  $\frac{x^3}{2}y^4$ d)  $\frac{x^5}{5}y^3$ The general solution of  $(D - D'^2)Z = 0$  is \_\_\_\_. a)  $z = \Sigma A e^{k^2 x + ky}$  b)  $z = \Sigma A e^{kx - y}$ c)  $z = Ae^{kx-ky}$ d) none of these Fill in the blanks. B) 06 By elimination of arbitrary constant a and b from z = (x + a)(y + b) we 1) get partial differential equation The first order partial differential equation p = P(x, y), q = Q(x, y) are 2) compatible if and only if The standard form IV of non-linear partial differential equation of order 3) The complete integral of  $q = 3p^2$  is \_\_\_\_\_. 4) The P.I. of  $\frac{1}{D+mD'}f(x,y) =$ \_\_\_\_\_. 5) The P.I. of equation  $(D^2 - 2DD^1 + D'^2)z = \tan(y + x)$  is 6) Q.2 Attempt any Eight of the following. 16 Eliminate arbitrary constant from  $z = (x - a)^2 + (y - b)^2$ a) Eliminate arbitrary function from  $z = f(x^2 + v^2)$ b) Solve 2p + 3q = 1C) Define General Integral. d) Solve xzp + yzq = xye) Find complete integral of  $p^2 = qz$ f) Solve  $r = a^2 t$ g) Solve  $D^2(x^4v^5)$ h) Find particular integral  $(D^2 + 3DD' + 2D'^2)Z = x + y$ i) Solve  $(D^2 - 2DD' + D'^2)Z = e^{x+2y}$ j) **Q.3** A) Attempt any Two of the following. 10 Find the integral surface of  $x^2p + y^2q + z^2 = 0$  which passes through hyperbola xy = x + y, z = 1. Show that the equation xp = yq and z(xp + yq) = 2xy are compatible 2) & solve them. Solve  $(D^2 - 5DD' + 4D'^2)z = \sin(4x + v)$ 3) Derive the partial differential equation by eliminating arbitrary function  $\phi$  from B) 06 the equation  $\phi(u, v) = 0$  where u and v are function of x, y and z. Q.4 Attempt any two of the following: 80 A) Explain the method of finding complementary function of the linear homogeneous partial differential equation with constant coefficient f(DD')Z = f(x, y) when the roots are distinct. Solve  $\sqrt{P} + \sqrt{q} = x + y$ 2) Solve  $(D^2 - 2DD' + D'^2)z = 12xy$ 3)

- **B)** For homogeneous linear partial differential equation with constant coefficient if f(a,b) = 0 then prove that  $\frac{1}{(bD-aD')^n}\phi(ax+by) = \frac{x^n}{b^n n!}\phi(ax+by)$
- Q.5 Attempt any two of the following.

- a) Explain the Charpit's method for solving the non-linear partial differential equation of order one.
- **b)** Explain method of solution of Lagrange's partial differential equation  $P_p + Q_q = R$  with usual notation.
- c) Attempt the following.
  - 1) Solve  $(D^2 D'^2 3D')Z = e^{x+2y}$
  - 2) Solve  $r 2s + t = \sin(2x + 3y)$

10

Seat	Set	D
No.	Set	

## B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 **Mathematics (Special Paper - XII)** Mathematical Analysis (19201527 - B)

Day & Date: Saturday, 13-04-2024	Max. Marks: 80
Time: 03:00 PM To 06:00 PM	

**Instructions:** 1) All questions are compulsory.

3) Figures to right indicate full marks.

### Select the correct alternative for each of the following. Q.1 A)

If f is derivable at c and  $f(c) \neq 0$  then the function  $\frac{1}{f}$  is also derivable

there at end \_\_\_\_\_.
a) 
$$\left(\frac{1}{f}\right)'c = -\frac{f'(c)}{f(c)}$$

b) 
$$\left(\frac{1}{f}\right)'c = -\frac{1}{\{f'(c)\}^2}$$
  
d)  $\frac{-f'(c)}{\{f(c)\}^2}$ 

c) 
$$\left(\frac{1}{f}\right)' c = \frac{1}{\{f(c)\}^2}$$

d) 
$$\frac{-f'(c)}{\{f(c)\}^2}$$

2) If f is continuous on [a, b] and  $f(x) \in [a, b]$  for every  $x \in [a, b]$  then f has a fixed point  $C \in [a, b]$  such that f(c) = c is called .

- a) Intermediate value theorem
- b) Rolle's theorem
- c) Bolzano Wierstrass theorem
- d) Fixed point theorem

The term  $R_n = \frac{h^n(1-\theta)^{n-1}}{(n-1)!} f^n(a+\theta h)$  is called \_\_\_\_\_. 3)

- a) Rolle's form of remainder
- b) Lagrange's form of remainder
- c) Cauchy's form of remainder
- d) Roche form of remainder

The exponential function E(1) is \_ 4)

 $\lim_{x \to \frac{\pi}{2}} \tan x = \underline{\qquad}.$ 5)

a) 
$$-1$$

For the function  $f(x) = 3x^2 - 2x^3$  for  $-2 \le x \le 2$  V(f, -2, 1) =\_\_\_\_\_. 6)

 $\lim_{x\to 0^+} \frac{\sin x}{\sqrt{x}} = \underline{\qquad}.$ 7)

b) 
$$\sqrt{2}$$

			SLR-GA-21	3
		8)	The series $\sum \frac{x^n}{n}$ converges for	
			a) $x = 1$ b) $x = -1$	
			c) $ x  < 1$ d) $ x  > 1$	
		9)	By the logarithmic function (to the base e) $E\{L(y)\} = _{y} > 0$	
			a) <i>y</i> b) <i>E</i>	
			c) $L$ d) $\log y$	
		10)	$If L'\{E(x)\} \cdot E(x) = \underline{\qquad}.$	
			a) $x$ b) $E^2$ c) 1 d) 0	
	Β,	<b>-::::</b> :::		00
	B)	1)	If $f$ and $g$ are bounded variation function then $V(f \pm g, a, b)$	06
		2)	By the addition theorem $E(x) \cdot E(-x) =$	
		3)	$\lim_{n\to\infty} x^n \cdot e^{-x} = \underline{\hspace{1cm}} \text{ for all } n$	
		4)	The Maclaurin's infinite expansion of $e^x$ is	
		5)	The value of the $\lim_{x\to 0^-} \frac{ x }{x} = \underline{\qquad}$ .	
		6)	If a function $f$ is derivable on a closed interval $[a, b]$ and $f'(a), f'(b)$	
			are of opposite signs then there exists at least one point $c$ between $a$	
			and $b$ such that	
Q.2	Ans		, ,	16
	a)	Find 1	he right hand limit and left hand limit of the function $(1x - 4)$	
		f(x)	The right hand limit and left hand limit of the function $ = \begin{cases} \frac{ x-4 }{x-4} & x \neq 4 \\ 0 & x = 4 \end{cases} $ $ \text{ate } \lim_{x \to 0} \frac{e^{1/x}}{e^{1/x}+1} $	
	b)	Evalu	ate $\lim \frac{e^{1/x}}{e^{1/x}}$	
	c)	Prove	that $\lim_{x \to 0} x \cdot \sin\left(\frac{1}{x}\right) = 0$	
	d)		that the function $f(x) = x^2$ is uniformly continuous on $[-1,1]$	
	e)		ss the derivability of the function	
		f(x)	$= \begin{cases} x & if  0 \le x < 1 \\ 1 & if  x \ge 1 \end{cases}$	
	f)		If $f$ if $f$ $f$ $f$ $f$ $f$ $f$ $f$ is a continuous function on domain $f$ , then prove that $f$ $f$ $f$ is	
	-,	also d	ontinuous on D.	
	g)		e increasing and decreasing function.	
	h)	theor	the function $f(x) = x^2 + 2x$ over $[-2,0]$ satisfies the criteria in Rolle's em.	
	i)		e the term function of bounded variation for vector valued function.	
	j)	Show	that monotonic function is a function of bounded variation.	
Q.3	A)	Atten	ipt any two of the following.	10
	,	1)	State and prove Jordon's theorem.	
		2)	Obtain the power series expansion of $log(1 + x)$	
		3)	Investigate the continuity of the function	
			$f(x) = \begin{cases} \frac{e^{\frac{1}{x}} - e^{-\frac{1}{x}}}{e^{1/x} + e^{-1/x}} & x \neq 0 & \text{at } x = 0\\ 0 & x = 0 \end{cases}$	
			$0 \qquad x = 0$	

B) State and prove Cau	chy's mean value theorem.
------------------------	---------------------------

### Q.4 A) Attempt any two of the following.

80

06

- 1) Let  $f: [0,2] \to R$  be differentiable with f(0) = 0, f(1) = 2, and f(2) = 1 then prove that there exist  $c \in [0,2]$  such that  $f'(c) = \frac{1}{2}$
- 2) Prove that the product of two function of bounded variation is also of bounded variation.
- Prove that a function which is derivable at a point is necessarily continuous at that point.
- **B)** If  $\lim_{x \to a} f(x) = L$ ,  $\lim_{x \to 0} g(x) = M$  then prove that  $\lim_{x \to a} (f, g)(x) = L \cdot M$  and  $\lim_{x \to a} \left(\frac{f}{g}\right)(x) = \frac{L}{M}$  provided  $M \neq 0$

### Q.5 Attempt any two of the following.

- a) State and prove Taylor's theorem remainder after n terms.
- **b)** Assuming f'' to be continuous on [a,b] show that  $f(c) f(a) \frac{b-c}{b-a} \frac{c-a}{b-a} f(b) = \frac{1}{2} (c-a)(c-b) f''(r)$  where c and r both lie in [a,b]
- c) 1) Show that the function  $f(x) = \frac{1}{x}$  is not uniformly continuous.
  - 2) Determine all the value of c which satisfies the conclusion of mean value theorem for the function  $f(x) = x^3 + 3x^2 x$  on [-1, 2]

					JLN-GA-2	. 14
Seat No.					Set	Р
I	B.Sc	:. (Se	mester - V) (New) (CBCS) STATISTICS (Spe Operations Resea	cial P	-	
,			urday, 13-04-2024 To 06:00 PM		Max. Marks	s: 80
Instru	uctio	2) 3)	All questions are compulsory. Draw neat labelled diagrams wl Figures to right indicate full mar Use of log table and calculators	ks.	•	
Q.1	A)	Multi 1)	iple Choice questions.  To convert ≥ inequality constrate a) add a surplus variable b) subtract an artificial variable c) subtract a surplus variable d) add a surplus variable and	ole e and a		10
		2)	Constraints in an LP model repair a) limitations b) requirements c) balancing limitations and d) All of the above			
		3)	The solution to a transportation $n$ - columns (destination) is feature and $m+n$ c) $m+n-1$	•		
		4)	For any primal problem and its a) Optimal value of objective b) Primal will have an optimal both primal and dual cannul all of the above	function	on is same ion if and only if dual does too	
		5)	If there were $n$ workers and $n$ a) $n!$ solutions $(n !)^n$ solutions	jobs the b) d)	ere would be (n- 1)! solutions n solutions	
		6)	When total supply is equal to to problem, the problem is said to a) balanced c) degenerate		mand in a transportation  unbalanced none of the above	
		7)	Monte Carlo is a) a technique for modeling c) a technique for Simulation	b) n d)	a book None of these	
		8)	Which of the following method feasible solution to transportat a) Hungarian c) Simplex		<u> </u>	

	9)	a) Certainty b) Uncertainty c) Risk d) All of these	
	10)	<ul> <li>The mathematical model of an LP problem is important because</li></ul>	-
B)	Fill i 1) 2) 3) 4) 5)	The expected value of perfect information is equal to A given Transportation problem is said to be if the total supply is equal to the total demand.  The value at least one basic variable is zero then a basic feasible solution is called The difference between the expected profit under conditions of risk and the expected profit with perfect information is called To calculate penalty for each row and each column by taking the difference between the unit costs, in VAM.  Monte Carlo is technique for	06
Solv a) b) c) d) e) f) g) h) i)	Give Defii Write Defii Wha How Wha Wha	e a standard form of LPP ne Surplus Variable. e the mathematical Model of Assignment Problem. ne Transportation Problem. at is Sequencing Problem? to balanced Assignment Problem? at is an opportunity loss in decision making problem? at is a decision alternative in decision making problem? e advantages of Simulation.	16
A)	<b>Atte</b> 1) 2)	Write the definition and properties of random numbers.  A departmental head has four tasks to be performed and three subordinates differ in efficiency. The estimate of the time subordinates would take to perform is given below in the matrix. Allocate the task one to each man so as to minimize the total man hour.            Task/Men         1         2         3           1         9         26         15	10
	3)	3 35 20 15 4 18 30 20 Give the procedure of generating n random observations from Normal	
B)	Write		06
	Solva)  Solva)  b) c) d) e) f) j) A)	10)  B) Fill in 1) 2) 3) 4) 5) 6) Solve any a) Give b) Defi c) Writh d) Defi e) What f) How g) What i) Writh j) Defi A) Atternal 1) 2)  3)	a) Certainty c) Risk d) All of these  10) The mathematical model of an LP problem is important because a) it helps in converting the verbal description and numerical data into mathematical expression b) decision-makers prefer to work with formal models c) it captures the relevant relationship among decision factors d) it enables the use of algebraic technique  B) Fill in the Blanks 1) The expected value of perfect information is equal to 2) A given Transportation problem is said to be if the total supply is equal to the total demand. 3) The value at least one basic variable is zero then a basic feasible solution is called on the action of the solution is called on the action of the solution is called on the difference between the expected profit under conditions of risk and the expected profit with perfect information is called of the difference between the unit costs, in VAM. 6) Monte Carlo is technique for on the difference between the unit costs, in VAM. 6) Monte Carlo is technique for on the difference between the unit costs, in VAM. 6) Monte Carlo is technique for on the difference between the unit costs, in VAM. 6) Monte Carlo is technique for on the difference between the unit costs, in VAM. 6) Monte Carlo is technique for on the difference between the unit costs, in VAM. 6) Monte Carlo is technique for on the difference between the unit costs, in VAM. 7) Define Surplus Variable. 8) What is Sequencing Problem? 9) What is Sequencing Problem? 9) What is a decision alternative in decision making problem? 1) Write advantages of Simulation. 1) Define Artificial Variable. 1) Write advantages of Simulation. 2) A departmental head has four tasks to be performed and three subordinates would take to perform is given below in the matrix. Allocate the task one to each man so as to minimize the total man hour.  1

Q.4 A) Attempt any Two of the following.

80

- 1) Write the steps involved in the Procedure of Monte Carlo Simulation.
- 2) Write the dual of following LPP:

Maximize  $Z = 3x_1 + 2x_2$ 

Subject to the constraints,

$$-2x_1 + 3 x_2 \le 9$$
$$x_1 - 5 x_2 \ge -20$$

 $x_1, x_2 \ge 0$ 

- 3) Write the procedure of processing n jobs on M machines.
- B) Solve Following LPP

08

 $Maximize Z = 5x_1 - 2x_2$ 

Subject to the constraints,

$$4x_1 + x_2 \ge 6$$
  
$$4x_1 + 3x_2 \ge 5$$

$$x_1, x_2 \ge 0$$

Q.5 Attempt any Two of the following.

16

a) The probabilities of three states of nature are 0.1,0.7, 0.2 respectively. Calculate EMV, EOL and EVPI.

States of Nature	Acts				
States of Nature	<b>A</b> 1	A <sub>2</sub>	<b>A</b> 3		
E <sub>1</sub>	25	-10	-125		
E <sub>2</sub>	400	440	400		
E <sub>3</sub>	650	740	750		

- b) Explain Big M method of finding an optimum solution of a LPP.
- c) Find the optimal sequence in performing the following five jobs on two machines. Processing times (in hours) are given in the following table:

•	`	,	•		U
Job	1	2	3	4	5
Machine M1	5	10	6	7	11
Machine M2	8	6	2	3	4

Also find total elapsed time and idle times for both machines.

Seat No.			Se	t P
E	3.Sc	. (Se	mester - V) (New) (CBCS) Examination: March/April-202 STATISTICS (Special Paper - XII) Regression Analysis (19201532)	4
•			urday, 13-04-2024 Max. Mai To 6:00 PM	rks: 80
Instru	ctior	2) 3)	All questions are compulsory. Figures to the right indicate full marks. Draw neat labeled diagrams wherever necessary. Use of log table and calculators is allowed.	
Q.1	<b>A</b> )	Choo 1)	Backward elimination process begins with the assumption that a) no regressors are in the model b) some regressors are in the model c) all regressors are in the model d) None of These	10 _·
		2)	Value of adjusted $R^2$ always lies between a) 0 and 1 b) $-1$ and 1 c) 0 and $\infty$ d) $-\infty$ and $\infty$	
		3)	Regression means a) relation between variables b) relation between dependent and independent variables c) relation between dependent variables d) all the above	
		4)	In simple linear regression model $Y = \beta_0 + \beta_1 X + \varepsilon$ , $\beta_0$ and $\beta_1$ are respectively  a) response variable and regressor variable b) response variable and predictor variable c) intercept and slope d) none of the above	
		5)	Forward selection method always begins with the assumption that a) no regressors are in the model b) some regressors are in the model c) all regressors are in the model d) None of These	
		6)	Hat matrix is given by a) $X(X'X)^{-1}$ b) $X'(X'X)^{-1}$ c) $X'(X'X)^{-1}X'$	
		7)	The sum of residuals weighted by the corresponding value of the regressor is always equal to a) $0.5$ b) $0$ c) $1$ d) $-1$	

		0)	line, then	
			a) $SST = SSR$ b) $SSR = SS_{res}$	
			c) $SST = SS_{res}$ d) $SST = SSR = SS_{res}$	
		9)	Logistic regression is used when we want to predict  a) a dichotomous variable from continuous or dichotomous variables b) a continuous from dichotomous variables c) any categorical variable from several other categorical variable d) a continuous variable from dichotomous or continuous variables	
		10)	In simple linear regression, estimate of $\sigma^2$ is given by a) $MS_R$ b) $MS_{Res}$	
			c) SSR d) SST	
	B)	Fill i 1) 2) 3) 4) 5)	For regression equation $y=2-5x$ , the slope is The transformation $\ln\left(\frac{\Pi(x)}{1-\Pi(x)}\right)$ is called as In simple linear regression, the distribution of response variable is In multiple linear regression, the number of regressor variables are Sum of residuals in any regression model that contains an intercept term is equal to In simple linear regression model, to test the hypothesis about intercept parameter test is used.	06
Q.2	Solv	ve anv	Eight of the following.	16
	a) b) c) d) e) f) g) h)	Defin Defin Discu State Expla Write Write	e coefficient of determination $R^2$ . e simple linear regression with assumptions. e hat matrix H and its properties. uss logit transformation in the context of logistic regression model. all variables selection methods. uin studentized residual. multiple linear regression model. logistic regression model. is the use of normal probability plot?	
Q.3	A)	Atter 1) 2) 3)	In simple linear regression model, describe the procedure of testing regression coefficients, using t-test.  Explain how residuals plots are useful in verifying assumptions in a linear regression model.  Write note on transformations for linearizing a non-linear model.	10
	B)	<b>Write</b> 1) 2)	e short note on each of the following.  Forward selection method  Backward elimination method	06
Q.4	A)	Atter 1) 2) 3)	npt any Two of the following.  Find confidence interval for $\beta_1$ in simple linear regression.  State multiple linear regression model with p regressors. Also, state the assumptions.  Describe any two criteria for evaluating subset regression models.	80
		<b>–</b> ,	= ====================================	

**B)** Define odds ratio,  $\Psi$ . Write its interpretation if:

80

- i)  $\Psi = 1$
- ii)  $\Psi > 1$
- iii)  $\Psi < 1$
- Q.5 Attempt any Two of the following.

- a) Derive the maximum likelihood estimators of parameters of a logistic regression model with one covariate.
- **b)** Explain the concept of the simple linear regression with illustrations. Derive least square estimators of the regression coefficients in the model
- c) Describe a multiple linear regression model. Stating the assumptions, obtain the least square estimator of (LSE)  $\hat{\beta}$  of  $\beta$ .

					<b>52</b> 11 <b>5</b> 71 2	
Seat No.					Set	P
E	•		Geology (Spe	ecial Pape	nation- March/April - 2024 er - XII) ing Geology (19201537)	
		aturday, 13-04 M To 06:00 PN			Max. Mark	s: 80
Instru	ctions:	<ul><li>2) Draw neat I</li><li>3) Figures to t</li></ul>	s are compulsory abelled diagrams he right indicate t able and calculat	s wherever the subsection where the subsection is subsection in the subsection is where the subsection is subsection in the subsection is subsection in the subsection is subsection.	•	
Q.1	<b>A) Ch</b> 1)	a) Recon	g based on geolo urvey. maissance	b)	with scale of 1:50,000 is called  Preliminary	10
	2)		are known from L ving geological cr ic		None of the above in is the best example of which Structural Lithological	
	3)		i horizontal openi ie strike of a vein		rom a shaft and (or near) right e body. Crosscut Chute	
	4)		n balance	ment used b) d)	for magnetic method? Proton magnetometer None of the above	
	5)	In the curve	e-matching techni	ique if $\rho 1 >$	$\rho 2 > \rho 3$ , the curve type is:	

The spacing of the trenches pits and boreholes depend on:

The modes of occurrence of the deposits.

Which of the following criteria is used for coal deposits?

b)

d)

b)

d)

'H' type

'K' type

Lithological criteria

All of the above

a) Specimen

'Q' type

'A' type

a)

a)

b)

c)

a)

6)

7)

- b) Sample
- c) Both specimen and sample can be used

The length of the ore body.

The depth of the deposits.

The outcrops of the deposit.

d) Quantitative specimen

Climatic criteria

Stratigraphic criteria

		<ul> <li>Acid mine drainage is the result of</li> <li>a) ash and air debris creating acid rain</li> <li>b) boulders and debris blocking the flow of rivers / streams</li> <li>c) toxins from water in mines drain into streams</li> <li>d) minerals from mining being left behind creating pollution</li> </ul>	
		<ul> <li>In geophysical investigation, artificial signals are introduced into the earth and subsequently recorded after being modified by the earth materials.</li> <li>a) Gravity method</li> <li>b) Magnetic method</li> <li>c) Self potential method</li> <li>d) Seismic method</li> </ul>	
	B)	Fill in the blanks:  1) In resistivity method, a series of measurements of resistivity are made with a constant electrode spacing moving the whole of the electrode arrangement.  2) elements/minerals provide good clues in search for hidden ore bodies because they generally form large haloes.  3) In configuration of resistivity survey, the current and potential electrode pairs have a common mid-point and the distance between adjacent electrodes are equal.  4) sampling which best suited to bedded, banded and vein type of deposits.  5) A criteria covers the geological settings associated primarily with the age of various sedimentary series (or intrusions) enclosing a mineral.  6) Which mining method is most likely to destroy the habitat of wildlife?	6
Q.2	Solva)  a) b) c) d) e) f) g) h) i)	Define Curie point. Name the types of electrical configuration methods. Give two examples of magmagenic geological criteria. Name the instrument used in Magnetic methods of exploration. Name any two types of mining used to extract the ore minerals. Give two examples of path finder elements. What is mean by geochemical mobility? Name any two data corrections of gravity geophysical method. Which two geophysical methods are used for prospecting oil and gas deposits? Give two applications of Seismic geophysical method.	6
Q.3	A)	<ol> <li>Attempt any Two of the following.</li> <li>Discuss the interpretation of gravity geophysical survey.</li> <li>Explain the primary and secondary dispersion halos of geochemical exploration.</li> <li>Describe the environmental impact of acid mine drainage.</li> </ol>	0
	B)	Write short note on Wenner electrical resistivity method.	6
Q.4	A)	Attempt any two of the following.  1) Explain the principle of Self potential method with suitable diagram.  2) Write the note on structural criteria of geological prospecting  3) Discuss in detail open cast mining and its types.	8
	B)	Define sampling. Explain the different types of sampling with suitable <b>0</b> diagram.	8

### Q.5 Attempt any two of the following.

- a) Discuss the instrumentation, field procedure and application of Seismic methods.
- **b)** Explain lateral exploration and vertical exploration of electrical resistivity method.
- c) Explain any three geological criterions for coal deposits.

Seat	Set	D
No.	Set	

# B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024

				MICROBIOLOG Industrial Mic	• •	-	
_			,	, 13-04-2024 6:00 PM		,	Max. Marks: 80
Instr	uctio	2	) Draw ) Figu	uestions are compul	ams whereve ate full marks		
Q.1	A)	Mult 1)	•	hoice questions. are the beer in whice Middle yeast Top yeast	b)	n is carried out by Bottom yeast All of these	
		2)	The a)	bread or idli dough ı Heating Grinding	rises because b) d)	of Growth of yeast Freezing	
		3)	Whe a) c)	y is the by-product i Cheese Butter		e of Yogurt Skimmed milk	
		4)	The a)	preservation of food Lyophilisation Radiation	l by cold steril b) d)		
		5)	_	juice that is extracte n as Wort Must	ed from grapes b) d)	s used for wine pro Liquor Solution	oduction is
		6)	Blacl a) c)	k gram is used in the Idli Bread	e production o b) d)	of Curd Cheese	
		7)	Ame a) c)	s test is a prelimina Allergen Carcinogen	ry test for dete b) d)	ection of Pyrogen oncogene	
		8)	The a)	value of $a_w$ water as $0.75$	ctivity of pure b) d)	water is 0.80 1.00	
		9)	a) c)	_ cheese is a soft c Cottage Swiss	heese. b) d)	Cheddar Parmesan	
		10)	Solve a) c)	ent extraction is also Solid – gas Solid – solid	o known as b) d)	extraction. Liquid – liquid Liquid – gas	

	B)	Write true or false				
	•	1)	The recovery of ethanol is carried out by using distillation.			
		2)	Insulin is produced by liver cell.			
		3)	The undesirable change occurs in food which make the food unsafe for consumption is called as food infection.			
		4)	The recovery of streptomycin is carried out by ion exchange chromatography.			
		5) 6)	The conversion of milk to curd is carried by lipase enzyme. Sham test is used for carcinogen testing.			
Q.2		-		16		
	a)		the types of wine.			
	b) c)	Define	n organism is responsible for ropiness in milk? e food poisoning.			
	d)		e sterility test.			
	e)		are the sources of milk spoilage? is precipitation?			
	f) g)		types of microorganism involved in curd production.			
	h)		two examples of chemical food preservative.			
	i)		is crystalization?			
	j)		major bacterial pathogen which causes spoilage of meat and eggs.			
Q.3	A)		• •	10		
		1)	Give a detailed account on food as substrate for growth of microorganism	n.		
		2) 3)	Discuss in detail fermentation of bread.  Describe in detail recovery and purification of product by chromatography	.,		
	B)	,		y. 06		
	,					
Q.4	A)	1) 2) 3)	npt any Two of the following. What is aminoglycoside? Describe in details production of streptomycin. Discuss in details production of cheese. Give a detailed account on food spoilage by Claustridium botulinum.	80		
	B)	,		08		
	D)	∟хріа	III III detail production of insulin by 1-DNA technology	00		
Q.5		Attempt any Two of the following.				
	a) b)		ss in details wine production. ribe in detail principle and method of food preservation.			
	c)		is downstream process? Explain in details filtration used as recovery			

Seat No.		Set	Р
E	B.Sc. (Semester - \	V) (New) (CBCS) Examination: March/April-2024	

**ELECTRONICS (Special Paper - XII) Electronics Communication (19201552)** Day & Date: Saturday, 13-04-2024 Max. Marks: 80 Time: 03:00 PM To 06:00 PM **Instructions:** 1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary. 3) Figures to the right indicate full marks. 4) Use of log table and calculator is allowed. Q.1 A) Choose correct alternatives. 10 is not used in modern telephone. 1) a) Dial tone b) Busy tone c) Pulse tone d) Ring tone 2) The hybrid in telephone hand set is a) Special transformer b) Transistor c) Relay d) MOSFET 3) In TV 4:3 represents \_\_\_\_\_. a) Interlace ratio b) ratio of two diagonal c) aspect ratio d) Field ratio 4) A super heterodyne receiver with IF of 450 KHz is tuned to signal of 1200 KHz, the image frequency is 2100 KHz a) 750 KHz b) c) 1650 KHz 450 KHz d) 5) D layer in ionosphere present largely a) All The day b) During day c) During night d) none 6) Current distribution in half wave dipole antenna is b) Not uniform a) Uniform c) Both d) None 7) To eliminate draw backs of low frequency signal and to radiate them is necessary. a) modulation b) multiplexing c) demultiplexing d) detection 8) Over modulation occurs when a) Em > Ec b) Em < Ec c) Em = Ec d) none 9) The electronic communication that takes place in two way is ... a) multiplex b) simplex d) None of these c) duplex 10) Noise is mostly introduced in \_\_\_\_

a) channelc) receiver

b) transmitter

d) both

	B)	Answer in one sentence.					
	•	1) What is full form of TDM and FDM?					
		2) What is importance of modulation?					
		3) What is the role of ringer in telephone hand set?					
		4) Define aspect ratio.					
		5) List the parameters of antenna.					
		6) Define noise. List its types.					
Q.2	Sol	ve any Eight of the following.	16				
<b>~</b>		What are different layers of ionosphere?	. •				
	b)	What is skip distance? Give its formulae.					
	c)	Why AGC is used in radio receiver?					
	d)	Give composition of blanking pulse period.					
	e)	What is principle of telephone communication?					
	f)	What are the types of electronic communication system?					
	g)	What is local loop?					
		Define PAM and PPM.					
	i)	What are merits and demerits of FM?					
	j)	Define Signal to noise ratio.					
Q.3	A)	Attempt any two of the following.	10				
	-	1) Explain concept of PCM.					
		<ol><li>Explain any five receiver characteristics of Radio receiver.</li></ol>					
		<ol><li>Explain tropospheric wave radio propagation.</li></ol>					
	B)	Explain ratio detector.	06				
Q.4	A)	Attempt any two of the following.	08				
	-	1) The output voltage of transmitter is given by $500(1 + 0.4 \sin 3140t)$					
		$\sin(6.28 \times 10^7)t$ feed to load resistance of 600 $\Omega$ .					
		Find: 1) fc 2) fm 3) Ml 4) Ec					
		Explain basic action of antenna.					
		3) Explain electronic communication system with proper block diagram.					
	B)	Explain composite video signal used in TV transmission.	80				
Q.5	Δtt	ttempt any two of the following.					
۷.0	a)	What is scanning? What are its types? Explain Interlaced scanning.	16				
	b)	What is radio wave propagation? What are its types? Explain space wave					
	,	propagation.					
	c)	What is modulation? What are its types? Explain Amplitude modulation in					
	-	detail.					

Sea No.	t				Set	P		
	B.Sc. (Semester - V) (New) (CBCS) Examination: March/April-2024 Computer Science (Special Paper - XII) Python (19201546)							
•			turday, 13-04-2024 To 06:00 PM		Max. Marks:	80		
Instr	uctio	2)	) All questions are compulsory. ) Draw neat labelled diagrams wl ) Figures to the right indicate full		-			
Q.1	A)	Multi	iple choice questions.			10		
	ŕ	1)	PVM is often called  a) Python compiler  c) Python interpreter	b) d)	Python volatile machine Portable virtual machine			
		2)	Which of the following blocks a	llows y	ou to test the code blocks for			
		,	errors?	•				
			<ul><li>a) except block</li><li>c) finally block</li></ul>	b) d)	try block None of the these			
		3)	Study the following program: class Student:					
			print("Students of Section A	")				
			Student()					
			Student()					
			obj = Student()					
			How many objects are there for	the gi	ven program?			
			a) 4	b)	3			
		4)	c) 2	d)				
		4)	Which of the following statemer  a) mytuple[123] = ("apple", "base")  b) mytuple = ("2" * ("apple", "base")  c) mytuple = ("apple", "banana")  d) None of the these	anana' banana	", "cherry") a", "cherry"))			
		5)	Study the following statements:					
			>>> str1 = "POONAM"					
			>>> str2 = ":"					
			>>> str3 = "YASHASHREE"					
			>>> str1 [-1:]					
			What will be the output of this s	tateme	ent?			

b) M

d) YASHSHREE

a) m c) POONAM

6)	What is the output when following code is executed? >>> names = ['Meera', 'Radha'. 'Saraswati', 'Laxmi']						
	>>> print(names[-3][-3]) a) d b) Daman c) Error d) h						
7)	<ul> <li>In Regex, s stands for?</li> <li>a) Returns a match where the string DOES NOT contain digits</li> <li>b) Returns a match where the string DOES NOT contain a white space character</li> <li>c) Returns a match where the string contains a white space character</li> <li>d) Returns a match if the specified characters are at the end of the string</li> </ul>						
8)	function returns a randomly selected element from a non-empty sequence.  a) random.random() b) random.randint() c) random.choice() d) random()						
9)	The python takes source code as input and returns a code object which can later be executed by exec() function.  a) callable() Function b) bytes() Function c) compile() function d) exec() Function						
10)	What will be the output of below Python code? Employee = {"Name": "Prem", "Age": 23,						
	"salary": 50000, "Company": "GOOGLE"," Address": "Bangalore"} for						
	x in Employee:						
	print(x) a) Name Age salary Company Address b) Prem 23 50000 GOOGLE Bangalore c) Prem 23 50000 GOOGLE d) Name Age salary Company						
	in the blanks.	06					
1)	Python Keywords are special reserved words that convey a special meaning to the						
2)	The Python allows a part of the code to be executed until the given condition returns false.						
3)	A can be written as the collection of comma-separated (,) values enclosed with the small () brackets.						
4)							
5)	The Python is defined as a container that is used to store						
6)	collections of data, for example - list, dict, set, and tuple, etc.  The can be defined as the sequence of characters which are used to search for a pattern in a string.						

B)

Q.2		ve any Eight of the following.  Define String literals.	16
	b)	Define Pass statement.	
	c)	Characteristics of Lists.	
	d)	What is set?	
	e) f)	Explain abs() Function with example.  How to get the current time?	
	g)	Explain the import statement.	
		Explain any four Common Exceptions.	
	i)	Explain Python Multi-Level inheritance.	
	j)	Explain Python pow() Function with example.	
Q.3	A)	Attempt any Two of the following.	10
	,	Explain local and global variable in python with example.	
		2) What is loop? Explain different types of loops used in python.	
		3) Explain math module with example.	
Q.3	B)	Short note/Solve.	
		1) What is inheritance? Explain all types of inheritance.	06
		2) What is difference between tuple and list?	
Q.4	A)	Attempt any Two of the following.	08
	•	1) What is exception? Explain various keywords to handle exception.	
		2) Explain any five methods of Dictionary with suitable example.	
		3) Explain the characteristics of python.	
	B)	Explain following File Handling operations & Access mode in python	80
		with example.  1) Open a file	
		Read or write - Performing operation	
		3) Close the file	
		4) file Access mode	
Q.5	Δttc	empt any Two of the following.	16
۵.0	a)	How to reverse a number in Python. Write a program algorithm with example.	
	b)	What is module? What are the advantages of module? Write a program for	
	_ \	importing multiple modules.	
	c)	Define Regular Expressions. Explain Regex Functions with example.	

Seat No.								Set	P
E		•		- V) (New) (CE se in Testing (Special Pap	and Repai	irs of Ele	ectric Appli		
			nday, 15-0 To 06:00			•	M	lax. Marks	: 80
Instru	ıctio	2) 3)	Draw nea	ions are compuls at labelled diagra to the right indica og table and calcu	ms whereve te full marks	į	y.		
Q.1	A)	Choo 1)	Human b a) a goo b) some c) bad	ct alternatives. body is od conductor of e etimes good conductor of electrical insulator	ductor				10
		2)	<ul><li>a) save</li><li>b) preve</li><li>c) just r</li></ul>	rician wears a rub e electricity ent himself from make fun o away from getti	shock	hile doing	electrical repa	airs to	·
		3)			he ideal valu b) d)	10000 Ω	ng resistance	e used	
		4)				bination w R <sub>1</sub> - R <sub>2</sub>			
		5)	,	•	e most impor b)		g required? / testing	move	
		6)		nce is carrying c . How much will b ì	oe its resistai		0 V potential	drop	
		7)	<ul><li>a) heati</li><li>b) by in</li><li>c) hami</li></ul>	nductive action of	another ma				

	8)	Which of the following equipment do not use Joule's heating effect of electric current for its working?  a) automatic iron b) oven c) water heater d) cabin fan					
	<ul> <li>An electric bulb has</li> <li>a) two terminal and a filament</li> <li>b) multiple terminals and multiple filaments</li> <li>c) single terminal and a filament</li> <li>d) single terminal and multiple filaments</li> </ul>						
	10)	Freon group of refrigerants are  a) inflammable  b) toxic  c) inflammable and toxic  d) non-inflammable and non-toxic					
B)	Give 1) 7 2)	the blanks/ Definition/ One sentence answer/ One word answer/ the name/ Predict the product etc.  100 watt bulb used for 10 hours will consume unit of electricity. wo resistances of 220 Ω resistance each are connected in parallel. calculate their equivalent resistance. he temperature remaining constant, the ratio of voltage across a esistor and current through it remains constant equal to its resistance called law. doorbell uses magnet. Mercury vapor lamp gives off coloured light. Which one of these viz, I Generator ii) Main compressor iii) Cooling fan and v) Heat exchanger, is not a component of a simple air- cooling system?	6				
Sol a) b) c) d) e) f) g) h) i)	What Why is Explain parall Why a What Differ What Why a Menti	s need of Earthing? s fuse wire used in electrical circuits? n how to calculate the equivalent resistance of resistors connected in	6				

**Q.2** 

			<b>SLR-GA-221</b>
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write a note on electrical Insulators.</li> <li>2) Explain repairing steps of ceiling fan.</li> <li>3) With neat diagram explain working of tube light.</li> </ul>	10
	B)	Explain working of mixer.	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Discuss different electrical quantities and their units.</li> <li>2) With neat diagram explain working of table fan.</li> <li>3) Discuss different parts of air cooler.</li> </ul>	08
	B)	Explain use of a resistor in an electric circuit.	08
Q.5	Att a) b) c)	t <b>empt any two of the following.</b> Discuss different safety rules of electricity. With neat diagram explain construction and working of automat Draw neat diagram of hair dryer and explain its principle of worl	

Seat	Set	D
No.	Set	

	D.3	•		ilm Deposition and Ch (Special Paper -	aracte		
				y, 15-04-2024 06:00 PM	, ,	Max. Mark	s: 80
Instr	uctic	2) 3)	Dra Fig	questions are compulsory. aw neat labelled diagrams w lures to the right indicate full e of log table and calculator	marks		
Q.1	A)	Multi 1)	ind a) b)	ustry. Increased thermal resistan Lower electrical conductivi Reduce cost of manufactu	sing thin films in the electronic	10	
		2)	a)	is the sector in which to ar cell efficiency. Healthcare Agriculture	hin film b) d)	play crucial role in enhancing  Automotive  Renewable energy	
		3)	a)	property is crucial for to bow controlled charge flow. Low electrical resistivity High thermal conductivity	b)	used in electronic circuit to Optical transparency Chemical stability	
		4)	inc a)	e Sol-Gel method can be ap luding only metals and alloys metal, ceramics, polymers only ceramics only polymers	•		
		5)	sur a)		articles	rate cavitation bubbles that sadhering to the substrate's	
		6)	thir a) b) c) d)	factor determines the to film in spray pyrolysis. Solar radiations Substrate colour Precursor solution concent Ambient humidity		ss and quality of the deposited	

		7)	A surface with a water contact angle of around 150 deg. or more is considered as				
			b) hydrophilic b) hydrophilic d) superhydrophobic				
		8)	significantly affects the electrical resistivity of the material.  Magnetic susceptibility b) Temperature  Refractive index d) Density				
		9)	type of electron are used to generate images in SEM.  b) Infrared G) Gamma rays d) Backscattered and secondary				
		10)	method is often used for non-conductive substrates as it emoves contaminants without physical contact.  Abrasive scrubbing b) Ultrasonic cleaning  Plasma cleaning d) Chemical etching				
	B)	answ 1) \ 2) \ 3) \ 4) \ 5) \ 6)	the blank/Definition/ One sentence answer/One world r/Give the name/Predict the product etc. nat does SEM stand for in microscopy? ite any ONE example of top-down method. nat unit is commonly used to express electrical resistivity? nat type of solution is commonly used in CBD to deposit thin films? nat is the purpose of substrate cleaning in manufacturing processes? which sector are thin films commonly used for corrosion protection d wear resistance?	16			
Q.2	Att a) b) c) d) e) f) j)	Write any two disadvantages of physical techniques over chemical techniques.  Mention the parameters used in the formation thin films by CBD.  What does the term "lonic" refer to in SILAR method?  How do deposition temperatures generally compare between Sol-gel and Spray pyrolysis method?  What information can X-ray diffraction provide about a material?					
Q.3	A)	1) E 2) E	ot any Two of the following.  plain conductive substrate cleaning process.  plain construction of UV-visible spectrophotometer with labelled gram.  scuss importance of thin film in various sectors.	0			
	B)	and a	ate the electrical resistivity of a copper wire with a length of 10 meters or cross-sectional area of 2 mm <sup>2</sup> . The resistance of the wire is red to be 0.5 ohms.	6			

Q.4	A)	<ol> <li>Attempt any two of the following.</li> <li>Draw the neat diagram of SEM and write the principle of it.</li> <li>The X-ray with a wavelength of 0.154 nm is incident on a crystal lattice. The first order diffraction peak is observed at an angle of 20 deg. Calculate the spacing between the crystal lattice planes.</li> <li>A liquid droplet is placed on a solid surface; contact angle is measured to be 40 deg. Determine the wetting property of the surface.</li> </ol>	30
	B)	Describe the Chemical Bath Deposition (CBD) method, including its principle, working and applications.	08
Q.5	Atte a) b) c)	empt any two of the following.  Describe the spray pyrolysis method with labelled diagram.  Explain bottom-up and top-down approaches of thin films.  Discuss four probe method for electrical resistivity.	16

Seat No.					Set	P
	-	esearch Sub		g Pa	mination: March/April-2024 aper Writing and Publication 9201517)	ıs
-		nday, 15-04-20 To 06:00 PM	24		Max. Marks	: 80
Instru	2) 3)	Draw neat lab Figures to the	are compulsory. elled diagrams who right indicate full notes and calculators	nark	S.	
Q.1 .	A) Multi 1)	ple choice qu Scientific metl a) Objectivit c) Proposition	nod is committed to y	b)	 Ethics Neutrality	10
	2)	Ethical Neutra a) deduction c) observation		b) d)	scientific method experience	
	3)	APA Style, MI famously known a) Citation M c) Abbreviat	wn as Ianuals	b)	ual, Blue Book, OSCOLA are Directories Handbooks	
	4)	a) Question	ne report includes: naires tical derivations	,	 Sample information All of the above	
	5)	The Origin so a) Photo edi c) Report fo	•	b)	software. Table formatting Plotting graph and analysis	
	6)	The fe a) Auto Filte c) Auto Fill		b)	ckly completes a series of data. Auto Complete Auto Sum	
	7)	journal. a) Large vol	ume	b)	to be considered as standard  Free accessibility  Peer review process	
	8)	Scaling the X a) Easy c) Challengi		b)	lotted in Origin software is Difficult Impossible	
	9)	Formulas in E a) / c) –	xcel start with	 b) d)	<i>f</i> =	

		<ul> <li>a) Bibliography is:</li> <li>a) At the end of the study arranged in alphabetical order</li> <li>b) Anywhere in the study</li> <li>c) Beginning of the study</li> <li>d) Not necessary to be included</li> </ul>	
	B)	Fill in the blank/ Definition/One sentence answer/One word answer/Give the name/Predict the product etc.  1) The graph can be copied from Origin and added in the MS word using  2) is the first step of Research process.  3) Population Census is an example of type of research.  4) is a quality of Good Researcher.  5) In MS Excel, the content of the cell is shown in  6) Origin can produce graphs.	<b>06</b>
Q.2	<ul> <li>Solve any Eight of the following.</li> <li>a) What is referencing in the research paper? Where the references are mentioned?</li> <li>b) What is research?</li> <li>c) Name any four types of reports.</li> <li>d) What is Scopus?</li> <li>e) How do you add pictures and formula in the technical report writing?</li> <li>f) What are the advantages of origin over MS Excel?</li> <li>g) Name the chart elements in MS excel.</li> <li>h) Name two software's for plotting graph.</li> <li>i) What is worksheet in MS excel?</li> <li>j) How the table of three rows and two columns are inserted in the resea</li> </ul>		<b>16</b> er?
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain the steps involved in preparing technical report writing.</li> <li>2) A report is prepared using MS-word and excel. Give the steps to add equations, tables, different types of graphs in the report.</li> <li>3) What is literature review? How it can be carried out? Explain.</li> </ul>	10
	B)	What are the contents of the research paper? Briefly explain each one.	06
Q.4	A)	<ol> <li>Attempt any Two of the following.</li> <li>A group of 10 people have health benefits by exercise in gym, skipping, yoga, running, walking, dieting practices every day. They scored points from 1 to 50. Prepare a table using MS excel and prepare a pie chart using the scores mentioned in your excel sheet.</li> <li>Plot the graph using MS-excel for the degree students result analysis in 1st class, 2nd class, Distinction etc. (Consider 12 students in the class)</li> <li>Write Short note on scientific writing. Give few examples using scientific words.</li> </ol>	08
	B)	Write the steps involved in preparing power point presentation of a research paper in a national level conference. In detail explain the preparation of first slide of the presentation.	80

#### Q.5 Attempt any Two of the following.

- a) With an example describe how the power point presentation of ten slides can be prepared for a presentation on a research topic? Specifically, explain how the first and last slide of the presentation should be prepared?
- **b)** What is a research paper? Explain peer review process and publication process for the research paper/article in any journal?
- c) What is a project? Explain in detail the procedure to prepare project report.

16

				<u> </u>	
Seat No.				Set	P
B.S	c. (Se	mester - V) (New) (CBCS) Medical Physics (Special		ination- March/April-2024 - XI) (19201518)	
•		nday, 15-04-2024 To 06:00 PM		Max. Marks	: 80
Instructi	2)	Q. 1 and Q. 2 are compulsory. Attempt any three questions from Figures to the right indicate full		to Q. 7.	
Q.1 A)	Choo 1)	ose correct alternatives.  Which two number form the bin  a) 0 and 2  c) 0 and 1	nary num b) d)	nber system? 1 and 2 1 and 3	10
	2)	What properties of sound wave a) Reflection and Refraction c) Refraction only		e the principle of ultrasound? Reflection only Propagation	
	3)	In how many generations a cola, 3 c) 5	mputer c b) d)	an be classified? 4 6	
	4)	<ul><li>What is the difference between</li><li>a) Velocity</li><li>c) Frequency</li></ul>	n soft and b) d)	d hard X-rays? Intensity Polarization	
	5)	In a normal X-Ray machine, X-a) Bombardment of cathode b) Nuclear fission c) Nuclear fusion d) Super heating of an elem	rays on	·	
	6)	When an abdominal ultrasound full bladder?  a) To have a good acoustic b) To increase the water cord c) To lower impedance d) To allow for better propagation.	window ntent		
	7)	<ul> <li>Which of the following number</li> <li>a) Binary Number System</li> <li>b) Hexadecimal Number System</li> <li>c) Octal Number System</li> <li>d) Decimal Number System</li> </ul>	-	is known as bas-10 system?	
	8)	For which of these areas can t not for an adult?  a) Cranium c) Arms	he ultras b) d)	ound be taken for an infant but Chest Legs	

		9)	a) Light Absorbent and Stimulated Emission of Radiations b) Light Absorbing Solar Energy Resource c) Light Amplification of Stimulated Emission of Radiations d) Light Amplification of Singular Emission of Radiations	
		10)	Dental X-Ray is also known as  a) Orthopedics b) Orthopentology  c) Orthology d) Orthopantomography	
	B)	Gi۱	in the blanks/ Definition/ One sentence answer/ One-word answer/ we the name/ predict the product/ Write true/ false.	06
		1)	Optic fibers are used in endoscopy.  a) True b) False	
		2)	Laser energy is used to break up kidney or gallstones in process called?	
		3)	T <sub>1</sub> increase with magnetic field.	
		4)	• • • • • • • • • • • • • • • • • • • •	
		5)	Flame emission detector is a type of radiation detector.  a) True b) False	
		6)	What does MRI Stand for?	
Q.2	a)	Des Wha Wha	the following. Incribe ultrasonic waves from piezoelectric materials. Incribe ultrasonic waves from piezoelectric materials. Incribe types of optical radiation? Explain any one of them. Incrite the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Explain any one of them. Increase the types of optical radiation? Increase the type of type of the type of type	16
Q.3	a)	Exp	the following.  lain the application of Laser in medical field.  lain the term electromagnetic wave and Doppler Shift.	16
Q.4	a)	Writ	the following. te short notes on contact CT Scan. lain the five types of lumineense.	16
Q.5	a)	Des	the following.  cribe about GM tube and its working with the help of diagram.  se short note on CPU.	16
Q.6	a)	Wha	the following.  at do you mean by medical diagnostic and therapeutic radiation?  at are the advantages of PET and X-Ray?	16
Q.7		Des	the following.  cribe sonography and its working.  cribe the x-ray tube and its working with the help of diagram.	16

Seat No.						Set	P
E	•			-	ination: March// er - XI) (1920151	-	
•		nday, 15-04-20 To 06:00 PM	)24			Max. Marks	: 80
Instrud	2) 3)	Draw neat la Figures to rig	are compulsory belled diagrams ht indicate full r ble and calculat	wherever marks.	•		
Q.1 A	•	<ul><li>a) combust</li><li>b) fission o</li><li>c) fusion of</li></ul>	uestions.  Tree gy is derived by ion of atoms of the fatoms of U 235 atoms of U 235 both ing of U 235	U 235 5 5			10
	2)	Which of the dioxide? a) Oil c) Coal	following energ	b)	does not produce ca Uranium Natural gas	rbon	
	3)	a) solar en		b)	ated groundwater? geothermal energy nuclear energy		
	4)	Ozone layer a) lonospho c) Thermos		b)	Stratosphere Troposphere		
	5)	Which of the a) solar c) hydroele	_	b)	le energy resource? methane coal	•	
	6)	This is an ex a) tidal c) solar	ample of non-po	olluting rend b) d)	ewable type of energ wind All of these	gy.	
	7)	a) Heat end	t inside the eart ergy mal energy	h is known b) d)	as Kinetic energy Thermal energy		
	8)	Renewable s a) Petroleu c) Nuclear		b) d)	 Coal Trees		
	9)	Which type o	of wind machine	s are used	at several residence	e or local	

b) Remote machinesd) Medium size machines

a) Large size machinesc) Small size machines

		<ul> <li>What does OTEC stand for?</li> <li>a) Ocean thermal energy cultivation</li> <li>b) Ocean thermal energy conversion</li> <li>c) Ocean techno energy conservation</li> <li>d) Ocean thermal energy consumption</li> </ul>	
	B)	<ul> <li>Fill in the blank.</li> <li>1) Natural gas, oil and are nonrenewable energy resources.</li> <li>2) Soil conservation is the process where is protected against loss.</li> <li>3) The major constituent of biogas is, CO<sub>2</sub> and some traces of gases such as H<sub>2</sub>S and ammonia.</li> <li>4) How many forms of fossil fuels are there</li> <li>5) type of resource is iron ore.</li> <li>6) resource is a finite resource.</li> </ul>	06
Q.2	a) b) c) d) e) f) g) h)	Define solar energy. How is it utilised? Hydropower is a renewable source of energy. Justify. What are the advantages of nuclear energy? Write two advantages of using a solar cooker? What is Geothermal Energy? Define OTE (ocean thermal energy). Mention any two reasons, why wood is not preferred as fuel? Give any two examples of renewable energy resources. Define Solar Constant. Define fill factor and efficiency of solar cell.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Give difference between Renewable and Non-Renewable Sources.</li> <li>2) What is biogas? How can biogas be obtained?</li> <li>3) Write any five characteristics of good source of energy.</li> </ul>	10
	B)	Write short note on geothermal energy.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write any four disadvantages of fossil fuels.</li> <li>2) What are the limitations of energy derived from oceans?</li> <li>3) What is the difference between tide and wave? And what are the limitations of extracting energy from tides and waves?</li> </ul>	80
	B)	Describe construction and working of solar cooker with neat labeled diagram.	80
Q.5	a)	empt any Two of the following.  What is photovoltaic cell? Explain the principle and characteristics of the solar photovoltaic cell.  Briefly describe solar, wind and biomass energy.	16
	c)	Draw the line diagram and explain the working of hybrid OTEC cycle and list out the major problems associated OTEC.	

Seat No.			Set	P
I	3.Sc	). (S	Semester - V) (New) (CBCS) Examination: March/April-2024 Geoinformatics (Special Paper - XI) (19201538)	
_			Max. Marks: M To 06:00 PM	40
Instru	ıctio		<ol> <li>All questions are compulsory.</li> <li>Figures to the right indicate full marks.</li> </ol>	
Q.1	A)	1)	A trend of fault line can be represented by in GIS structural mappin  a) point b) line c) polygon d) none of these	<b>05</b> g.
		2)	Sand along river bank show tone in the aerial photograph.  a) black b) light c) moderate d) bright	
		3)	In the high oblique aerial photographs, tilt angle of the axis is a) $20^0$ - $30^0$ b) $30^0$ - $40^0$ c) $40^0$ - $60^0$ d) $60^0$ - $90^0$	
		4)	In visible region, the blue light is having a wave length range of  a) 0.42-0.52 µm b) 0.42-0.92 µm  c) 0.22-0.32 µm d) None of the above	
		5)	A pocket stereoscope is used to view  a) digital satellite data b) microscopic minerals c) fine grained minerals in the field. d) hard copy of aerial data	
	B)	<b>An</b> 1) 2) 3)	swer the following questions in one sentence.  On what basis aerial photographs are classified as vertical and oblique?  Name the study of the characters / interpretation of the geological features on earth surface using the aerial photographs.  What is the scale of large-scale aerial photographs?	03
Q.2	Ans a) b) c) d) e)	Wh Na Ide Wh	rany four of the following. That is the term used for surveying and mapping using aerial photographs. The two infrared (IR) bands in LANDSAT? That is the structure when beds dipping away from a common linear axis. That is mosaic? That is the colour of water bodies in IR colour image?	08
Q.3	A)		tempt any One of the following.  What is Atmospheric window?  Describe various error in flying.	05
	B)	Exp	olain any temporal and spatial resolution of digital imagery.	03

#### Q.4 Attempt any two of the following.

80

- a) Explain in detail overlap? What are their types? Why overlap is required?
- **b)** Describe various platforms of remote sensing.
- c) What is spectral reflectance curve?

#### Q.5 Attempt any One of the following.

08

- a) Describe any four drainage patterns & their significances.
- **b)** Describe any three uses of aerial photographs in Geology.
- c) Describe tone and texture with examples and uses in identification of features.

Seat No.						Set	P
E	3.Sc	:. (Se		V) (New) (CBCS) IUX (Special Pape		nination: March/April-2024 l) (19201547)	
			nday, 15-04 To 06:00 F			Max. Marks:	80
Instru	ıctio	2)	Draw neat	ns are compulsory. labelled diagrams wh the right indicate full r		•	
Q.1	A)		-	questions.			10
		1)	a) XFCe c) KDE	a Linux desktop envir	onme b) d)	nt. Gnome All of these	
		2)	The stater in z? a) 0 c) 2	ment z='expr 5/2' wou	d store b) d)	e which of the following values  1 2.5	
		3)	In the comis an exist a) overwb) move c) move as 'tar	ing directory, the result rite 'target' directory v 'source' directory to b	get', if It will I vith 'so se a su se on s	ource' directory  Ibdirectory of 'target' directory  same level in the directory tree	
		4)	process? a) nice b) chpric c) renice	ority		I to change priority of the	
		5)	a) /etc/a <sub>l</sub>	he following is the ma pache.conf ttpd/conf/httpd.conf	in Apa b) d)	ache configuration file? /etc/httpd/config /etc/srm.conf	
		6)		cd/, where am I no e/linux		//Downloads/abc. After /home/linux/Downloads None of these	
		7)	Which corhost? a) netstac) routet	ıt .	ne rou b) d)	te packets trace to a network route none of these	
		8)	without ex	ommand is used to se	,	content of tar (backup.tar) file tar -svf backup.tar None of these	

		9) The information present in the Inode consists of a) owner and group owner of the file b) Number of links to the file c) Number of characters in a file d) All of these	
		<ul> <li>10) What does mean by octal permission 641?</li> <li>a) Owner can read and write; group can write; other can read</li> <li>b) Owner can read and write; group can read; other can execute</li> <li>c) Owner can read and write; group can write and execute; other can read</li> <li>d) Owner can read, write and execute; group can read and write; other can read</li> </ul>	
	B)	Fill in the blanks.  1) system variable is used to return status of last command.  2) character used to redirect the input.  3) command to put a job back in the foreground.  4) "*" Wild character is used for matching character.  5) In Vi editor, option is used move to the end of a line.  6) file responsible for storing basic information about user like UID, GUI, login shell etc.?	06
Q.2	Solva)  a) b) c) d) e) f) g) h) i)	What is hard links? How do you terminate an ongoing process? What is the purpose of groups? What are the types of shell? List the functions of kernel. Define Data Block. How to partition the drives? How will you forcibly remove a file? Differentiate between Home and Root Directory. List out the communication commands.	16
Q.3	A)	Attempt any two of the following:  1) What are use of echo and read statement? Explain.  2) Explain different boot loaders.  3) How to translate characters? Explain command in details.	10
	B)	<ul> <li>Write a menu driven shell Script.</li> <li>1) To change the ownership of a "Student.txt" file</li> <li>2) To add data at end of a "Student.txt" file</li> <li>3) To kill a process of process id is 975</li> <li>4) List all files and directory in reverse order from current directory</li> </ul>	06
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Explain Security Enhanced Linux.</li> <li>2) What is shell Script? Explain Conditional Statements in shell programs.</li> <li>3) Write a shell script to count number of lines present in a text file.</li> </ul>	80
	B)	How to search a file and directory? What are the selection criteria's used for locating files in Linux.	80

16

- Q.5 Attempt any two of the following.a) Define vi Editor and explain its modes.
  - What is grep? How it is useful? b)
  - c) What is ftp? How files can be transferred between two systems? Explain.

No.							Set	Ρ
В	3.Sc. (Se		, , , , ,	•		nination: March/A XI) (19201533)	pril-2024	
•		nday, 15-04- To 06:00 PN					Max. Marks	: 80
nstru	2	) Draw neat I ) Figures to r	s are compul abelled diagr ight indicate t ables and cal	ams wher full marks.		er necessary. owed.		
Q.1 <i>i</i>	<b>A) Cho</b> 1)		**	common i	)	ltiple. LCM () RTLCM ()		10
	2)	Which of the a) Address c) Name		b	ce ) I)	ll in Excel? Formula Label		
	3)	Which tern a) Filter c) Pivot	n is used to jo	b	ect ) I)	ed cells in one cell? Wrap Merge		
	4)	A formula i a) Equal c) Comr	•		)	_		
	5)	The result a) Logic c) Algori	al	b		RUE or FALSE. Arithmetic Logarithm		
	6)	Press a) Shift · c) Shift ·		b	ox. )  )	Shift + F4 None of these		
	7)	Workbook a) Work c) Butto		n ofb		Page set-up Diagrams		
	8)	a) Cell c) Colun	ne intersection nn	b	wit ) I)	th a column. Row All of these		
	9)		ress F	b	dia () ()	alog box, with the Find Tab + F ctrl + F	tab	
	10)	a) Form	ab you will fin atting tab lard tab	d AutoSur b d	)	outton. Formulas tab Clipboard tab		

	B)	FIII IN the blanks.	06
		<ol> <li>Press to save the active file with its current file name, location, and file format.</li> </ol>	
		2) are equations that perform calculations on values in your	
		worksheet.	
		function is used to add the values in the function argument.	
		<ul> <li>4) Press to undo in MS-EXCEL.</li> <li>5) of the worksheet appears vertically and are identified by letters</li> </ul>	
		at the top of the worksheet window.	
		6) Press to select all rows and columns in the worksheet.	
Q.2	Solv	ve any Eight of the following:	16
	a)	Write different charts in MS-Excel.	
	b)	Explain what is a spreadsheet?	
	c)	Which function is used to generate random numbers?	
	d)	Write the function for calculating p. m. f. of binomial distribution with n=10 and p=0.8.	
	e)	Which function is used to calculate mean of numbers?	
	f)	Which function is used to calculate sum of numbers?	
	g)	Which function is used to find maximum of numbers?	
	h)	Write the name of file formats that are used to save a MS-EXCEL file.	
	i) j)	How can you add cells, rows or columns in Excel? What is the use of the IF function in Excel?	
Q.3	<b>A</b> )	Attempt any Two of the following:	10
Q.J	Α)	Explain MS Excel in brief.	10
		2) How do you find averages in MS- excel?	
		3) How will you write the formula for the following?	
		- Multiply the value in cell A1 by 20, add 10 in the result, and divide it by 4.	
	B)	What is the difference between formulas and functions in Excel?	06
Q.4	A)	Attempt any Two of the following:	80
		1) What is the order of operations used when evaluating formulas in Excel?	
		2) How do you create Pivot Tables?	
		3) How can you draw a 20 random numbers from 0 to 1?	
	B)	Explain different charts in MS-Excel.	80
Q.5	Atte	, ,	16
	a)	Explain the SUM and SUMIF functions with examples.	
	b)	What are the different types of COUNTIF functions in Excel?	
	c)	Explain RAND and RANDBETWEEN functions with examples.	

Seat	Sat D	
No.	Set P	_

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024

		`		NGĹľSH (Cóm / Mindscapes	•	• ,	
•			esday, 16-04-2024 I To 05:00 PM				Max. Marks: 40
Instr	uctio		) All questions are 2) Figure to the righ		rks		
Q.1	Ch( 1)	a)	the correct option _ was left by Rober Money Note	t's wife in the sto	ory b)		08
	2)	a)	onov was imprisone 27 years 28 years	1	b)	n the story 'God Sees T 26 years 23 years	ruth but Waits'.
	3)	,	children wave lis 03 06		ory b) d)	narrated by mother in th 05 08	ne poem 'Sita'.
	4)	a)	_ is the painter of tl Aphra Pandolf Aphra Behn	· 1		ait in the poem 'My Last Fra Pangol Fra Pandolf	Dutchess'
	5)	a)	peat in the poem 'O dooms of mighty o grand palaces	lead l	b)	s to the grandeur of tombs of our ancestors grand towers	
	6)	a)	_ is not a dream sa Hallucination Illusions	1		e in the poem 'Life'. Life Nightmares	
	7)	adve a)			b)	(afterward / after) (Choo after an after	se correct
	8)	He sa a) b) c) d)	aid to her, "What a He told her that it He exclaimed that He exclaimed sorr He claimed that it	was a ȟot day. it was a hot day owfully that it wa	as a		

Q.2	Write answers in short. (Any Four)	12
	<ul><li>a) Why did Robert Quick felt sad after returning from the business trip?</li><li>b) What are the things of beauty mentioned in the poem 'Ode to beauty'?</li></ul>	
	<ul><li>c) How does Charlotte Bronte describe the life in the poem 'Life'?</li><li>d) Describe the personality &amp; the Dutchess in the poem 'My Last Dutchess'?</li></ul>	
	<ul><li>e) Which town does Aksionov belong to and to which fair did he visit to?</li><li>f) What happened to the children after listening to the story Sita narrated by their mother?</li></ul>	
Q.3	<ul><li>Answer any one of the following questions.</li><li>a) How can technology literacy skills help learners in the future?</li><li>b) What are the best characteristics of a good Leader.</li></ul>	10
Q.4	Mention eight habits which show that you are conscious of the environment and understand the need to conserve it.	10

	SLR-GA-2	30
Seat No.	Set	P
В	B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 PHYSICS (Paper - XIV) Electrodynamics (19201619)	
,	Date: Thursday, 18-04-2024 Max. Marks: 03:00 PM To 06:00 PM	: 80
Instru	ctions: 1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary. 3) Figures to the right indicate full marks 4) Use of log tables and calculator is allowed.	
Q.1 /	<ul> <li>A) Choose correct alternatives from the options.</li> <li>1) The trajectory of a particle in mutually perpendicular crossed electric and magnetic field is</li> <li>a) straight line parallel to \( \vec{E} \) b) parabola</li> </ul>	10

d) cycloid

b)  $\vec{E} = \frac{1}{\nabla \Phi}$ 

d)  $\vec{E} = \Phi$ 

b) opposes

 $\epsilon_0 \vec{E}$ 

d) decreases

 $(\epsilon_0 \vec{E} + 2\vec{P})$ 

 $376.6\Omega$ 

 $3776\Omega$ 

b)  $\vec{G} = u \in \vec{N}$ 

d)  $\vec{G} = \vec{N} \in /u$ 

b) discontinuous

d) always continuous

Electric field intensity  $\vec{E}$  in terms of scalar potential  $\emptyset$  is given by \_\_\_\_\_.

According to Lenz's law, the induced e.m.f. \_\_\_\_\_ the rate of change

b)

d)

d)

In electromagnetic wave, the phase difference between electric and

Momentum density  $(\vec{G})$  and Poynting's vector  $(\vec{N})$  are related to each other in a medium characterized by  $\mu$  and  $\epsilon$  as

If there are free charges on the interface of two dielectrics then normal

component of electric displacement vector at the interface is ...

magnetic field vectors  $\bar{E}$  and  $\bar{B}$  in vacuum is

The electric displacement vector in dielectric medium is \_\_\_\_\_.

c) circle

a)  $\vec{E} = -\nabla \Phi$ 

of magnetic flux

c) increases

a)  $(\epsilon_0 \vec{E} - \vec{P})$ 

c)  $(\epsilon_0 \vec{E} + \vec{P})$ 

a)  $0\Omega$ 

a) 0

c)

c)  $37.66\Omega$ 

a)  $\vec{G} = \vec{N}/\mu\epsilon$ c)  $\vec{G} = \sqrt{\mu \epsilon} \vec{N}$ 

a) continuous

c) zero

a) does not opposes

The wave impedance of free space is \_

c)  $\vec{E} = \nabla \Phi$ 

2)

3)

4)

5)

6)

7)

8)

		9) An oscillating charge a) radiates b) does not radiate c) may or may not radiate d) nothing can be said	
		<ul> <li>The intensity of radiation along the axis of electric dipole is proportional to</li> <li>a) Zero</li> <li>b) infinity</li> <li>c) finite value depending distance</li> <li>d) finite value independent of distance</li> </ul>	
	B)	<ul> <li>Fill in the blanks.</li> <li>1) Poisson's equation is</li> <li>2) Self-inductance and mutual inductance are measured in</li> <li>3) Mathematical formulations of empirical laws in electricity and magnetism are known as</li> <li>4) The nature of electromagnetic waves is</li> <li>5) If there are no free charges on the boundary of two dielectrics, then normal component of electric displacement vector at the boundary is</li> <li>6) charge cannot radiate.</li> </ul>	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	wer any Eight of the following: State Gauss's law in electrostatics. What is electromagnetic induction? Define Electromotive force (e.m.f.). State the principle of transformer. State Faraday's law. State Biot-Savart's law Determine the electrostatic force between the two charges of magnitude $3 \text{ C}$ and $1 \text{ C}$ separated by a distance $1 \text{ m}$ in air. [Given $K = 9 \times 10^9 \text{ Nm}^2/\text{C}^2$ ] What do you mean by wave impedance? What is self inductance? What is retardation time?	16
Q.3	A)	<ol> <li>Attempt any two of the following:</li> <li>Obtain integral and differential form of Faraday's law.</li> <li>Show that T + R = 1 and find the value of reflection and transmission coefficients for normal incidence at the glass- air interface If refractive indices of glass and air are respectively 1.5 and 1.</li> <li>Derive equation of continuity.</li> </ol>	10
	B)	Write a note on total internal reflection.	06
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) What is mutual inductance and explain its application to transformers.</li> <li>2) Obtain an expression for total power radiated by an electric dipole.</li> <li>3) Obtain the boundary conditions for electromagnetic field vectors (D, E) at the interface of two media.</li> </ul>	80
	B)	State and prove Ampere's circuital law and obtain differential form of Ampere's circuital law.	80

#### Q.5 Attempt any two of the following.

- Show that a charged particle moves along a circular path with a constant speed in a uniform magnetic field  $(\vec{B})$ .
- **b)** Establish the law of conservation of energy for electromagnetic field and explain the meaning of Poynting's vector.
- c) What is radiation reaction? Deduce an expression for radiation reaction force for an electric dipole.

16

							SL	R-GA-2	<b>3</b> 1
Seat No.								Set	P
В	S.Sc.	. (Sei	CH	, , , , ,	′ (Specia	I P	mination: March/ <i>A</i> aper - XIII) 9201610)	April-2024	
Time:	03:00	0 PM ( ns: 1) 2) 3)	rsday, 18-04 To 06:00 PM All question Draw neat I Figures to t	- 4-2024 И s are compu	ilsory. rams whei cate full ma	reve arks	er necessary.	Max. Marks:	. 80
Q.1 ,	<b>A</b> )	1)	The compl a) stean c) simpl	n distillation e distillation	le solution I	can o) d)	be separated by evaporation fractional distillation		10
		2)	For vibration $\Delta v = 0$	<u>±</u> 1	ŀ	o)	he selection rule is $\Delta v = 0, \pm 1$ $\Delta v = \pm 1, \pm 2, \pm 3,$	·	
		3)		expression for the reactio	n is	tion · o) d)	is $dx/dt = kA^{1/2} B^{3/2}$ 1 3	<sup>2</sup> , then the	
		4)	The unit of a) s <sup>-1</sup> dn c) s <sup>-1</sup> dn		rd order re I	acti o) d)	on is $s^{-1}dm^{3}mol^{-2}$ $s^{-1}dm^{-3}mol^{-1}$		
		5)	The select a) $\Delta J = \frac{1}{2}$ c) $\Delta J = 0$	<u>+</u> 1	l	၁)	transitions is $\Delta J = 0, \pm 1$ $\Delta J = 0, \pm 1, \pm 2$		
		6)	At equilibri a) positi c) zero	um, $\Delta G$ and ve	l	 o) d)	negative all of these		
		7)	For third of $a$ ) $3/2a^2$			ime ၁)	$t_{1/2} = $ 0.693/ $k$		

10)	The relationship which describ	oes variation of vapour pressure with
	temperature is expressed by _	equation.
	a) Kirchoff's	b) Van't Hoff's isochore

d)

The composition of phenol in phenol-water system at CST is \_\_\_\_\_.

b)

d)

b)

d)

Which of the following reaction belongs to complex reactions?

0

50%

100%

all of these

consecutive reactions

c) 1/ak

a) 10%

c) 34%

a) parallel reactions

c) reversible reactions

8)

9)

)	Kirchott's	b)	van't Hott's Isochol
	Cibbs Halmhaltz	٩/	Clausius Clanevror

d) Clausius-Clapeyron c) Gibbs-Helmholtz

D)	Give the name/Predict the product.	Ub
	1) What is Rayleigh line in Raman spectrum?	
	,	
	<b>,</b>	
	,	
	o) white Armenius equation.	
		16
a)	•	
	·	
-		
•		
-		
1)		
a)		
	·	
•		
	order reaction.	
A)	Attempt any two of the following:	10
,	• •	
	2) Explain diagrammatically various vibrational overtone transitions.	
	3) Derive the expression for rate constant of a third order reaction with	
	equal initial concentrations of the reactants.	
B)	Short note/Solve.	06
•	The rotational spectrum of <sup>1</sup> H <sup>35</sup> Cl molecules shows that the rotational lines	
	are equally separated by $20.70~\mathrm{cm^{-1}}$ . Calculate the internuclear bond	
	length. (Atomic masses are ${}^{1}\text{H} = 1.67 \times 10^{-27} \text{Kg}$ ${}^{35}\text{Cl} = 5.88 \times 10^{-26} \text{Kg}$ )	
A)	Attempt any two of the following:	08
7 1,		•
	for rate constant k at the temperature indicated	
	At 600 K; $k = 2.75 \times 10^{-8} L \text{ mol}^{-1} \text{ s}^{-1}$	
	At 800 K; $k = 1.95 \times 10^{-7} L \text{ mol}^{-1} \text{ s}^{-1}$	
	2) Diagrammatically explain vapor pressure composition and boiling point	
	composition curves of completely miscible binary solutions.	
	3) Derive the expression for rotational energy of a diatomic molecule.	
B)	Describe/Explain/Solve.	08
•	Derive thermodynamically the law of mass action.	
Δtta	empt any two of the following	16
		. •
,	·	
b)	Derive an expression for Van't Hoff's isotherm.	
c)	What is polarizability? Give classical and quantum mechanical approach of	
	Raman spectra.	
	Sol <sup>1</sup> a) b) c) d) e) f) g) h) i) j) A) B) Atte	Give the name/Predict the product.  1) What is Rayleigh line in Raman spectrum?  2) The force constant 'k' is expressed as  3) Define 'molality'.  4) At what condition ΔA = ΔG?  5) Write the mathematical expression for Helmholtz free energy.  6) Write Arrhenius equation.  Solve any eight of the following:  a) Mention different steps involved in a chain reaction.  b) Give the expression for Gibbs- Helmholtz equation.  State Raoult's law.  d) What is fractional distillation?  e) Calculate the frequency of a radiation having wavelength 3800 Å.  f) Estimate the reduced mass of CO molecule (m <sub>C</sub> = 12 amu and m <sub>O</sub> = 15.995 amu)  g) What is hot band?  h) Give the half life time expression for third order reaction.  i) What are stokes and anti-stokes lines?  j) Give an example for opposing reaction in which first order opposed by first order reaction.  A) Attempt any two of the following:  1) What is Gibbs' free energy? Give physical significance of it.  2) Explain diagrammatically various vibrational overtone transitions.  3) Derive the expression for rate constant of a third order reaction with equal initial concentrations of the reactants.  B) Short note/Solve.  The rotational spectrum of ¹H³⁵CI molecules shows that the rotational lines are equally separated by 20.70 cm⁻¹. Calculate the internuclear bond length. (Atomic masses are ¹H = 1.67 × 10⁻²² Kg ³⁵Cl = 5.88 × 10⁻²⁶ Kg)  A) Attempt any two of the following:  1) Determine the value of energy of activation. Given the following values for rate constant k at the temperature indicated At 600 K; k = 2.75 × 10⁻³ℓ. mol⁻¹ s⁻¹  At 800 K; k = 1.95 × 10⁻²¹ mol⁻¹ s⁻¹  2) Diagrammatically explain vapor pressure composition and boiling point composition curves of completely miscible binary solutions.  3) Derive the expression for rotational energy of a diatomic molecule.  B) Describe/Explain/Solve.  Derive hermodynamically the law of mass action.

Seat	Sat	D
No.	Set	L

	B.SC	. (Sei	mesi	ter - VI) (New) (CBCS) BOTANY (Special Plant Pathology	Pa	•
				v, 18-04-2024 5:00 PM	•	, Max. Marks: 80
Insti	uctio	-	-	uestions are compulsory. es to the right indicate full m	arks	
Q.1	A)	<b>Cho</b> (1)	Dan a)	correct alternatives from the pring-off disease is caused Aspergillus Bacillus	by _	
		2)	a)	rot of sugarcane is caused  Phytopthora infestans  Cercospora personata	b)	
		3)	a)	ses enter the plant cells thro Osmosis Diffusion		Pinocytosis
		4)	and a)	nt disease which affects the minerals is  Root rot Soft rot		orption and accumulation of water  Wilts  Damping off
		5)	a)	toplasma in plant cells are t Xylem vessels Cambium tissue	b)	located through Phloem sieve tube Plasmodesmata connections
		6)	a)	y blight of potato is caused Alternaria alternata <i>Alternaria solani</i>	b)	 Alternaria helianthin Alternaria tenuis
		7)	a)	of Piegon pea is caused by Sclerotium rolfsii Fusarium udum	b)	 Rhizoctonia solani Fusarium oxysporum
		8)	Whi a) c)	ch of the given diseases is ı Tikka Leaf rust	b)	ed to Wheat? Downy mildew Late blight
		9)	Mos a) c)	st fungal diseases spread oเ Dry & Cold weather Dry & Hot weather	b) ¯	Wet & Cold weather Wet & Hot weather
		10)	a)	te rust of crucifers causes th Local type Local and systemic type	b)	Systemic type

	в)	1) Tikka disease is caused by  2) Sulfur based fungicides are used for type of disease.  3) An organisms that is capable of living only as a parasite obligate parasite.  4) The ability of a pathogen to cause plants disease is  5) Little leaf of brinjal is caused by  6) The mode of nutrition in fungi is	06
Q.2	Solv a) b) c) d) e) f) g) h)	re any Eight of the following: What is host range? What are seed borne pathogens? What are symptoms of grain smut of Jowar? What is sterilization? Give any two differences between rust and smut disease? What is difference between primary host and secondary host? What is seed certification? What is plant pathogen? What are facultative parasites? What is infection?	16
Q.3	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Describe the causal organism and symptoms of Oily spot of pomegranate.</li> <li>2) Describe the causal organism and control measures of Downy mildew of grapes.</li> <li>3) Describe the seed treatment methods</li> </ul>	10
	B)	Describe the scope and importance of Aerobiology.	06
Q.4	A)	<ol> <li>Attempt any two of the following:         <ol> <li>Describe classification of plant diseases based on symptoms.</li> <li>Describe symptoms, causal organism and control measures of white rust of mustard.</li> </ol> </li> <li>Describe the causal organism, symptoms and control measures of Red rot of sugarcane.</li> </ol>	<b>08</b>
	B)	Describe causal organism, symptoms and control measures of Little leaf of brinjal.	80
Q.5	Atte a) b)	mpt any two of the following.  Classify the plant diseases based on severity of infection and spread of disease.  Describe the causal organism symptoms and control measures late blight of	16
	c)	potato.  Describe the causal organism, symptoms and control measures of tomato mosaic disease.	

Seat No.	Set	Р
•	•	

	B.SC	. (Sei	mester - VI) (New) (CBCS) ZOOLOGY (Speci		mination: March/Aprii-2024 aper - XIII)	
		Anin	nal Physiology: Life Susta		•	
•			rsday, 18-04-2024 To 06:00 PM		Max. Marks	: 80
			All questions are compulsory.			
		2)	Draw neat labelled diagrams where to the right indicate full		<del>_</del>	
Q.1	A)	<b>Cho</b> (1)	ose the correct alternative from The normal diastolic blood pressis		e options. in a normal healthy adult human	10
			a) 80 mm Hg c) 90 mm Hg	•	60 mm Hg 110 mm Hg	
		2)	helps in blood clotting.  a) Fibrin c) Vitamin K	b) d)	Prothrombin Albumin	
		3)	is defined as gaseous e environment. a) Digestion c) Excretion		nge between the organism and Circulation Respiration	
		4)	The breakdown of complex foc a) Digestion c) Circulation	b)	simpler form is called Respiration Excretion	
		5)	The animals excreting uric acid a) Ureotelic c) Hydrotelic	b)	called Uricotelic Amonotelic	
		6)	a) A c) O	b)	ersal donar. B AB	
		7)	HCL is produced in part a) Stomach c) Liver	b)	ody Brain Lung	
		8)	is the functional unit of tage a) Hilum c) Neurons	b)	dney. Nephron Medulla	
		9)	The rhythmic contraction and r a) Heart valve c) Heart attack	b)	tion of heart is known as Heart beat Heart burn	
		10)	Major stress hormone is a) Adrenaline	b)	glucagon	

	B)	Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc.	06
		1) is used to measure Blood pressure.	
		2) Define: Excretion.	
		3) What is gastric digestion?	
		4) Name the pigment present in blood.	
		<ul><li>5) Name the Instrument used to treat the patients with acute renal failure.</li><li>6) What is the end product of protein digestion.</li></ul>	
Q.2	Sol	ve any Eight of the following:	16
	a)	What is Peristalsis?	
	b)	What is Tidal Volume?	
	c)	What are enzymes? Name any 2 gastric enzymes.	
	d)	What is micturation?	
	e)	Name the hormones which regulate kidney functions.	
	f)	Name 2 bile salts.	
	g)	Give the different types WBC in blood.	
	h)	Write the function of liver.	
	i)	What is Tachycardia?	
	j)	Name 2 hormones of pancreas.	
Q.3	A)	Attempt any two of the following:	10
		Describe origin and conduction of heart beat.	
		2) Mechanical digestion of food	
		3) Structure of Nephron	
	B)	Short note/Solve.	06
	,	Describe functions of blood.	
Q.4	A)	Attempt any two of the following:	08
		Describe cardiac cycle.	
		2) Bhor's effect	
		3) Functions of pancreas	
	B)	Describe/Explain/Solve	80
		Explain Yoga and stress.	
Q.5	Atte	empt any two of the following.	16
	a)	Describe the process of blood clotting.	
	b)	Explain the process of transport of carbon dioxide in blood.	
	c)	Describe the process of urine formation.	

Seat	Sat	D
No.	Set	

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 MATHEMATICS (Special Paper - XIII) Metric Spaces (19201635)

				wetric Spaces	(19₄	(01635)		
•			•	/, 18-04-2024 6:00 PM		Max. Marks	: 80	
Instru	ctior	,		uestions are compulsory. res to the right indicate full ı	mark	s		
Q.1 /	A)	<b>Choo</b> 1)	Choose correct alternatives for each of the following.  1) The set {0,1} in <i>R</i> with usual metric is  a) compact b) open					
			,	closed	•	connected		
		2)	a)	, $Q$ is dense complete	•	compact connected		
		3)	a)	discrete metric space $R, B$ (0) {2}	b)	is <i>R</i> (-2,2)		
		4)	a)	f: R → R be a continuous m an open set Both (a) and (b)	b)	a closed set		
		5)	$\lim_{x\to 0}$ a) c)		,	−1 Dose not exist		
		6)	If <i>f f</i> is	is non-increasing on <i>J</i> then on <i>J</i> .	f is	strictly increasing on $J$ if and only if		
			a) c)	onto into	b) d)	one-one Bijective		
		7)		$\in R^1$ , then $\{a\}$ is in $R$				
				open set not a closed set		not an open set None of these		
		8)		set [0, ∞) is a subse				
			,	open compact	,	closed None of these		
		9)	met	open interval $E = (0,1)$ on ric is compact		real line with absolute value complete		
			c)	not compact	d)	dense in R		
		10)	a)	ich of the following is not a $d(x,y) =  x  +  y $ Both (a) and (b)	b)			

B) Fill in the blanks. 06 1) In R the diameter of the set  $\{0,1,2,\ldots,100\}$  is \_\_\_\_\_. 2) The real valued function f is continuous at  $a \in R'$  if \_\_\_\_\_. 3) If A and B are compact subset of R, then  $A \times B$  is . 4) Any finite subset of a metric space *M* is \_\_\_\_\_. 5) The interval  $[0,\frac{1}{2})$  is \_\_\_\_\_ subset of R'. 6) If  $f: A \to R'$  and f attains a maximum value at  $a \in A$  then  $f(\underline{a}) \equiv \underline{\hspace{1cm}}$ . Solve any Eight of the following: Q.2 16 Show that the sequence  $\left\{\frac{1}{\sqrt{n}}\right\}_{1}^{\infty}$  is not an element of  $l^2$ . If |x-2| < 1, prove that  $|x^2-4| < 5$ . b) c) Define the term homeomorphism. Define the term  $\in$  – dense d) e) Show that the metric space [0,1] with absolute value metric is compact. f) State the Heine-Borel property. Prove that the empty set in any metric space is open set. g) Prove that every subset of  $R_d$  is open. h) Prove that the interval [a, b] is neither open nor closed. i) Let  $T: \mathbb{R}^2 \to \mathbb{R}^2$  be a function defined by  $f(x) = \frac{1}{2}x$ . Prove that T is a contraction. j) 10 **Q.3** A) Attempt any two of the following: 1) Prove that a subset E of  $l^2$  is bounded and hence find its diameter. Prove that in any metric space, every open ball is open set. 3) Show that the metric space  $\langle M, \varrho \rangle$  is compact if and only if every sequence of points in M has a subsequence converging to a point in M. If f is a continuous function from the compact metric space  $M_1$  into the 06 metric space  $M_2$ . Then show that the range  $f(M_1)$  of f is compact. **Q.4** A) Attempt any two of the following: 08 1) Show that a continuous function of a continuous function is continuous. 2) If  $F_1$  and  $F_2$  are closed subset of a metric space M, then show that  $F_1 \cup F_2$ 3) Show that in any metric space, every convergent sequence is Cauchy. Show that  $l^2$  is complete. 08 **Q.5** Attempt any two of the following. 16 Fix  $n \in I$ . If  $x = \langle x_1, \dots, x_n \rangle$  and  $y = \langle y_1, \dots, y_n \rangle$  are two ordered n - tuples of real numbers, define  $\varrho(x,y) = \left[\sum_{k=1}^{n} (x_k - y_k)^2\right]^{1/2}$  Then prove that  $\langle R^n, \varrho \rangle$  is a metric space. In a metric space  $\langle M, \varrho \rangle$ , show that the subset A of M is totally bounded if b) and only if every sequence of points of A contains a Cauchy subsequence.

Show that f is continuous if and only if the inverse image of every open set

c)

is open.

No.
-----

	<b>D</b> .00	). ( <b>0</b> 0	STATISTICS (Special Paper - XIII) Statistical Inference - II (19201643)	
-			ursday, 18-04-2024 Max. Marks: To 06:00 PM	80
Instr	ructio	2) 3)	All questions are compulsory. Draw neat labelled diagrams wherever necessary. Figures to the right indicate full marks. Use of log tables and calculator is allowed.	
Q.1	A)	<b>Cho</b> 1)	Most frequently used method of breaking the ties is  a) midrank method  b) average statistics approach  c) to omit tied values  d) most favorable statistic approach	10
		2)	The decision criteria in SPRT depends on the functions of  a) type I error b) type II error c) type I error and type II error d) none of the two types of errors.	
		3)	Degrees of freedom is related to  a) no. of observations in a set b) hypothesis under test c) no. of independent observations in a set d) None of the above	
		4)	<ul> <li>Which of the following is correct if P (5.25 ≤ Θ ≤ 20.25) = 0.99?</li> <li>a) 5.25 and 20.25 are 99% confidence limit.</li> <li>b) The length of the confidence interval is 15.</li> <li>c) Both a) and b)</li> <li>d) None of These</li> </ul>	
		5)	Neyman - Pearson lemma provides a) Unbiased C. R. b) Most powerful C. R. c) Admissible C. R. d) Minimal C. R.	
		6)	Which of the following is applicable to paired data  a) The Sign test b) The Median test c) Wilcoxon's signed rank test d) Both a) & c)	
		7)	A sequence of symbols shows lack of randomness if there are  a) Too many runs b) Too few runs c) Both a) and b) d) Neither a) nor b)	

		8)	a) size of type I error b) size of type II error c) value of the statistic d) number of observations	
		9)	Test of H <sub>0</sub> : $\mu = 40$ against H <sub>1</sub> : $\mu > 40$ leads to a) left tailed test b) right tailed test c) two tailed test d) none of these	
		10)	A test which is at least as powerful as any other test of the same is known as  a) M. P. test b) U. M. P. test c) L. R. test d) none of these	ne size
	B)	Defin 1) 2) 3) 4) 5) 6)	ine the following. Pivotal quantity Level of significance Type-2 error Confidence Interval Run Power of test	06
Q.2	a) b)	Null a Critic ASN Size One	the following terms. (Any Eight) and Alternative hypothesis cal regions I function e of test e sided confidence interval. The confidence interval for $\mu$ when $\sigma^2$ is unknown in case of $N$ ( $\mu$ , $\sigma^2$ ).	<b>16</b>
	g) h) i)	distril State Simp	ribution. The confidence interval for population variance $\sigma^2$ when $\mu$ is known. The ple and composite hypothesis. The confidence interval for population proportion P.	
Q.3	A)		empt any two of the following: A coin is for which the probability of occurrence of head is P, the times and null hypothesis is $H_0$ : $P = \frac{1}{2}$ tested against $H_1$ : $P = \frac{1}{2}$ accepted more than one head appears, then compute i) size of test ii) power of test Obtain $100(1-\alpha)\%$ confidence interval for the parameter $\mu$ in of $N(\mu, \sigma^2)$ distribution, when $\sigma^2$ is known. Describe the procedure of Sign test.	4 is
	B)	Expla	lain the procedure of Mann-Whitney U test for two samples.	06
Q.4	A)	1) E s 2) C	empt any two of the following: Derive the likelihood ratio test for testing $H_0$ : $\mu=\mu_0$ against $H_1$ : $\mu$ sample of size $n$ is taken from $N(\mu,\sigma^2)$ Obtain $100(1-\alpha)$ ) confidence interval for ratio of two population variances in case of normal distribution. Describe the procedure of Wilcoxon Signed-Rank test.	
	B)	P(x,6	X be a Bernoulli variate with p.m.f $\Theta$ )= $\Theta^x$ (1- $\Theta$ ) <sup>1-x</sup> ; $x=0,1,0\leq x\leq 1$ struct SPRT test for testing $H_0:\Theta=\Theta_0$ gainst $H_1:\Theta=\Theta_1$	08

### Q.5 Attempt any two of the following.

16

- a) State and prove Neyman- Pearson lemma.
- **b)** Obtain SPRT for testing  $H_0$ :  $\lambda = \lambda_0$  against  $H_1$ :  $\lambda = \lambda_1$  where  $\lambda$  is the parameter of poisson distribution, find appropriate expressions for OC function and ASN function.
- c) State the procedure of Wald-Wolfowitz Run test for two independent samples.

Seat	Sat	D
No.	Set	L

	D.3(	). (Oei	GÉÔLOGY (	Special Paper - XIII)	-2024
-			rsday, 18-04-2024 To 06:00 PM	emote Sensing (19201652)  Max	x. Marks: 80
		ons: 1) 2) 3)	All questions are compul Draw neat labelled diagra Figures to the right indica Use of log table and calc	ms wherever necessary. te full marks.	
Q.1	A)	<b>Cho</b> (1)	ose correct alternatives What is the percentage a) 20 c) 50	from the options. of forward overlap in stereo pair? b) 30 d) 60	10
		2)	A point on the ground d a) Kadir c) Natial	rectly in line axis of the aerial photogra b) Nadir d) None of these	ph is
		3)	Sandstones show a) black c) intermediate	_ tone in the aerial photograph. b) dark d) light	
		4)	a) black	os show tone in the aerial photo b) dark d) light	graph.
		5)	Raster data is a type a) numerical c) spatial	data. b) non-spatial d) Vector	
		6)	Vector data is a type of a) numerical c) spatial	data. b) non-spatial d) raster	
		7)	Basic elements of vectors) point c) polygon	r data are b) line d) All of these	
		8)	In vector format bedding a) point c) polygon	g plane is represented by b) line d) All of these	
		9)	Outcrop of shale in vect a) point c) polygon	or format can be represented by b) line d) All of these	
		10)	Which one of the following a) point c) polygon	ng data is represented in grid form? b) line d) raster	

	<ol> <li>What is Photogrammetry?</li> <li>What is Photointerpretation?</li> <li>What is the use of fiducial marks?</li> <li>What is side overlap percentage for stereo pair?</li> <li>What is lineament?</li> <li>Define Geographic information System.</li> </ol>	
Solva) b) c) d) e) f) g) h)	What are specular and diffused reflections? What is panchromatic black and white photograph? Advantages of vector data model. Disadvantages of vector data model. Advantages of raster data structure. Disadvantages of raster data structure. How to number and mark the specimen collected in the field? Explain two types of base maps. What is strike and dip? What is passive and active remote sensing?	16
A)	<ul> <li>Attempt any two of the following:</li> <li>1) What is difference between vector and raster data structure? Specify what geological applications are used in each data structure.</li> <li>2) Distinguish planimetric maps from topographic maps and briefly outline their specific uses.</li> <li>3) How to map lithological contact in the field?</li> </ul>	10
B)	Short note/Solve.  Describe various drainage patterns, Draw sketches.	06
A)	Attempt any two of the following:  1) Explain types of resolutions.  2) What is radiance?  3) Describe types of aerial photographs depending on optical axis position.	80
B)	Describe/Explain/Solve.  Describe in detail texture and pattern of aerial photographs.	80
Atte a)	mpt any two of the following. What are atmospheric windows? Explain spectral reflectance curve.	16
	a) b) c) d) e) f) g) h) i) A)  B)  Atte	2) What is Photointerpretation? 3) What is the use of fiducial marks? 4) What is side overlap percentage for stereo pair? 5) What is lineament? 6) Define Geographic information System.  Solve any Eight of the following: a) What are specular and diffused reflections? b) What is panchromatic black and white photograph? c) Advantages of vector data model. d) Disadvantages of vector data model. e) Advantages of raster data structure. f) Disadvantages of raster data structure. g) How to number and mark the specimen collected in the field? h) Explain two types of base maps. i) What is strike and dip? j) What is passive and active remote sensing?  A) Attempt any two of the following: 1) What is difference between vector and raster data structure? Specify what geological applications are used in each data structure. 2) Distinguish planimetric maps from topographic maps and briefly outline their specific uses. 3) How to map lithological contact in the field?  B) Short note/Solve. Describe various drainage patterns, Draw sketches.  A) Attempt any two of the following: 1) Explain types of resolutions. 2) What is radiance? 3) Describe/Explain/Solve. Describe in detail texture and pattern of aerial photographs.  Attempt any two of the following.

Seat	Sot D
No.	Set P

	<b>D</b> .50	, (Sei	MICR	, , , ,	(Special	Paper - XIII) 9201660)	Αρι 11-2024
•			rsday, 18-04 To 06:00 PM		·	·	Max. Marks: 80
Instr	uctio	2)	Draw neat la Figures to the	s are compulso abelled diagram ne right indicate bles and calcul	s whereve full marks		
Q.1	A)	<b>Cho</b> (1)			nique	otions. used as marker. VNTR RFLP	10
		2)	a) SWIS		b)	base. EMBL TREMBL	
		3)		ise enzyme.	b)	ron of <i>E.coli</i> encode Lac Y Lac Z	sβ
		4)	a) Prima		b)	irried out enz Topoisomerase Helicase	yme.
		5)	a) Sange		-	encing also known a Automated Edman	s method.
		6)		gments of DNA	b)	ost commonly used for SDS-PAGE 2D PAGE	or separation
		7)		known is as _ shift	muta <sup>:</sup> b)	tion or deletion of nu tion. Non sense Translocation	ıcleotide in
		8)	Eco RI technology a) Type c) Type	 I	b)	rme most commonly Type II Type IV	used in r-DNA
		9)	the 3' end of a) Poly A	during poly-ade A polymerase	nylation by b)	at the nascent chain the enzyme Taq polymerase DNA polymerase	

		<ul> <li>10) A population with selection would most quickly lead to two groups with few shared traits.</li> <li>a) Directional</li> <li>b) Disruptive</li> <li>c) Stabilizing</li> <li>d) All of above</li> </ul>	
	B)	Define the following.  1) Define semiconservative DNA replication.  2) Define phenotype.  3) Define auxotroph.  4) What is DDBJ?  5) Define nonsense mutation.  6) Define vector.	)6
Q.2	Solva) b) c) d) e) f) g) h) i)	e any Eight of the following:  What is PDB?  What is Okazaki fragment?  What is a Genebank?  What is bioinformatics?  What is adaptor?  What is folded fiber model of DNA?  What is missense mutation?  Enlist the applications of protein engineering.  What is a BLAST?  Enlist the applications of DNA finger printing.	16
Q.3	A)	Attempt any two of the following:  1) Give a detailed account on Restriction endonucleases.  2) Describe in detail cis -trans test.  3) Describe in detail agarose gel electrophoresis.	10
	B)	Discuss in detail Lac operon.	)6
Q.4	A)	<ol> <li>Attempt any two of the following:         <ul> <li>What is role of 6 (Sigma) factor of RNA polymerase? Discuss in detail mechanism of transcription.</li> </ul> </li> <li>Discuss in detail effect of mutation on time course of phenotypic expression.</li> <li>Describe in detail selection of recombinant on the basis of white- Blue screening.</li> </ol>	
	B)	Define DNA profiling. Discuss in brief steps involved in DNA fingerprinting. 0	8(
Q.5	a)	npt any two of the following.  Discuss in detail vectors used in genetic engineering.  Define DNA replication. Describe in detail mechanism of DNA replication.	16
	b)	Describe in detail DNA sequencing by sanger method.	

Seat	Sat	D
No.	Set	

		`		ROŃICS (Sp ver Electroni			
•			rsday, 18-04-20 To 06:00 PM	)24		Max. Mar	ks: 80
Instr	uctio	2) 3)	igures to the ri	re compulsory. led diagrams wh ght indicate full s and calculator	marks	•	
Q.1	A)	<b>Cho</b> (1)	SIT is a a) majority b) minority	t alternatives fr charge carrier ority and minorit	device	=	10
		2)	In SCR the macurrent.  a) less than c) equal to	_	b)	rent is always the latching greater than all of these	J
		3)	forward break a) increased b) remains	-over voltage is d as it depend on gate			
		4)	In SCR based a) Class A c) Class B	parallel inverter		_type of commutation is used. Class C Class F	
		5)	b) Unijuncti c) Uninterru	upted Power SC on Power Suppl opted Power Sup erformance SCR	y oply		
		6)	The buried ga a) GTO c) PUT	te is fabricated i	n b) d)	_ device. SCR SIT	
		7)	Power BJT is a) one c) four	alayer se	emicor b) d)	ductor power controlling device. two three	
		8)	a) Gate volt c) Anode vo	•	T. b) d)	Load current Cathode voltage	

		9) If the firing angle of SCR is $\alpha$ then conduction angle is a) $0^0$ b) $90^0$ c) $180^0$ d) $(180-\alpha)^0$	
		<ul> <li>The SCR is turn off if the anode current is reduced below the</li> <li>a) gate current</li> <li>b) latching current</li> <li>c) holding current</li> <li>d) resonating current</li> </ul>	
	B)	Fill in the blanks.  1) SIT is a controlled device.  2) Another name for Class B commutation is  3) SMPS means  4) The GTO is turn off by using  5) The buried gate is fabricated in device.  6) A power circuit that converts DC into variable DC is called as	06
Q.2	Solva)  a) b) c) d) e) f) g) h) i)	Why power devices are not operated with higher frequency? Draw the symbol of Power MOSFET and GTO. What do you mean by Phase control? Give the disadvantages of SCR. Draw the circuit diagram for speed control of DC motor using SCR. Why controlled rectifiers are used? Define turn off time of SCR. Give the function of drift layer of power devices. Define threshold voltage of power MOSFET. Define firing angle of SCR.	16
Q.3	A)	Attempt any two of the following:  1) Give the construction of power diode.  2) Explain in brief the working of battery charger circuit using SCR.  3) Explain working of parallel inverter using SCR.	10
	B)	Explain Emergency Lighting System by using SCR.	06
Q.4	A)	<ul> <li>Attempt any two of the following:</li> <li>1) Explain working of single-phase full wave-controlled rectifier with resistive load.</li> <li>2) Give the construction of power BJT.</li> <li>3) Explain working of SCR firing by UJT.</li> </ul>	80
	B)	Explain working of GTO.	08
Q.5	Atte a)	empt any two of the following.  Explain working of single-phase half wave-controlled rectifier with inductive load and effect of free wheel diode.	16
	b) c)	Explain Class D commutation technique of SCR. Give the classification of Inverter and explain working of basic transistorized inverter.	

Seat		Sat	D
No.		Set	

	D.3C	. (Sei		MPUTER SCIENC	E (		
Day	& Date	· Thu	sday, 18-0	Web Technology	/ (1 <u>9</u>	<b>9201668)</b> Max. Marks: 80	<b>1</b>
•			To 06:00 P			iviax. iviai ks. oc	,
Instr	uction	•	•	ns are compulsory. the right indicate full r	nark	S.	
Q.1	A)	<b>Choo</b> 1)	Which ter a) Cont	rrect alternatives from is used for pages the lent Pages Pages	nat d	ne option. 10 epend on the Master page? Master Pages None of the above	)
		2)	a) Glob	contains the Applicat al.asax al.asax		Start event? Web.config None	
		3)	What is the a) Integral c) Float			ck property? Boolean All	
		4)	a) Data b) Data c) Com			DO.NET?	
		5)	a) Upda	ntrol is required for ev atePanel tentPanel	ery p b) d)	page that have AJAX Extensions. ScriptManager None of the above	
		6)	a) Clier b) Serv c) Both	validation controls wont side only er side only client side and server of the above		(handle validation) at	
		7)	a) garb	_ is responsible for all age collector manager	b)	ing, freeing, and compacting memory. type checker memory Manager	
		8)		p of radio buttons. pName		be set to achieve single selection  TextMode  SingleGroup	
		9)	a) Wind	y types of authenticati dows Authentication ns Authentication	b)	ASP.NET supports? .NET Passport Authentication All of the above	

		<ul> <li>Which data provider gives the maximum performance when connect to SQL Server?</li> <li>a) The Oracle data provider</li> <li>b) The SqlClient data provider</li> <li>c) The OLE DB data provider</li> <li>d) All of the above</li> </ul>	
	B)	<ul> <li>Fill in the blank.</li> <li>1) Extension of Master page is</li> <li>2) HTTP stands for</li> <li>3) method will send you to a new page, update the address bar and add it to the Browser History.</li> <li>4) The control enables you to perform postbacks at a specified interval in AJAX.</li> <li>5) cache stores a copy of the finally rendered HTML pages or part of pages sent to the client.</li> <li>6) can be used to store information that needs to be submitted along with the web page, but should not be displayed on the page.</li> </ul>	06
Q.2	a) b)	List out components of .Net Framework. What is Validation? How to create Cookies? What is Data Cache? What are the event ordering of master page? What are the different site navigation control in ASP.Net? What is AJAX? What is authentication? What is AutoPost back? What is page directive?	16
Q.3	A)	Attempt any two of the following:  1) Explain page life cycle phases.  2) Explain Timer Control in AJAX with example.  3) Explain Global.asax.	10
	B)	What is session? How to store and retrieve value from session?	06
Q.4	A)	Attempt any two of the following:  1) Differentiate client side validation and server side validation.  2) Design a xml file for student  3) Explain need of master page.	80
	B)	Explain App_Code application folder. Use app_code for class library having method for checking number is ODD, EVEN, PRIME.	80
Q.5	Atte a) b) c)	mpt any two of the following.  How to store student information into database using stored procedure  Design a web page having a SiteMapPath control in ASP.NET.  What is ADO.Net? Explain components of ADO.Net	16

Seat	Set	D
No.	Set	

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 PHYSICS (Paper - XV) Materials Science (19201620)

				Materials Scie	•	•	
•				sday, 24-04-2024 06:00 PM			Max. Marks: 80
Instr	uctio		2) Fig 3) Dra	questions are compulsory lures to the right indicate t aw neat labelled diagrams e of log table and calculat	<sup>f</sup> ull marks. s wherever r	-	
Q.1	A)	<b>Cho</b>		the correct alternatives dielectric strength is func thickness charge	-	 length	10
		2)	A br	rittleness is opposite to Toughness Resilience	,		
		3)	Bak a) c)	elite is obtained by reaction phenol ethane	on of formal b) d)	•	·
		4)	Low a) c)	density polymers have _ cross linked branched	structo b) d)	linear	
		5)	Oxio a) c)	de ceramics are n Semiconductor Good conductor	naterials. b) d)	Conductor Insulator	
		6)	Cera a) c)	amics normally exhibit sort brittle	natul b) d)	re. hard elastic	
		7)	The a) c)	strength of composite is low zero	b)	high infinite	
		8)	Cerr a) b) c) d)	mets are examples of micro composites continuous fiber compos short fiber composites large particle composites			

		9)	a) c)	leather wool	ŀ	iai o) d)	cloth	
		10)	nand a)	n energy ball milling is omaterials. Physical Chemical	ŀ	၁)	od of synthesis of Hybrid Electrical	
	B)	Fill (1) (2) (3) (4) (5) (6)	The Cera Con The calle Sol-	materials which finds ed Gel is metho	rials. re materials application i	is on the	called materials. he field of medicine are of nanomaterials. nen the material becomes	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	Define What What What Give Explosion Give What Write	ne sp at is d at are at are any lain a at is b e two	bllowing (Any Eight): becific heat. lifference between har legree of polymerization polymers? four examples of cera ny one method of fabr two characteristics of biomechanism? applications of nanon op-down approach of	dness and to on? mics. ication of co composites. naterials.	mp	osites.	16
Q.3	A)	1) 2)	Exp Exp	any two of the follow lain processing of bior lain applications of pol lain Co-precipitation m	naterials. lymers.			10
	B)	Wha	at is C	Ceramic? Explain Rock	Salt (NaCl)	str	ructure with suitable diagram.	06
Q.4	A)	Atte 1) 2) 3)	Expl Wha	any two of the follow lain electric and magn at is homo- polymer? ( cribe physical vapour	etic propertion Give applicat	es d	of materials. is of polymers.	80
	B)	Give	four	properties and four ap	oplications of	f bi	omaterials.	08

16

- Q.5 Attempt any two of the following questions.a) Discuss various techniques of characterization of nanostructured materials.
  - Explain classification of materials in detail. b)
  - Explain particle reinforced composites and fiber reinforced composites. c)

Soci	<u>.                                    </u>							[	
Seat	L							Set	Р
	.Sc.	(Sen	CH	/I) (New) (CB HEMISTRY (S norganic Che	pecial F	<b>a</b> p	-	April-20	24
			ednesday, 2 I To 06:00 I	24-04-2024 PM				Max. Mar	ks: 80
Instr	uctio	2 3	) Figures to ) Draw nea	ons are compuls the right indica at labelled diagra g table and calc	ate full ma ams where	eve	er necessary.		
Q.1	A)	<b>Cho</b> 1)		orrect alternation he following lan	thanide io b	n v o)	o <b>ptions.</b> vhich is diamagnet tu <sup>3+</sup> Hd <sup>2+</sup>	ic.	10
		2)	Observed a) [xc]4f <sup>6</sup> c) [xc]4f <sup>6</sup>	<sup>7</sup> 5d <sup>0</sup> 6s <sup>2</sup>	b	)	Gadolinium is [xc]4f <sup>7</sup> 5d <sup>1</sup> 6s <sup>2</sup> [xc]4f <sup>7</sup> 5d <sup>1</sup> 6s <sup>1</sup>		
		3)	methods. a) Bulk s		t	)	from one another Fractional prescri ion Exchange	•	-
		4)	Supercond a) Resor c) Trans		b	o) d)	Raman Meissner		
		5)	A Semicon a) 3 c) 1	nductor has	b	e e o) d)	4		
		6)		re of diborane di m.	t	two o) d)	een two boron ator 177 144	n is	
		7)	In so <sub>2</sub> oxid a) 3 c) 1	lation state of S	į	) d)	 		
		8)	Effect of o a) Farad c) Evan's	-	b	olai o) d)	•	e	

		9) is essential for corrosion. a) Liquid b) Solid	
		c) Gas d) Water  10) Self-stifling corrosion. a) Prevent b) decreases c) Increases d) promotes	
	B)	Fill in the blanks with suitable answer.  1) Germanium doped with acceptor atom is called  2) Electrical Conductivity decreases with of temperature.  3) xe-F bond length in xenon difluoride is  4) Iron coated with zinc, then it is called as  5) Passivity producing reagent are  6) Tetrameric alkyl-lithium has a characteristic bonding.	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	Mention methods of separation of lanthanide. What is Horkin's Rule? Explain n-type semiconductor. Write note on metallic lustre. Draw the structure of Borazine. Define structural chemistry. Define atmospheric corrosion. Comment on electrochemical positivity. Describe the synthesis of Alkyl-aluminum compounds. Explain mononuclear carbonyls.	16
Q.3	A)	Answer the followings (Any Two):  1) Give the detailed electronic configuration of lanthanide.  2) Draw & explain the structure of XeO <sub>4</sub> .  3) Discuss structural study of alkyl-beryllium compounds.	10
	B)	Explain the separation of lanthanide by ion exchange process.	06
Q.4	A)	<ul> <li>Answer the followings (Any Two):</li> <li>1) Explain in detail the structure of P<sub>4</sub>O<sub>6</sub>.</li> <li>2) What is corrosion? Explain electrochemical theory of corrosion.</li> <li>3) Explain the synthesis and structure of Alkyl-lithium compounds.</li> </ul>	08
	B)	Explain extrinsic semiconductor.	08
Q.5	Ans a)	wer the following (Any Two). What TU elements? Explain preparation of TU elements by neutron capture followed by B-decay method.	16
	b) c)	What is metallic bond and explain band theory of bonding in metallic.  Draw and explain the structure diborane in detail.	

	_	
Seat	Cat	D
No.	Set	

		•		BÓTANÝ (Spec Plant Biotechno	-	-	•	•
_				sday, 24-04-2024 06:00 PM			N	/lax. Marks: 80
Instr	uctio	2) 3)	) Fig ) Dra	questions are compulson tures to the right indicate aw neat labelled diagram e of log table and calcula	full ma	eve	r necessary.	
Q.1	A)	<b>Cho</b> 1)	Re diff a)	the correct alternative combinant DNA Techno ferent DNA molecules. one three	logy is t		process of joining _ two	
		2)	livi a)	fingerprinting is a ted ng things. DNA both a and b	chnique	thab)	at shows the geneti	c makeup of
		3)	reg a)	porter gene is an gion. endogenous both a and b	_	_	egion joined to a pro exogenous None of these	moter
		4)	a)	ansgenic plants have bee proteins fat		b)	cted that express _ lipid All of these	<del>.</del>
		5)	a) c)	<del></del> :		b)	process called trans Virus Mycoplasma	sformation.
		6)	PC a) c)	CR cloning is a slow both a and b	_	d fo b) d)	or cloning genes. rapid None of these	
		7)	a) c)	is another term for tis Micropropagation both a and b		ture b) d)	e. Macropropagation None of these	
		8)	a) b) c)	•	s	foll	owing aspects	·
		9)	de <sup>v</sup> a)	otechnology provides imposted	]	tool b) d)	s for the sustainable fisheries All of these	е

		<ul><li>10) Biotechnology is used for studies.</li><li>a) therapeutic b) diagnostic</li><li>c) forensic d) All of these</li></ul>	
	B)	<ul> <li>Fill in the blanks of the following.</li> <li>1) A as related to molecular biology.</li> <li>2) The library is a collection of DNA fragments.</li> <li>3) Total methods of gene transfer is</li> <li>4) Colony hybridization can define as the method for the isolation of the specific sequences.</li> <li>5) Anther culture is a type of tissue culture technique used to produce</li> <li>6) Protoplast isolation from leaves involves basic steps.</li> </ul>	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	wer the following (Any Eight): What is recombinant? Give the long form of DNA and RNA. Define marker genes. Give the function of genes. What is mean by transformation. Define hybridization. What is tissue culture? Define micropropagation. What is gene cloning? Define vector.	16
Q.3	A)	<ul> <li>Answer the following (Any two):</li> <li>1) Explain the DNA libraries studied by you.</li> <li>2) Write on southern blotting techniques.</li> <li>3) Describe the somatic hybridization studied by you.</li> </ul>	10
	B)	<ul> <li>Write short notes any two of the following.</li> <li>1) General character of recombinant DNA Technology.</li> <li>2) General character of method of gene transfer.</li> <li>3) General character of gene cloning.</li> </ul>	06
Q.4	A)	Answer the following (Any two):  1) Explain the northern blotting studied by you.  2) Write on DNA finger printing.  3) Describe the PCR studied by you.	08
	B)	<ul> <li>Solve any two of the following.</li> <li>1) Explain the physical method of gene delivery.</li> <li>2) Describe the transgenic plant studied by you.</li> <li>3) Give the anther culture studied by you.</li> </ul>	08
Q.5	Ans a) b) c)	wer the following. (Any Two).  Describe the techniques of tissue culture.  Explain the biotechnology in agriculture studied by you.  Give the biotechnological Institutes and their role.	16

Seat	Set	D
No.	Set	

				ZOOLOGY (Spe Evolutionary B	-		
-				day, 24-04-2024 6:00 PM		Max. Mark	s: 80
Instr	uctic	3	2) Figu 3) Drav	uestions are compulse res to the right indicat v neat labelled diagra of log table and calcu	e full marks ms whereve	er necessary.	
Q.1	A)	<b>Cho</b> 1)	On tha	ne correct alternative ne Origin of Species w Charles Babbage Charles Darwin	vas written l b)	•	10
		2)	a) (	earliest geological tim Cambrian Quaternary	b)	nong the following is Jurassic Permian	
		3)	theor a) A	ervation of species on ry of evolution. Andaman Galapogos	isla b) d)	and heavily inspired Darwin's Nicobar Fiero	
		4)	a) S	_ was considered as a opodsds. Seymouria Lobe fish	b)	nk between annelids and Archeopteryx Peripatus	
		5)	a) \	force that initiates evo /ariation Extinction	lution is b) d)	Mutation Adapatation	
		6)	many a) 2	/ million years?		of life appeared before how 3000 5000	
		7)	a) F	study of fossils is Fossology Geology	 b) d)	Paleontology Zoogeology	
		8)	a) (	modern man is Cromagnon man Lemuroidea	 p)	Homo neanderthalensis Dromaeosaurus	
		9)	a) li b) M c) E	rin's theory of natural s nheritance of acquired Mutation Enormous rate of repro existence and survival Changes due to the us	d characters oduction in of the fittes	organisms, struggle for st.	

		a) Gene flow b) Mutation c) Natural selection d) All of these	
	B)	Fill in the blanks/one word answer.  1) It is known that the total sum of all the frequencies of the allele is  2) The process when some species migrate from the original to a new place, which in turn changes the allele frequency is called  3) is the Hardy Weinberg Equation.  4) Allele is the  5) primate is closest to man regarding organic evolution.	06
	Solva)  a) b) c) d) e) f) g) h)	e any Eight of the following. Genotype Chemogeny Fossil OrganicEvolution Speciation Gene Genetic code Molecular evolution RNA world	16
Q.3	A)	Answer the following (Any two):  1) Explain geological time scale upto eras.  2) Give the stages in evolution of horse.  3) Describe the modes of speciation.	10
	B)	Short note on. Types of fossils.	06
Q.4	A)	Answer the following (Any two):  1) Discuss evolution of eukaryotes.  2) Explain universitality of genetic code with examples.  3) Discuss about role of heritable variation in evolution.	80
	B)	<b>Describe/Explain/Solve.</b> Explain Lamarckism.	08
	Ans a) b) c)	ver the following (Any Two). Explain Darwin's theory. Discuss in detail Hardy Weinberg law. Give the stages in evolution of man.	16

Seat No.

## B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS (Special Paper - XIV)** Numerical Analysis (19201636)

Day & Date: Wednesday, 24-04-2024

Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- **Instructions:** 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.
  - Use of scientific calculators is allowed.

### Q.1 A) Choose the correct alternatives from the options.

10

The solution of the equation  $u_{n+3} - 3u_{n+1} + 2u_n = 0$  is \_\_\_\_\_.

a) 
$$u_n = c_1(-2)^n + (c_2 + c_3 n)(1)^n$$

b) 
$$u_n = c_1(2)^n + (c_2 + c_3 n)(1)^n$$

c) 
$$u_n = c_1(-2)^n + (c_2n + c_3n^2)(1)^n$$

d) 
$$u_n = c_1(-2)^n + (c_2 + c_3 n^2)(1)^n$$

The order of difference equation  $y_{n+2} - 2y_n + y_{n-1} = 1$  is \_\_\_\_\_. 2)

The P.I. of equation  $y_{n+2} - 5y_{n+1} - 6y_n = 4^n$  is \_\_\_\_\_.

a) 
$$P.I. = -\frac{1}{16}4^n$$

b) 
$$P.I. = \frac{1}{16}4^n$$

c) 
$$P.I. = -\frac{1}{10}4^n$$

d) 
$$P.I. = \frac{1}{10}4^n$$

If the interval of differencing is unity then 4)

$$\Delta^{4}[(1-x)(1-2x)(1-3x)] = \underline{\hspace{1cm}}$$

c) 
$$-6x^3$$

5) If 
$$(E^{1/2} + E^{-1/2})(1 + \Delta)^{1/2} =$$
\_\_\_\_\_.  
a)  $\Delta + 1$  b)  
c)  $\Delta + 2$ 

a) 
$$\Delta + 1$$

b) 
$$\Delta - 1$$

c) 
$$\Delta + 2$$

$$d) \Delta - 2$$

6) If 
$$(1 + \Delta)(1 - \nabla) =$$
\_\_\_\_\_.

b) 
$$1 - \Delta \nabla$$

c) 
$$\Delta - \nabla$$

d) 
$$-1$$

7) The exact value of 
$$\int_{0}^{6} \frac{dx}{1+x^2} =$$

		8)	In trapezoidal rule, the function $y = f(x)$ is taken to be  a) ellipes b) circle c) straight line d) parabola	
		9)	Gauss - forward interpolation formula is used to interpolate value of $y$ for	
			a) $-1 < P < 0$ b) $0 < P < 1$ c) $0 < P < 2$ d) $-\infty < P < 0$	
		10)	The Lagrange's interpolation formula for unequal intervals for ' $n$ ' points is a polynomial of degree	
			a) $n+1$ c) $n$ b) $n-1$ d) $n+2$	
	B)	Fill	in the blanks.	06
		1)	In Simpsons $\left(\frac{1}{3}\right)^{rd}$ rule, the function $y = f(x)$ is taken to be	
		2)	Find $\Delta(x^2 + x) = $ for $h = 1$ .	
		3)	The central difference formula which are best suited for interpolation is	
		4)	If $\int_{0}^{\infty} e^{x} dx$ dividing the interval 0 to 4 into four party and width is	
		<b>5</b> \	1 then $y_4 = \underline{\hspace{1cm}}$	
		5)	Homogeneous equation of the type $f\left(\frac{y_{x+1}}{y_x}, x\right)$ to the linear from	
		6)	$f(u_x, x)$ by putting If $\lambda_1, \lambda_2, \lambda_3$ are real and distinct root then C.F. =	
ე.2	Atte	mpt	any eight of the followings.	16
	a)	-	ng newtons backward interpolation formula, find $\frac{dy}{dx}$	
	b)	Find	the initial acceleration using the entire data	
			ne t (Sec) 0 5 10 15 20	
	•		locity V (m/sec) 0 3 14 69 228	
			$(1-\lambda_1)^2 y_n = 0$ then prove that $y_n = (c_1 + c_2 n)(\lambda_1)^n$	
	d) e)	Find	$ye y_{n+2} - 4y_{n+1} + 3y_n = 5^n$	
	-,	i)	$P.I. = \frac{1}{(E-a)^3} a^n$ ii) $P.I. = \frac{1}{(E-a)} a^n$	
	f)		$e (4E^2 - 4E + 1)y_n = 0$	
	g)	Give	en the value $x: 0 \ 1 \ 2 \ 5$ $f(x): 2 \ 3 \ 12 \ 147$	
		Find	f (x): 2 3 12 147 I f (3) using Lagrange's formula.	

10

06

80

16

h) Find forward difference table for the following values

X:	3	4	5	6	7	8	9
Y:	4.8	8.4	14.5	23.6	36.2	52.8	73.9

- i) Prove that  $\mu = \frac{1}{2}(E^{1/2} + E^{-1/2})$
- **j)** Evaluate  $\Delta^2 \left( \frac{5x+12}{x^2+5x+6} \right)$

### Q.3 A) Attempt any two of the following.

1) Prove that  $\nabla y_{n+1} = h(1 + \frac{1}{2}\nabla + \frac{5}{12}\nabla^2 + \cdots)y'_n$ 

2) Using Newton's forward formula, find the value of f(1.6) if

<i>x</i> :	1	1.4	1.8	2.2
<i>f</i> ( <i>x</i> ):	3.49	4.82	5.96	6.5

- 3) Solve  $y_{n+2} 4y_n = n^2 + n 1$
- B) State and prove Lagrange's interpolation formula.

A) Attempt any two of the followings.

### Q.4 A) Attempt any two of the followings. 1) Solve $y_{p+3} - 3y_{p+2} + 3y_{p+1} - y_p = 1$

2) Use the Trapezoidal rule to estimate the integral  $\int_{2}^{2} e^{x^{2}} dx$ ,

taking the number 10 interval.

3) Find the cubic polynomial which takes the following values.

<i>x</i> :	0	1	2	3
<i>f</i> ( <i>x</i> ):	1	2	1	10

State and prove Simpson's  $\left(\frac{3}{8}\right)^{th}$  rule and hence solve

$$\int_{0}^{1} \frac{dx}{1+x}, \ h = 0.25$$

### Q.5 Attempt any two of the followings.

a) State and prove Newtons forward interpolation formula.

**b)** State and prove Simpson's  $\left(\frac{1}{3}\right)^{rd}$  rule and hence solve  $\int_{0}^{6} \frac{dx}{1+x^2}$ , h=1

c) Prove that

1) 
$$\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1 + \frac{\delta^2}{4}}$$

2) 
$$1 + \delta^2 u^2 = \left(1 + \frac{1}{2}\delta^2\right)^2$$

Seat No. B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 **STATISTICS (Special Paper - XIV) Probability Theory (19201644)** Day & Date: Wednesday, 24-04-2024 Max. Marks: 80 Time: 03:00 PM To 06:00 PM **Instructions:** 1) All questions are compulsory. 2) Figures to the right indicate full marks. Use of calculators is allowed. Q.1 A) Choose the correct alternatives from the options. 10 Which one of the following is an order statistic? a) sample mode b) sample median d) none of these c) sample mean If  $Y_5$  is the fifth order statistic of a random sample  $X_1, X_2, ... X_{10}$ ; 2)  $0 < X_i < 5$  then range of  $Y_5$  is \_\_\_  $\overline{b}$   $0 < y_5 < 10$ a)  $0 < y_5 < 1$ d)  $0 < y_5 < 5$ c)  $-10 < y_5 < 1$ W.L.L.N. does not hold good for the sequence  $\{X_n\}$  of i.i.d r.v. 3) a) Cauchy b) Chi-Square c) Normal d) Exponential The most famous example of convergence in distribution to 4) standard normal distribution is . . a) WLLN b) CLT c) convergence in probability d) none of these If  $X_2 \stackrel{P}{\rightarrow} X$  then 5) b)  $X_n^2 \xrightarrow{L} X^2$ d)  $X_n^2 \xrightarrow{P} X^2$ a)  $X_n^2 \xrightarrow{P} X$ c)  $X_n^2 \xrightarrow{2} X^2$ If state 3 is absorbing state then  $P_{32} = \underline{\hspace{1cm}}$ . 6) b) 0 a) 1 d) c) less then 1 0.5 Markov property is based on 7)

> a) unconditional probability c) conditional probability

b) expectation

d) none of these

		8)	Consider the following statements regarding Transition Probability Matrix (TPM)	
			<ul> <li>(A) For TPM row sum must be 1</li> <li>(B) For TPM column sum must be 1</li> <li>a) only (A) is true</li> <li>b) only (B) is true</li> <li>c) Both (A) and (B) are true</li> <li>d) Neither (A) nor (B) are true</li> </ul>	
		9)	In $M/M/1: \infty/FIFO$ model the distribution of arrivals is  a) Poisson b) Geometric c) Uniform d) Exponential	
		10)	In usual notations expected waiting time in the system is given by a) $W_s = (\lambda - \mu)$ b) $W_s = (\lambda - \mu)^{-1}$ c) $W_s = (\mu - \lambda)$ d) $W_s = (\mu - \lambda)^{-1}$	
Q.1	B)	Fill i 1)	in the blank  The probability density function of the largest order statistic $X_{(n)}$ is _	
		2)	Let $X_1, X_2, \dots, X_n$ be i.i.d $U(0,1)$ variates and $X_{(n)}$ $max = (X_1, X_2, \dots, X_n)$ . Then $E[X_{(n)}] = \underline{\hspace{1cm}}$ .	(n).
		3)	If $X_n \stackrel{P}{\to} x$ , then $(X_n - X) \stackrel{P}{\to} $	
		4)	Non recurrent state is also called as	
		5)	In M/M/1 : $\infty$ /FIFO model, distribution of inter arrival time is	
		6)	In usual notations, if $\lambda = 5$ per hour and $\mu = 4$ per hour then in M/M/1: $\infty$ /FIFO model, traffic intensity will be	
Q.2	Solv a) b)	In us	y Eight of the following sual notations state the p.d.f. of $r^{\text{th}}$ order statistic. $X_{(1)}, X_{(2)}, X_{(3)}, X_{(4)}$ be the order statistic of a random sample of size 4 vn from the distribution having p.d.f. $f(x) = \begin{cases} e^{-x} & 0, < x < \infty \\ 0 & , o.w \end{cases}$	16
	c) d) e)	State Defined 2	p.d.f. of $n^{\text{th}}$ order statistic. e the distribution sample median (when sample $n$ is odd) ne convergence in quadratic mean. $X_1, X_2, X_3, \dots X_n$ , be a random sample from a $\chi^2_{(10)}$ distribution.	
	f)		: whether WLLN holds good. ne Irreducible Markov.	
	g)	Give	one example of continuous state and continuous time of stochastic	
	h) i)	Define State	ress.  ne first return probabilities of TPM.  e any two assumptions made while deriving probability distribution	
	j)		ueuing system. e on service mechanism in queuing theory.	

### Q.3 A) Solve any two of the following

10

If  $X_1, X_2, X_3, X_4$ , be the i.i.d random variable having common distribution function

$$f(x) = 1 - e^{-3x} \qquad , x \ge 0$$

Find the expected value of first order statistic

- State and prove the WLLN for i.i.d. random variables.
- Suppose that if it rains today then it will rain tomorrow with probability  $\alpha$  and if it does not rain today then it will rain tomorrow with probability  $\beta$ . Then find TPM and draw transition diagram.
- B) One customer arrives at a counter in a bank after every 15 minutes. Staff on the counter takes 10 minutes on an average for serving a customer. Under the assumptions for applying  $M/M/1 : \infty/FCFS$  model, find:-
  - 1) Average queue length
  - Expected waiting time in the queue

### Solve any two of the following Q.4 A)

80

06

- Let  $\{X_n\}$  be a sequence of random variables defined by  $P(X_n = 0) = 1 - \frac{1}{n}, P(X_n = 1) = \frac{1}{n}$  show that  $X_n \to \frac{1}{n}$
- Let  $\{X_n, n \ge 1\}^n$  be a Markov chain with 3 states 1, 2, 3 with one 2) step TPM

$$P = \begin{bmatrix} 0.1 & 0.5 & 0.4 \\ 0.6 & 0.2 & 0.2 \\ 0.3 & 0.4 & 0.3 \end{bmatrix}$$
 and initial distribution and initial probability distribution  $P(X_0 = 1) = 0.7, P(X_0 = 2) = 0.2, P(X_0 = 3) = 0.1$  Figure 3.

distribution  $P(X_0 = 1) = 0.7, P(X_0 = 2) = 0.2, P(X_0 = 3) = 0.1$  Find

- ii)  $P(X_2 = 3)$
- For queuing model  $M/M/1: (\infty/FCFS)$  with usual notation, find expression for average number of customers in the system.
- If  $X_n \xrightarrow{p} X$  and  $Y_n \xrightarrow{p} Y$  as  $n \to \infty$  than show that  $X_n + Y_n \xrightarrow{p} X + Y$  as  $n \to \infty$ 80 B) also show that  $X_n - Y_n \stackrel{p}{\to} X - Y$  as  $n \to \infty$

### Q.5 Answer the following (Any Two).

16

- Order Stat Show that the distribution of sample median of a random sample of size (2n+1) from U(0,1) follows beta distribution of first kind
- For a Markov chain  $\{X_n, n \ge 1\}$  one step TPM is as follows. b)

$$P = \begin{bmatrix} 0 & 1 & 0 \\ p & 0 & q \\ 0 & 1 & 0 \end{bmatrix} \text{ check whether states are recurrent or not.}$$

- c) Customer arrives at a box office window being served by a single person according to Poisson input process with a mean rate of 60 per hour. The time required to serve a customer has an exponential distribution with of 40 seconds. Determine.
  - 1) utilization rate of this system
  - 2) average length of queue
  - 3) average length of non-empty queue
  - 4) mean waiting time of an arrival

Seat	Sat	D
No.	Set	L

В.5	c. (Se	, ,	New) (CBCS) E LOGY (Special		nination: March/Aprii-2024 oer – XIV)	
			` •	•	onics (19201653)	
•		dnesday, 24-04- To 06:00 PM	-2024		Max. Marks: 8	0
Instructi	2) 3)	Figures to the r	re compulsory. led diagrams wher ight indicate full ma e and calculators is	arks.		
Q.1 A)		ple choice que Which of the fo a) Ridge c) Island arc		ed w b) d)	rith a divergent plate boundary?	0
	2)	The removal of a) Abrasion c) Deflation	particles of dust a	nd s b) d)	and by strong winds is called Depletion Accretion	
	3)	erosion a valley or a gu a) Headward c) Valley wide	lly at its head.		vosion that lengthens a stream,  Valley deepening  None of these	
	4)	Karst topograph a) sandstone c) conglomera	hy is related with _ ate	b)	terrain. shale limestone	
	5)	What do scientia) convection c) gravity slab	currents	orce b) d)	behind the plate tectonics theory? the Sun's gravity the movement of the planets	
	6)	<ul><li>b) the plates t</li><li>c) the plates t</li></ul>	tones sitting on top	ust	malleable magma and the upper part of the mantle	
	7)	Which of the fo a) Moraines c) Eskers	llowing are not wat	b)	aid deposits associated with glaciers? Kames Varves	<u>}</u>
	8)	<ul><li>intermediate de</li><li>a) subduction</li><li>b) spreading of</li></ul>	epth earthquakes a zones centers ontinent converger	re a	g, granitic magmas, and ssociated with	

	9)	Volcanic island arcs are associated with  a) transform plate boundaries b) divergent plate boundaries c) ocean-ocean convergent plate boundaries d) ocean-continent convergent plate boundaries.	
	10)	Exfoliation domes are common in terrain.  a) inclined sedimentary beds b) horizontal lava flows of beds c) massive granitic rocks d) metamorphic rocks	
B)		n the blanks:  Alluvial fans and alluvial cones, meanders and ox-bow lakes and natural levees are characteristics of stage in the fluvial evolution.  a) youth b) mature c) old d) all of the above	06
	2)	Large pieces of the lithosphere that float on the asthenosphere are called:  a) Asthenosphere b) the mid-oceanic ridge c) deep-sea trenches d) tectonic plates	
	3)	The variously shaped depressions of different dimensions that are developed in the riverbed are called  a) Potholes b) Cavities c) Dents d) Craters	
	4)	The elevated land between two basins is known as  a) point bars b) spits c) subtracts d) drainage divide	
	5)	is the type of plate boundary of the Indian plate along the Himalayan mountains?  a) Ocean – continent convergence b) Ocean – continent divergent boundary c) Ocean – ocean transform boundary d) Continent – continent convergence	
	6)	is the study of the record of the Earth's magnetic field in rocks or sediments.  a) Paleoenvironment b) Paleoclimate c) Paleolithology d) paleomagnetism	
Solv a) b) c) d) e) f) g) h) i)	What Nam Defir Description Nam Give What Nam List t	y Eight of the following. It is principle of Uniformitarianism? It is principle of Uniformitarianism? It is principle of Uniformitarianism? It is endogenous processes. In easthenosphere. It is valley width in old stage. It is the types of plate boundaries. It is polycyclic landscape? It is polycyclic landscape? It is polycyclic landscape? It is depositional feature of karst topography. It is geological features related to convergent plate boundary. It is any two types of drainage pattern.	16

**Q.2** 

Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) What are characters of youth stage in cycle of erosion?</li> <li>2) Explain geological structures and mass movement relationship.</li> <li>3) Describe Paleomagnetism and its application.</li> </ul>	10
	B)	Discuss the types of convergent plate boundaries with suitable diagram.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write short note on Sea floor spreading.</li> <li>2) Explain the brief the karst topography and its features.</li> <li>3) Describe any three relations between landform and structures.</li> </ul>	08
	B)	Define orogeny. Describe in short the formation of Himalaya.	08
Q.5	Atte a) b) c)	empt any Two of the following.  Explain in detail the three stages of river with its suitable features.  Discuss the static and eustatic rejuvenation.  Describe in brief the magmatism and seismic activity related to plate boundaries	16

	_	
Seat	Cat	D
No.	Set	

	D.3(	). ( <del>G</del> E	1116	MICROBIOLOGY ( Microbial Bioche	Specia		
•				sday, 24-04-2024 06:00 PM	•	Max. Marks:	80
Instr	uctio	2) 3)	) Dra ) Fig	questions are compulsor aw neat labeled Diagram ures to the right indicate e of log tables and calcul	s where full mar	ks.	
Q.1	A)	Multi 1)	Enz	<b>choice questions.</b> zymes are made Up of _ Fats Nucleic acids	 b) d)	Proteins Vitamins	80
		2)	a) b) c)	zyme acts by  Reducing the activation Increasing activation er Decreasing pH value Increasing the pH value	nergy		
		3)	a)	e cofactor is Often a metal Often a vitamin	,	Always a protein Always an inorganic compound	
		4)	a)	mogenization cannot be Homogenizer French press	b)	using which one of the following? Mortar and pestle Centrifuge	
		5)	a)	zymes which are secrete Extracellular Cytoplasmic	b)		
		6)		composition of organic Ned as Nitrogen Fixation Nitrification	litrogen b) d)	of dead plants and Ammonia is  Ammonification  Denitrification	
		7)	an a) b) c)	e Conversion of Glucose Example of which of the Phosphate transfer Isomerization Dehydration Aldol cleavage		sphate to Fructose-6-Phosphate is ng Reactions?	
		8)	a) c)	is initiation codon du AUG GUA	• .	tein synthesis. UGA CAA	
		9)	cata a)	e substrate binds to activ alysis. Covalent Hydrogen	re site of b) d)	f enzyme by bond during  Disulphide  Hydrophobic	

		<ul> <li>10) In the catabolite repression of Lac operon β galactosidase enzyme encoded by structural gene.</li> <li>a) Lac I</li> <li>b) Lac Y</li> <li>c) Lac Z</li> <li>d) Lac a</li> </ul>	
	B)	<ul> <li>Give one word/one sentence answers of the following.</li> <li>1) Write down the long form of GOGAT.</li> <li>2) Lock and key hypothesis is proposed by which scientist?</li> <li>3) The enzyme without its coenzyme is known as</li> <li>4) Name the techniques which are used for enzyme purification by employing molecular size.</li> <li>5) Enlist names of Sulphur containing amino acids.</li> <li>6) Which form of the nitrogen from soil is absorbed by the plants?</li> </ul>	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	wer any Eight of the following.  Define Ribozymes?  Write a note on Induced fit model for enzyme action.  Significance of Km and Vmax.  Enlist the methods of enzyme purification on the basis of solubility.  What are applications of enzyme immobilization?  Define specific activity.  Define enzyme unit  What is catabolite repression?  Define active site.  Enlist the physico- chemical methods of cell disruption.	16
Q.3	A)	Attempt any two of the following.  1) ED pathway  2) Explain in brief Protein synthesis  3) Assimilation of Carbon	10
	B)	Discuss in detail Arabinose operon.	06
Q.4	A)	Attempt any two of the following.  1) Giyoxalate bypass 2) Peptidoglycan synthesis 3) Assimilation of Sulfur	10
	B)	Describe in detail Factors affecting catalytic efficiency of enzymes.	06
Q.5	Atte a) b) c)	empt any two of the following. Discuss in detail methods of enzyme immobilization. Describe in detail Bioluminescence. Write a note on Derivation of Michaelis-Menten equation.	16

	_	
Seat	Sat	D
No.	Set	F

		Electronics (Spec Embedded System D		-	
•		ednesday, 24-04-2024 1 To 06:00 PM		Max. Marks	: 80
Instructio	3	) All questions are compulsory.  2) Draw neat labelled diagrams w  3) Figures to the right indicate full  4) Use if log table and calculators	marl	(S.	
Q.1 A)		tiple choice question IC is used as line driver i microcontroller. a) 7447 c) MCT2E		BT136	08
	2)	The 16×2 smart LCD display has a) one c) three		registers. two four	
	3)	The % sign is type of ope a) Logical c) Arithmetic	erato b) d)		
	4)	In embedded C programming, to as a) Constant c) Variable		oup of similar quantities is called Array Keyword	
	5)	To interface the relay with 8051 across  a) switch b) collector-emitter junction of c) relay d) ground		•	
	6)	The Keil micro vision is an Integration of the Microcontroller based a) 89C51 c) 89V51RD2	emb b)	d Development Environment (IDE) edded system. 89C52 All of these	
	7)	Which statement is used programming using embedded a) while (0) c) while (10)	C. b)	uperloop in microcontroller while (1) while (100)	
	8)	The embedded C language the a) Constants c) Variables	-	vords are also known as Reserved words Integers	
	9)	The range of signed character of a) -128 to +127 c) 0 to 65535		0 to 255	

		<ul><li>10) An embedded system consists of minimum a device.</li><li>a) computing</li><li>b) input</li><li>c) output</li><li>d) I/O</li></ul>	
	B)	<ol> <li>Answer the following.</li> <li>How many total keyword are available in embedded C.</li> <li>Define the embedded system.</li> <li>Is for(;;) loop is used as superloop in embedded C programming?</li> <li>On execution of the statement X = Y/Z, where Y = 10, Z = 3, what is the value returned to X, if X variable is integer type?</li> <li>To display the BCD data on LCD, which code of the character should be send to LCD?</li> <li>State the name of header file necessary to include in embedded C program for 8051.</li> </ol>	06
Q.2	a) b) c) d) e) f) g) h)	State characteristics of an embedded system.  Define constants and variables of the C Language.  State applications of an embedded system.  Give the syntax of while loop statement.  What is the meaning of void function in embedded C.  Mention data types of the C language.  Give the logical operations in C language.  Give structure of embedded C program.  State the control signals of 16×2 LCD.  State format specifier for integer and character.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write Embedded C program for blinking the LED of Port 0.</li> <li>2) Why the need of operating system? Write a note on superloop.</li> <li>3) Describe interfacing of Relay to microcontroller 8951.</li> </ul>	10
	B)	What is if control statement? Describe in detail if control statement in detail with suitable example.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) What is loop? Discuss while loop with suitable example.</li> <li>2) Write embedded C program for generation of square of at port Port 1.</li> <li>3) Discuss the development of an embedded system for controlling of DC motor.</li> </ul>	08
	B)	With suitable diagram describe an interfacing of ADC 0804 to microcontroller 8951.	80
Q.5	a)	mpt any Two of the following.  Describe in detail the designing of an embedded system for temperature measurement system.  What is operators in C programme? Explain any three operators with suitable program.  Describe interfacing of 16 × 2 LCD to 8951 microcontroller.	16

Seat	Set	D
No.	Set	7

		. (0		COMPUTER SCIENC Advanced Java (	-		
•				esday, 24-04-2024 o 06:00 PM		Max. Marks:	80
Instr	uctio		-	I questions are compulsory. gures to the right indicate full m	narks	S.	
Q.1	A)		Wh a) b) c)	e the correct options. ich of the following is true abou They are used to compile serv They are responsible for mana They are part of the Java Deve They are used for storing serv	lets aging elopr	into bytecode I the lifecycle of servlets ment Kit (JDK)	10
		2)	a) b) c)	t" is implicit object of which clas javax.servlet.jsp.PrintWriter javax.servlet.jsp.SessionWrite javax.servlet.jsp.SessionPrinte javax.servlet.jsp.JspWriter	r		
		3)	Hov a) c)		Hibei b) d)	4	
		4)	a) b) c)	uts combines which of these in Java Servlets Java Server pages Custom tags and Message Re All mentioned above			
		5)	a)	ernate is an? Open Source ORM	•	Lightweight All mentioned above	
		6)	Wh a) c)	ich of the following is used to ro rollback() deleteTransaction()	ollbao b) d)	rollforward()	
		7)	Wh a) c)	ich pattern is the struts framew MVC2 Pattern MVC 1 Pattern	ork b b) d)		
		8)	Wh a) c)	ich attribute is used to specify i init initialization	nitial b) d)		
		9)		at is the default scope of JSP v Request scope Application scope		oles? Session scope Page scop	

		<ul> <li>What is the purpose of the ServletContext object?</li> <li>a) To hold client session information</li> <li>b) To process client requests</li> <li>c) To manage the lifecycle of servlet instances</li> <li>d) To provide a shared context for servlets within a web application</li> </ul>			
	B)	<ul> <li>Fill in the blanks.</li> <li>1) A valueStack is a simply stack that contains application specific object is</li> <li>2) attribute is used to specify class name of the bean?</li> <li>3) tag is used to iterate over a collection or array of objects?</li> <li>4) file database table configuration is stored?</li> <li>5) Parameterized queries can be executed by</li> <li>6) The object provides access to the initialization parameters configured for a servlet.</li> </ul>	06		
Q.2	Solo a) b) c) d) e) f) g) h) i)	<ul> <li>What is javabean?</li> <li>What is JSP?</li> <li>What is custom tag in JSP?</li> <li>Use of cookies.</li> <li>Use of struts.</li> <li>What is Hibernate?</li> <li>Use of Drivers.</li> <li>Use of setProperty.</li> </ul>			
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain Steps to create application of Hibernate.</li> <li>2) Write a program for prepard statement.</li> <li>3) Explain advantages and disadvantages of JSP.</li> </ul>	10		
	B)	Difference between Servlet & CGI.	06		
Q.4	A)	Attempt any Two of the following.  1) Explain JSTL core tags.  2) Explain use of URL Rewritten.  3) Write a program for execute() & execute Query()method in JDBC.	80		
	B)	Explain steps to create application of struts.	80		
Q.5	Atte a) b) c)	empt any Two of the following.  What is JDBC? Explain it's features.  What is servlet? Explain servlet life cycle.  Explain request & response implicit object in jsp with example.	16		

Seat No.							Set	P
B.S	Sc. (S	emes	ster -	VI) (New) (CB PHYSICS	-		ination: March/April-202 (VI)	4
At	tomic	c, Mo	lecula	ar Physics an	d Quan	tur	n Mechanics (19201621)	
Day & Time: (				5-04-2024 PM			Max. Marks	s: 80
Instrud	ctions	2) Di 3) Fi	raw ne gures	ions are compuls at labeled diagra to the right indica og table and calc	ams where ate full ma	arks	).	
Q.1 A	A) S <sub>(</sub>	) Mo a)	ost inte Maxi	rrect alternative nse line in doubl mum j value a and b togethe	et corres	pon b)	ds to $\underline{}$ . j and $\ell$ change in same way	10
	2)	) Ele a) c)	alkal	i metals		b)	st orbit are called alkaline earth metals inert gases	
	3)	ob a)	serve <sub>.</sub> norm	· ·	:t	b)	reak magnetic field, then we anomalous Zeeman effect Stark effect	
	4)	giv a)		alue splits into _	sub	lev b)	level corresponding to a els. $(2\ell+1)$ $2(2\ell+2)$	
	5)	) Th a) c)	$\frac{m_1+m_2}{m_1m_2}$	2 2		b)	s given by $\frac{m_1 m_2}{m_1 + m_2}$ $\frac{m_2}{m_1 + m_2}$	
	6)	•	nega	-		b)	robability density is  positive a negative real quantity	
	7)		$h/2\pi$	Plank's constan			$h/\pi$ $2\pi h$	
	8)			mum energy of p tained by substit	uting $n$ e		ned to one dimensional rigid I to zero two	

		·	The zero point energy of linear harmonic oscillator is given by a) $E_0=0$ b) $E_0=\hbar\omega$ c) $E_0=\frac{3}{2}\hbar\omega$ d) $E_0=\frac{1}{2}\hbar\omega$	<del>.</del>
		•	In quantum mechanics raising operator is given by a) $L_+ = L_x + iL_y$ b) $L_+ = L_x - iL_y$ c) $L_+ = L_z + iL_y$ d) $L_+ = L_z - iL_y$	
	B)	1) 2) 3) 4) 5)	The $1S^2$ $2S^2$ $2P^6$ $3S^1$ is the electronic configuration is When the atom is placed in external weak magnetic field, then we observe The Lande's g factor for ${}^2S_{1/2}$ level ( $L=0,S=1/2,J=1/2$ ) is The molecular system can be stable if the total energy possessed by the molecule is The energy spectrum of particle in one - dimensional rigid box has the nature of The kinetic energy operator is given by	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	State Give What What Find Defin Calcu [Mas State What	ne followings (Any Eight): Probability density. any two properties of Raman lines. It is an commutation rule? It is Paschen back effect? Eigen value of $(\sin nx)$ for operator $d^2/d^2x$ . Eigen value and Principle lines. Eigen the reduced mass of CO diatomic molecule. Eigen of $C = 1.99 \times 10^{-26} kg$ & Mass of $C = 2.66 \times 10^{-26} kg$ Eigen the Heisenberg's uncertainty principle. Eigen operator? Eigen point energy.	16
Q.3	A)	<ol> <li>1)</li> <li>2)</li> <li>3)</li> </ol>	mpt any two of the following questions.  Derive Schrodinger's time independent wave equation in three dimension.  Derive the expression for rotational energy energy levels of diatomic molecule.  The Raman exciting line in an experiment is 4358 A <sup>0</sup> . A sample gives Stoke's line at 4458 A <sup>0</sup> . Deduce the wavelength of anti-Stoke's line.	10
	B)	What hydro	t is the Stark effect? And also discuss Stark effect in weak field in ogen.	06

Q.4	A)	Attempt any Two of the following.  1) State and express Ladder operator.  2) Derive the component of orbital angular momentum $L_x$ .  3) State all quantum numbers.	08		
	B) Using the steady state Schrodinger's wave equation, derive the energy eigen values for the motion of particle in three dimensional rigid box.				
Q.5	Atte	empt any Two of the following.	16		
	a)	Explain anomalous Zeeman effect and obtain an expression for term shift.			
	b)	Solve Schrodinger's equation for hydrogen atom and discuss the radial wave equation.			
	c)	Obtain Zero point energy in case of linear harmonic oscillator.			

Seat	Set	D
No.	Set	

		•		CHEMISTRY (Special Organic Chemistry (		•	
				y, 25-04-2024 6:00 PM		Max. Marks	: 80
Instr	uctio	2	Ž) Figu	uestions are compulsory. Ires to the right indicate full m w neat, labelled diagrams and		e equations wherever necessa	ry.
Q.1	A)	<b>Cho</b> 1)	The a	he most correct alternative active ingredient of pyrethrum alcohol ester		each of the following. acid cyano	10
		2)			tituti b) d)	2	
		3)	•	_ is provitamin of vitamin A. Ergosterol <sup>D</sup> -nitrobenzene	b) d)	eta-carotene Isoprene	
		4)	as _ a) r	dye which requires binding manner	b)	al during dyeing is known azo dye disperse dye	
		5)	a) I	up's synthesis is used to prep ndole Quinoline		Pyrrole Pyridine	
		6)	a) (	colour of compound is due to chromophore pathochrome		presence of group. auxochrome hypsochrome	
		7)	a) a	rotation is catalyzed by acid acid and base	 b) d)	base metal	
		8)	orga a) k	drugs which inhibit the growth nisms are known as age pacteriostatic antibacterial			

		9)	Starch is a  a) trisaccharide b) amylose c) amylopectin d) amylose and amylopectin	
		10)	Among the following is an antidiabetic agent. a) Paludrine b) Ethambutol c) Tolbutamide d) Isoniazid	
	B)	Fill i 1) 2) 3) 4) 5)	in the blanks.  Alizarin belong to the class of dye.  Ethambutol is used as agent.  In Skraup's synthesis, is used as an oxidizing agent.  Adrenaline on fusion with KOH gives acid.  The change in specific rotation of an optically active compound is known as  The sodium salt of $\alpha$ -naphthol is used in the synthesis of insecticide.	06
Q.2	Ans a)		will you synthesize pyrrole from,	16
	b)	,	at are carbohydrates? Draw the open chain structure of D-glucose.	
	c)		lain in brief the structure of Adrenaline.	
	d)		at is the action of p-nitrobenzoic acid and manganese dioxide on min A?	
	e)	1)	ne the terms: Anaesthetics Antineoplastic agents	
	f)		at are disaccharides? Write the structure of Sucrose.	
	g)		te the synthesis of isoniazid drug.	- ^
	h) i)		v will you prepare 2-pyridone and pyridine-3-sulphonic acid from pyridine lain the qualities of good dye.	? (
	j)		e the synthesis and uses of Methoxychlor.	
Q.3	A)	Ans	wer the following questions. (Any Two)  What are hormones? Write about the Hems synthesis for thyroxine hormone.	0
		2) 3)	Write the classification of dyes based on the chemical composition. What are pyrethroids? Discuss the method of isolation, structure and uses of pyrethroids.	
	B)	<b>Writ</b> 1) 2)	te a short note on.  Basic character of pyrrole  Baygon.	06

Q.4	A)	Answer the followings (Any Two):  1) What are heterocyclic compounds? Give the methods of synthesis of pyridine.					
		2)	of pyridine. Discuss the analytical evidences put forth in support of structure of Vitamin-A.				
			Explain the Witt's theory for chromophore and auxochrome.				
	B)	1)	wer the following questions.  What happens when glucose is treated with,  i) Red P/HI  ii) Acetic anhydride  iii) Cone. HNO <sub>3</sub> iv) NH <sub>2</sub> OH  Give the synthesis and uses of Phenobarbitone.	08			
Q.5		nswer the following (Any Two).					
	a)		are antibiotics? Explain Penicillin-G with respect to,				
		i) ii)	Structure Types				
		,	Acidic hydrolysis				
		,	Alkaline hydrolysis				
	b)	,	in the different methods for the determination of ring size of D-				
		gluco					
	c)		is the action of following on quinolone?				
		i)	Conc. HNO <sub>3</sub> + Conc. H <sub>2</sub> SO <sub>4</sub>				
		,	SO <sub>3</sub> - H <sub>2</sub> SO <sub>4</sub> / 220°C				
		,	NaNH <sub>2</sub> /Δ C <sub>4</sub> H <sub>9</sub> Li				
		,	C <sub>6</sub> H <sub>5</sub> Li				
			Na in liquid NH <sub>3</sub>				
			H <sub>2</sub> /Ni, 150°C, 160 atm.				
		,	H <sub>2</sub> - Pt/CH <sub>3</sub> COOH				

Seat	Set	D
No.	Set	

			BOTANY (Specia Cell Biology (1	•	•	
-			ursday, 25-04-2024 I To 06:00 PM		Max. Mark	(s: 80
Insti	ructio	2	) All questions are compulsory. 2) Draw neat labelled diagram wh 3) Figures to the right indicate full		•	
Q.1	A)	<b>Mul</b> 1)	tiple Choice questions is present inside the nuc a) Ribosomes c) Cytoplasm	b)	eukaryotes. Cell membrane Nucleolus	10
		2)	ATP is the energy currency of coin a) chloroplast c) nucleus		ch is synthesized and stored mitochondria nucleolus	
		3)	In mitotic cell division, the chror plate in phase. a) prophase c) anaphase	b)	es are present on equatorial metaphase telophase	
		4)	The process of division of nucle a) karyokinesis c) parthenogenesis	b)	called cytokinesis all of these	
		5)	When the power of ocular lens magnification is larger th a) 100 times c) 400 times		ginal object.	
		6)	In division the chromoso daughter cells than the parental a) meiosis c) amitosis		mber is reduced to half in mitosis all of these	
		7)	Ultra structure of cell organelles <ul><li>a) dissecting microscope</li><li>c) electron microscope</li></ul>	s can b b) d)	compound microscope	
		8)	Eukaryotic cell differs from prok a) endoplasmic reticulum c) true nucleus		ribosome	

		<ul><li>9) Two sister chromatids are attached with the</li><li>a) spindle fibre</li><li>b) chromatids</li><li>c) centromere</li><li>d) chromocenter</li></ul>	
		10) Chromosome can be stained with one of the stain a) acetocarmine b) safranin c) light green d) eosin	
	B)	Filling the blanks.  1) Dissecting microscope have used lens.  2) are the fundamental units of life.  3) A diploid cell produces four haploid cells by a division.  4) Ribosome is the site of  5) The V- shaped chromosome with central centromere is known as  6) membrane develops from ER during cell division.	06
Q.2	Solva) b) c) d) e) f) g) h)	ve any EIGHT of the following.  Define Ribosome.  Write any two functions of RER.  Any two principles of microscopy.  long form of STEM.  Draw neat labelled diagram of chloroplast.  Any two significance of mitosis.  define karyotype.  Enlist the types of chromosomes.  Write on zygotene stage of meiosis.  Define cell.	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Describe the structure of chromosome.</li> <li>2) Write a brief account of light microscopy.</li> <li>3) Describe the structure of eukaryotic cell.</li> </ul>	10
	B)	Describe the phases of mitosis.	06
Q.4	A)	Attempt any two of the following.  1) Write the significance of cell cycle.  2) Illustrate the ultra-structure of Golgi body.  3) Explain in brief account of electron microscopy.	08
	B)	Explain the structure of prokaryotic cell.	08
Q.5	Atte a) b) c)	empt any two of the following.  Describe the structure and function of cytoskeleton.  Give an account of meiosis with their regulations.  Describe the structure of nucleus and give functions.	16

Seat No. Set	P
--------------	---

	D.30	c. (Se	mes	ZOOLOGY (Spec	-	aper - XV)
			Anin	nal Behavior and Ch	ronob	iology (19201629)
•			,	v, 25-04-2024 3:00 PM		Max. Marks: 80
Instr	uctic	2)   3)	Draw Figur	uestions are compulsory. neat labelled diagrams w es to the right indicate full of log table and calculator	marks	•
Q.1	A)	Choo 1)	Scie a)	orrect alternatives entific study of function and Ecology Ecological Economics	b)	tion of behavior is called as? Ethology Anthropology
		2)	and a)	lov's dog associated the r begins to salivate? Timer Telephone	b)	of with the arrival of food  Dish Bell
		3)	stim a)	gradual decrease in respolulus if found to be harmle Fixed Action Pattern Biological clock	ess is ca b)	Habituation
		4)	is aı a)	the ground, ants leave tra n example of use of Auditory Visual	_ sense b)	neromone for others to follow; this es for communication. Tactile Olfactory
		5)	knov a)	f-destructive behavior per wn as Polyandry Polygyny	formed b) d)	I for the well-being of others" is Altruism Mutualism
		6)	situa a)	nate choice, when a single ation is called as Polygyny Homogyny	b)	mates with many females, this Polyandry Homology
		7)	•	is considered as domir hms in many mammals? Sino-auricular Node Amygdala	b)	cemaker of many circadian  Antrio-ventricular Node  Suprachiasmatic Nuclei (SCN)
		8)	is ca	length of time required to alled as Period Amplitude	compl b) d)	ete an entire biological oscillation Phase Wavelength

		9)	An e is	endogenously generate	d rhythms	s with a period close to 24 hours	
			a)	Circannual rhythm Diurnal rhythm	,	Circadian rhythm Ultradian rhythm	
		10)	glan a)		b)	eep is produced by endocrine Pituitary Parathyroid	•
	B)					answer/ One word answer/	06
		Give 1)	Cure admi	inistration of various typ	se with proces of the		
		2)		the name of ethologist s:	who stud	died the dance language in honey	
		3)			immediat	e cause of behavior is known as:	
		4) 5) 6)	Defir	 ne the meaning of the tene the meaning of the tene ne the meaning of the te	erm: Chro	nopharmacology.	
Q.2	a) b) c) d) e) f)	Define State Explain State Vertel Define State	e meanthe main the meanthe mea	s. term 'Chronomedicine'. erm 'Society' with respe	lock' mplitude' I' with res	in biological oscillation. pect to seasonal reproduction in	16
	i) j)			e term 'Sexual Dimorphi term 'Geotaxis' with sui		mple.	
Q.3	A)	Atten 1) 2) 3)	Disco suita Expla Defir	able examples. ain imprinting behavior	instinctiv and its sig I a note o	e and learned behaviors with gnificance with suitable examples. n intra-sexual and intersexual	10
	B)	Give	a sho	e/Solve. ort account on classical outable illustration.	conditioni	ng experiment of Ivan Pavlov on	06
Q.4	A)	Atten 1) 2) 3)	Disco chron Give	nomedicine, chronother a short note on adaptiv	nobiology apy and o e signific	/ in chronopharmacology, drug design. ance of biological clock to animals. s advantages to animals with	08
	Б,	<b>D</b> -		able examples.			
	B)	Give	a deta	E <b>xplain/Solve</b> ailed account on the eth <sup>-</sup> inbergen and Karl von l	_	contributions of Konrad Lorenz	80

#### Q.5 Attempt any two of the following.

- a) Give a detailed account on foraging and dance language in honey bees with suitable illustrations.
- b) Give an account on types and characteristics of biological rhythms.
- c) Give a detailed account on the contributions of Ivan Pavlov and Karl von Frisch in ethology.

16

Seat	Sat	D
No.	Set	

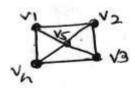
			MATHEMATICS (S Graph Theory	•	- 7	
-			nursday, 25-04-2024 // To 06:00 PM		Max. N	/larks: 80
Instr	uctio		l) All questions are compulsor 2) Figures to the right indicate	-	arks.	
Q.1	A)	<b>Cho</b> 1)	cose the correct alternatives  Convert 1011011 <sub>(2)</sub> to Decin  a) 91  c) 90			10
		2)	Convert 1476 <sub>(10)</sub> to octal nur a) 2703 c) 2701		 2704 2702	
		3)	The vertex which has degree a) pendent vertex c) cut vertex		is called isolated vertex initial vertex	
		4)	A directed graph is calledvertices of the graph both the from one to other.  a) weakly c) strongly	e verti	ces of the pair are reachable unilaterally	
		5)	A vector with in degreen a) 1 c) 0	e is ca b) d)	alled source. 2 3	
		6)	Repeated edges are allowed a) trail c) cycle	l in b) d)	 path walk	
		7)	A graph in which all vertices a) Complete c) Null	are sa b) d)	ame degree is called as Regular Bipartite	_ graph
		8)	Complete graph $k_n$ is Euleria a) 2 c) 5	an if <i>n</i> b) d)	= 6	
		9)	A tree with $n$ vertices has a) $n$ c) $n-1$	e b)	dges. $n+1$	

- 10) A tree with \_\_\_\_\_ vertex is called trivial tree.
  a) one b) two
  c) three d) four
- B) Fill in the blanks 06
  - Convert octal integer 25146<sub>(8)</sub> to decimal \_\_\_\_\_.
     Convert hexadecimal number 2D2E<sub>(16)</sub> to binary \_\_\_\_\_.
  - 3) A vertex is called pendent vertex if and only if it has degree
  - 4) Draw a tree on 5 vertices .
  - 5) Draw a Bipartite graph K<sub>33</sub>\_\_\_\_\_.
  - 6) Draw a wheel  $W_6$ .

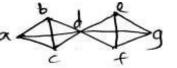
#### Q.2 Answer the followings (Any Eight):

16

- a) Convert  $13.6875_{(10)}$  to Binary number.
- **b)** Convert  $3526_{(8)}$  to Binary number.
- c) Define complete graph and give example.
- d) Find degree of each vertex.



- e) Draw a graph which is complete but not regular.
- f) Define trail and path
- g) Find distance between (a, g) and (a, e) of



h) Verify Eulers formula



i) Find any two Spanning tree

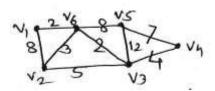


j) Draw binary tree representation of  $(a + b) * (^{C}/_{d})$ 

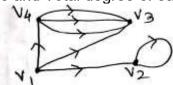
#### Q.3 A) Answer the followings (Any Two):

10

- 1) Show that maximum number of edges in simple graph with n vertices is  $\frac{n(n-1)}{2}$
- 2) Using Prim's algorithm find M.S.T.



- 3) Convert binary number  $111 \cdot 1101_{(2)}$  to decimal and the decimal number  $0.78125_{(10)}$  to binary number.
- B) Find indegree, out degree and Total degree of each vertex of graph. 06



Q.4 A) Answer the followings (Any Two):

- 80
- 1) Show that a graph G is self complementary if it has 4n or 4n + 1 vertices.

(n is non negative integer)

- 2) Write short note on polish prefix and postfix notation
- 3) Draw the graph whose incidency matrix is

	$e_1$	$e_2$	$e_3$	$e_4$	$e_5$	$e_6$	
$v_1$	L0	1	0	0	1	17	
$egin{array}{c} v_1 \ v_2 \ v_3 \end{array}$	1	0	1	0	0	0	
$v_3$	1	0 0	0	$e_4$ $0$ $0$ $0$	0	1	
$v_4$	0	1	1	1	1	0	
$v_5$	$L_0$	0		1	0	01	

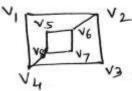
B) Convert

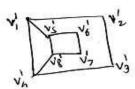
08

- 1)  $0.4375_{(10)}$  to Octal
- 2)  $27.A3C_{(16)}$  to Binary
- 3)  $11110101011001_{(2)}$  to hexadecimal
- 4)  $71_{(8)}$  to decimal
- Q.5 Attempt any two of the following questions.

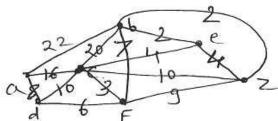
16

a) Show that following graph are not isomorphic

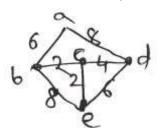




**b)** Using Dijkstra's algorithm find shortest path from a to z



c) By using Kruskal's algorithm find minimal spanning tree



Seat No.							Set	P
В.	Sc. (S	ST	l) (New) (CBC ATISTICS (Sp igns of Exper	ecial Pa	per - XV)	-	ril-2024	4
•		Thursday, 25-0 PM To 06:00 P				Max	k. Marks	s: 80
Instru	ctions		ns are compulso the right indicate		S.			
Q.1	<b>A) C</b>   1)	In complete	rect alternatives ely randomized d al units, error de - 1	lesign with grees of fro b)	$\dot{r}$ treatmen		·	10
	2)	a) increas b) reduce	ol in experimenta se the efficiency experimental er homogeneous l above	of the desi		·		
	3)		n 4 blocks and 5 egrees of freedor	m in ANOV			oservatio	on,
	4)	In RBD with	n 4 blocks and 5	treatments	s, number of	experimen	ıtal	

b) 12 d) 19

b)  $3 \times 3$  d)  $5 \times 5$ 

b) 24

d) 11

b) Exy/Exx

d) None of these

The degrees of freedom for treatments in LSD is 4, the Layout of

In  $5 \times 5$  LSD, one observation is missing then d.f. for error sum of

In ANOCOVA the least square estimate of  $\beta$  =\_\_\_\_.

units are \_\_\_\_.

a) 16

c) 20

LSD is  $\underline{\phantom{a}}$  a)  $2 \times 2$ 

c)  $4 \times 4$ 

a) 25

c) 12

a) Exx/Eyy

c) Eyy/Exy

squares is \_\_\_\_\_.

5)

6)

7)

		<ul> <li>A factorial experiment with three factors at two levels is called</li> <li>a) 2 × 3 factorial experiment</li> <li>b) 3 × 2 factorial experiment</li> <li>c) 3² factorial experiment</li> <li>d) 2³ factorial experiment</li> </ul>	
		9) If same factorial effect is confounded in all the replicates, then it is called a) Total confounding b) Incomplete confounding c) Partial confounding d) no confounding	
		10) In factorial experiment the effect totals are obtained by a) Kendall b) Yate's c) Karl Pearson d) None of these	
	B)	Attempt all of the following:  1) Define experimental unit.  2) Define Local control.  3) Explain the term Treatment.  4) State the formula to find M.S.S.  5) State mathematical model of C.R.D.  6) What is full form of ANOCOVA?	06
Q.2	Ans a) b) c) d) e) f) g) h)	Give situation where missing plot technique is applicable.  Define main effects in 2² factorial experiment.  Explain interaction effects in 2² factorial experiment.  Give real life situations where CRD is used.  Define layout of an experiment.  State the headings of columns of ANOVA Table.  Define block and yield.  Define efficiency of design of experiment.  Describe the principle of replication.  Define the principle of Randomization.	16
Q.3	A)	Attempt any Two of the following.  1) What is RBD? Give its layout. 2) Estimate the parameters in CRD. 3) Explain total and partial confounding.	10
	B)	Give layout of Latin Square Design.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Derive the formula for one missing observation in R.B.D.</li> <li>2) Explain Yate's procedure to obtain factorial effect totals in 2² factorial experiment.</li> <li>3) Find interaction effect in 2³ factorial experiment.</li> </ul>	80
	B)		08

#### Q.5 Attempt any Two of the following.

16

- a) Following data are available for a 5 × 5 LSD, Row S.S.= 22, Column S.S.= 26 Treatment S.S.= 16, Error S.S.= 18 Prepare and complete ANOVA Table.
- **b)** Explain the concept of ANOCOVA. Give the mathematical model and ANOCOVA table in CRD.
- c) Derive the formula for missing observation in LSD.

Seat No. Set F	
----------------	--

			GEOLOGY (Spe Environmental Ge		-
-			hursday, 25-04-2024 M To 06:00 PM		Max. Marks: 80
Instr	uctio	ns:	<ol> <li>All questions are compulsory.</li> <li>Draw neat labelled diagrams v</li> <li>Figures to the right indicate fu</li> <li>Use of log table and calculato</li> </ol>	ll marks.	
Q.1	A)	<b>M</b> (	ultiple choice questions. What disaster did India experi a) Cyclone	b)	Landslide
		2)	<ul><li>c) Avalanche</li><li>Commonly, who is the head o</li><li>a) Finance Minister</li><li>c) District Collector</li></ul>	d) f the Nat b) d)	subsidence tional Disaster Management team? Chief Minister Prime Minister
		3)	What is frequently experience a) Cyclone c) Avalanche	,	
		4)	Overexploitation of undergrou which disaster? a) Cyclone c) sea level rise	nd water b) d)	r & minerals illegally may cause Tsunami Subsidence
		5)	Industrialization is one of the r a) Cyclone c) Global Warming	major rea b) d)	asons for which effect? flood Subsidence
		6)	What is the effect of the removement may further lead to flooding?  a) siltation in the dam  c) Global Warming	b)	een cover in the catchment that  Tsunami  Subsidence
		7)	What is the effect of increase a) siltation in the dam c) Global Warming	in Green b) d)	nhouse gasses? Tsunami Subsidence
		8)	What is the meaning for the ol potential to cause damage?  a) Hazard c) Mitigation	bject, siti b) d)	uation of, process that has  Disaster Insecure
		9)	What may slope modification l a) Landslide c) Global Warming	lead to? b) d)	Tsunami Subsidence

		<ul> <li>a) protecting life and its environment</li> <li>b) protecting life</li> <li>c) sustainable development</li> <li>d) improving life quality</li> </ul>	
	B)	Fill in the blank/Definition/One sentence answer/ One word answer/ Give the name/Predict the product etc.  1) Define environmental geology. 2) Define abutment. 3) What happens when water vapor diffuses in clouds? 4) Water droplets after condensation fall down is called as? 5) What term is used to describe precipitation in the Upper Himalayan region? 6) What long lasting impact the Tsunami will cause on the coastal soils?	6
Q.2	Solva) b) c) d) e) f) g) h)	What was the name and type of the disaster that hit the west coast of India recently? What are the names of the ocean currents that adversely impact global precipitation? What is a tropical environment like? What are two supportive natural resources of the biosphere? What are the geographic locations of the solid state of the hydrosphere? Which is the most important lithospheric content that supports plants & why? Which most important content of the atmosphere is supportive to most of the animals? & Why? What impact on the atmosphere will be caused if the magnetic field of earth vanishes? Why? What are two major causes of subsidence? Give any two major causes of increased salinity of groundwater at the coastal areas?	6
Q.3	A)	Attempt any Two of the following.  1) Sketch & describe the energy energy budget 2) Sketch and describe the Hydrogeological cycle. 3) Sketch the idea of lithosphere & explain the processes and products required to it.	0
	B)	Explain the nature of geological report for preparedness of probable dam <b>0</b> failure.	6
Q.4	A)	Attempt any Two of the following.  1) Describe the interaction between lithosphere and biosphere.  2) Describe the interaction between biosphere and atmosphere.  3) Explain the relation of landslides or related phenomenon & floods with famous examples.	8
	B)	Describe the interaction between lithosphere and atmosphere. <b>0</b>	8
Q.5	Atte a)	npt any Two of the following.  What is disaster management? Explain the preparedness phase of a flood disaster.	6
	b) c)	Explain the mitigation and the post disaster phase of volcanic disaster.  What is drought? Explain the causes and sustainable remedies for controlling the draughts.	

10) What is the main objective of studying environmental geology?

Seat	Cot	D
No.	Set	

			MICROBIOLOGY (Special Paper- XV) Clinical Microbiology (19201662)
			ursday, 25-04-2024 Max. Marks: 80 I To 06:00 PM
Insti	uctio	2	) All questions are compulsory. ) Draw a neat labelled diagram wherever necessary. ) Figures to the right indicate full marks.
Q.1	A)		iple choose questions.
		1)	antibiotic has, a beta lactam ring.  a) Tetracyclin b) Streptomycin c) Penicillin d) Cephalosporin
		2)	Tetanus toxin is of Type. a) Neurotoxin b) Cytotoxin c) Endotoxin d) Enterotoxin
		3)	Germ tube test is used for the diagnosis of  a) AIDS b) Candidiasis c) Syphilis d) Typhoid fever
		4)	Organism showing swarming growth on culture media is  a) Shigella b) Klebsiella c) Proteus d) Escherichia
		5)	Selective medium for Vibrio cholera is a) Dettol agar b) NIH c) TCBS d) Stuart
		6)	Single skin lesion is seen in type of leprosy. a) TT
		7)	The genome of AIDS virus is a) ssDNA b) ssRNA c) dsDNA d) negative sense
		8)	is associated with food poisoning due to consumption of sea fish.  a) Vibrio vulnificus b) Vibrio alginolyticus c) Vibrio parahaemolyticus d) Vibrio cholerae
		9)	Multiple antibiotic resistance is mediated by  a) Plasmid b) Episome c) Col plasmid d) All of these

		10) Ringworm of the scalp is Known as a) Tinea capitis b) Onytchomycosis c) Tinea pides d) Tinea ungnium					
	B)	Answer in one or two words.  1) Define vaccine.  2) What is antifungal agent?  3) What is pathogenicity?  4) What is the mode of transmission of cholera?  5) What is oral thrush?  6) What are negri bodies?	06				
Q.2	Ans a) b) c) d) e) f) g) h) i)	wer the following. (Any Eight) What is acid fast staining? Enlist ideal characteristics of antibiotics. What is microbial adhesion? Enlist bacterial toxins. What is microbial invasion? What is antibiotic resistance. Give examples of antiprotozosl agents. How to dispose clinical samples. What is the role of fomites. Define CDC.	16				
Q.3	A)	<ul> <li>Answer the following. (Any Two)</li> <li>Write short note on Ebola disease.</li> <li>Explain the pathogenicity, Spread and control of malaria.</li> <li>Give the details of mechanism of pathogenicity of fungal infection.</li> </ul>					
	B)	Write an account on AIDS.	06				
Q.4	A)	<ul> <li>Answer the following. (Any Two)</li> <li>Write in detail about Rabies disease.</li> <li>Write pathogenesis of herpes simplex infection.</li> <li>Write an account on hospital acquired infection.</li> </ul>	80				
	B)	Give an detail account on biological warfare.	80				
Q.5	Ans a)	wer the following. (Any Two)  How is the chemotherapy tested with special reference to diffusion and birth dilution Methods.	16				
	b)	·					

Seat	Sat	Р
No.	Set	

#### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 ELECTRONICS (Special Paper - XV) Electronics Instrumentation (19201678)

			Electronics Instrumer	- · · · · · · · · · · · · · · · · · · ·	
_			nursday, 25-04-2024 // To 06:00 PM	Max. Ma	rks: 80
nstı	uctio	3	I) All questions are compulsory. Draw neat labelled diagrams to Figures to right indicate full materials. Use of log tables and calculate.	arks.	
Q.1	A)	<b>Mul</b> 1)	tiple choice questions.  Normally data acquisition systems:  a) on-line c) both (a) and (b)	em is measurement system. b) off-line d) can't say	10
		2)	In multichannel data acquisitio the conditioned outputs from da) Buffer c) A/D converter	n system unit is used to scar ifferent channels. b) Controller d) Multiplexer	า
		3)	The instrumentation amplifiers signals from of the followa) Active filters c) D/A converters		
		4)	To design bridge amplifier it re a) differential amplifier c) op-amp noninverting		
		5)	As far as power consumption i power when compared a) less c) no power	s concerned LCD display consume to LED displays. b) more d) same power	
		6)	In electronic circuit in which do signal, amplified by standard a dc signal is called  a) chopper c) inverter	signal is converted into an ac mplifier and finally converted back of b) clamper d) rectifier	to
		7)	In instrumentation amplifier, the algorithm algorithm and difference of inputsion blooms gain and ratio of input sign clother control all of these	al	

		8)	The 4-20 mA current transmission is an example of technique.  a) ratiometric conversion b) offset compensation c) logarithmic conversion d) grounding	
		9)	The AD594/595 is precalibrated precision amplifier to produce output voltage from thermocouple signal. a) 1 m V/ $^{0}$ C b) 10 $\mu$ V/ $^{0}$ C c) 10 mV/ $^{0}$ C d) 1 $\mu$ V/ $^{0}$ C	
		10)	Stress and strain curves are plotted using  a) Strip chart recorder b) X-Y recording c) X-T Recorder d) All of these	
	B)	One 1) 2) 3) 4) 5) 6)	sentence answer.  What is the use of Digital Multimeter?  What is the role of Isolation amplifiers?  What is need of Programmable instrumentation amplifier?  What is full form of DAS?  Which is most popular crystal structure in LCD display?  Which is the nature of liquid, if the pH of liquid is less than 7?	06
Q.2	Solv a) b) c) d) e) f) g) h) i)	Com Give Drav Wha Drav Enlis Drav Wha Drav	per Eight of the following.  Inpare dc and ac signal conditioning technique.  Salient features of Programmable Instrumentation amplifiers.  In pin configuration of the IC AD620.  It is Data logger?  It block diagram AC signal conditioning technique.  It the names of Display Unit.  It block diagram of chopper amplifier.  It is 4-20 mA current transmission?  It block Schematic of digital multimeter.  It block diagram of temperature meter.	16
Q.3	A)		mpt any Two of the following. Write a note on X-Y meter. Explain General block diagram for electronics instrument design for measurement. Explain ratiometric conversion.	10
	B)	Write	e a note on Bridge Amplifier.	06
Q.4	A)	Atte 1) 2) 3)	mpt any Two of the following. Explain Instrumentation amplifier Draw diagram and explain pH meter. Write a note on Computer based Data Acquisition System.	80
	B)	Expl	ain Digital storage oscilloscope.	80

#### Q.5 Attempt any Two of the following.

16

- a) Draw block Diagram & Explain LCR-Q meter.
- **b)** Describe general DAS with block diagram. And explain the multichannel DAS.
- c) Give Salient features, Draw & Explain Block diagram and Pin description of AD620.

Seat	Set	D
No.	Set	

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 COMPUTER SCIENCE (Paper- XVI) Data Communication and Networking – II (19201670)

		Dat	ta C	COMPUTER SCIENCE ommunication and Net	•	• '	670)
•				ay, 25-04-2024 06:00 PM			Max. Marks: 80
Instr	uctio			questions are compulsory. ures to the right indicate full ı	marks	3.	
Q.1	A)	<b>Cho</b> 1)	The a)	the correct alternatives from elements of data communical Sender Transmission medium	ation : b)	-	10
		2)	cha a)	is the process of dividing nnels for better efficiency. Multiplexing Protocol	b)	the physical med Switching Modulation	dium, into logical
		3)	a)	evice operating at the physica Bridge Repeater	b)	er is called a Router All of these	
		4)	a)	and FM are examples of Analog-to-analog Digital-to-digital	b)	odulation. Analog-to-digital Digital-to-analog	
		5)	arch a) b) c)	model is a model for undenitecture. TCP/IP Open system interconnection Network Model None of these		ding and designir	ng network
		6)	of ti a)	is a number of packets pa me Switching Throughput	b)	through the netw Modulation Multiplexing	ork in a unit
		7)	Mos a)	st packet switches use	princ b)		
		8)	ove a)		b)	veen two or more  Data networking  Communication	•

		In transmission, the channel capacity is shared by both communicating devices at all times.  a) Simplex b) Half-duplex c) Full-duplex d) None of these	
		<ul> <li>Which of the following layer of OSI model also called end-to-end layer?</li> <li>a) Presentation layer</li> <li>b) Network layer</li> <li>c) Session layer</li> <li>d) Transport layer</li> </ul>	
	B)	Il in the blank.  The packet of information at the application layer is called  provides a connection-oriented reliable service for sending messages.  In the OSI model, encryption and decryption are functions of the layer.  As frequency increases, the period  is a set of rules that governs data communication.  DNS is the abbreviation of	6
Q.2	Ans a) b) c) d) e) f) g) h)	r the followings (Any Eight):  efine Computer Network? And what are the benefits of the networks?  efine the term half-duplex and full-duplex.  That are the different transmission media?  efine Analog and Digital signal?  That is Attenuation?  efine the term Multiplexing?  efine Parity Check?  That do mean by congestion control?  efine the term Period and Phase?	5
Q.3	A) B)	Explain the Connection oriented and connection less services in data Communication.  Describe Manchester and Differential Manchester scheme?  Define Network devices? Explain Hub and Switch.	
Q.4	A)	ttempt any Two of the following.  Explain Fiber Optic Cable transmission media?  Differentiate packet switching and circuit switching?	
	B)	Explain the Point to Point Protocol in detail	8
Q.5	Atte a) b) c)	ot any Two of the following.  Tiefly explain the different data transmission modes: Parallel and Serial?  Replain the TCP/IP protocol suite with SMTP, HTTP and SNMP.  Tiefly explain the CSMA/CD method with neat diagram?	6

Seat	Set	Р
No.		-

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024

				PHYSICS (Pa Electronics	•			
				, 22-04-2024 6:00 PM			Max. Marks	: 80
Insti	ructio	2) 3)	) Drav ) Figu	uestions are compulsory. w neat labelled diagram wl res to right indicate full ma of log table and calculator	arks.	•		
Q.1	A)	Sele 1)	An S a)	e correct alternative from SCR has three terminals i.d anode, cathode, grid anode, cathode, drain	e., <u>b)</u>	 cathode, anode, gate		10
		2)	a)	output of non-inverting op constant in phase	b)	is with input. reverse out of phase		
		3)	a) b) c)	normal way to turn ON an appropriate gate current breakdown voltage appropriate anode currer none of the above		is by		
		4)	a)	SFET is sometime called _ shorted gates many gates	b)			
		5)	a)	out of timer is of so dependant constant	b)	oltage. corresponds independent		
		6)	a)	stands for Light Emitting Diode Length Emitting Diode				
		7)	a)	ac is equivalent to two SC in parallel in-inverse-parallel	b)	in series none of the above		
		8)	a)	ED, Gallium Arsenide mate yellow green	b)	sed for doping give blue red	colour.	
		9)	a)	55 timer operates in single three	b)	de. double four		
		10)	are a)	as discharge plasma displacalled gate nixies		old cathode numerical i cathode anode	indicators	

	В)	<ul> <li>Fill in the blank/Definition/ One sentence answer/One world answer/Give the name/Predict the product etc.</li> <li>1) In IC 555 pin number six is</li> <li>2) An SCR is sometimes called</li> <li>3) Which MOSFET can be operated in depletion as well as enhancement mode?</li> <li>4) The device that does not have gate terminal is a</li> <li>5) The turn ON-OFF time of LED's is less than</li> <li>6) The two inputs terminals of an op-amp are known as</li> </ul>	06
Q.2	Atternal (a) (b) (c) (d) (e) (f) (g) (h) (i) (j)	mpt any Eight of the following.  Write the applications of DAIC.  Define the terms: Breakdown voltage and Holding current.  State any four characteristics of an ideal OP-AMP.  What are the advantages of LED?  Draw the pin connection diagram of IC-555 timer.  Give the important features of LCD's.  Draw the symbols of DIAC and TRAIC.  What do you understand by Nixies?  Define comparator.  Sketch the I-V characteristics of SCR.	16
Q.3	A)	Attempt any Two of the following.  1) Give comparison between D-MOSFET and E-MOSFET.  2) Explain op-amp as a differentiator.  3) Explain LCD.	10
	B)	In 555 astable multivibrator, $R_a$ = 22 k, $R_b$ = 39 k and C = 0.01 $\mu f.$ Calculate the $T_{\text{ON}}$ and $T_{\text{OFF}}.$	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Draw the functional block diagram of IC 555 timer.</li> <li>2) Draw the structure of LED and explain its operation in brief.</li> <li>3) Explain op-amp as an integrator.</li> </ul>	80
	B)	Write a not Schmitt trigger.	80
Q.5	Atte a) b) c)	mpt any Two of the following.  Explain construction, working and characteristics of DIAC.  Derive an expression for voltage gain of non inverting amplifier using op-amp.  Explain gas discharge plasma displays.	16

Seat No.	Set	Р

		Ana	CHEMISTRY (\$ alytical and Industrial (	Special Paper- XVI) Organic Chemistry (19	9201617)
•		te: Mo	nday, 22-04-2024 To 06:00 PM	3 (	Max. Marks: 80
Instr	uctio	2) 3)	<ul> <li>All questions are compulso</li> <li>Draw neat labelled diagran</li> <li>Figures to right indicate ful</li> <li>Use of log table and calcul</li> </ul>	n wherever necessary. I marks.	
Q.1	A)		A linear polymer of 1,3 but takes place.  a) 1, 2 c) 1, 3	_	10 polymerization
		2)	Nitrogen is used as mobile a) Thin layer c) Paper	phase in chroma b) Gas d) Column	tography.
		3)	Toilet soap can be represe a) (RCOO <sup>-</sup> ) <sub>2</sub> Mg <sup>++</sup> c) RCOO <sup>-</sup> K <sup>+</sup>	ented by general f b) (RC00 <sup>-</sup> ) <sub>2</sub> Ca <sup>++</sup> d) RC00 <sup>-</sup> Na <sup>+</sup>	ormula.
		4)	Semi-solid mass obtained called as a) sprit c) melter	at the end of crystallization b) molasses d) massecuite	process is
		5)	Compound imbibitions tech a) concentrate c) extract	nnique is used to s b) decolorize d) crystallize	ugar cane juice.
		6)	Cyclobutanone is converte a) 1,3-dithiane c) NaBH <sub>4</sub>	d into cyclobutanol by action b) SeO <sub>2</sub> d) OsO <sub>4</sub>	on of
		7)	Lthium aluminium hydride a) oxidizing c) hydrating	(LiAlH₄) can used ı b) reducing d) hydrolyzing	reagent.
		8)	Acetaldehyde is converted a) glyoxal c) oxalic acid	b) ethyl alcohol d) peopane	eO <sub>2</sub> .
		9)	In steam heater cane juice a) 333 c) 328	is heated to K. b) 273 d) 373	
		10)	Natural rubber is polymer of a) styrene c) isoprene	of b) ethane d) butadiene	

	в)	<ol> <li>Heating of raw rubber in presence of sulfur and white lead at moderate temperature is known as</li> <li>The ratio of distance moved by solute to that by solvent front is known as value.</li> <li>Soap when vigorously shaken in water forms aggregate structure called as</li> <li>The polymer which softens on heating and hardens on cooling is called as</li> <li>Thermal conductivity cell is used as detector in chromatography</li> </ol>	<b>06</b>
		6) Monomer used in manufacture of neoprene is	
Q.2	Sol <sup>1</sup> a) b) c) d) e) f) g) h) i)	Write the reactions for preparation of teepol.  Mention any two advantages of sops over detergents.  Mention the types of polymers based on origin and composition.  Write synthesis and uses of PVC.  Define the terms absolute alcohol and power alcohol.  Mention the By-products of alcohol industry.  Write any four characteristics of bio-catalytic reactions.  Write any two synthetic applications of Sodium borohydride with reactions.  Write the principle of Thin layer chromatography.  Mention different types of mobile phases used for Gas and Thin layer chromatography.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write a note on Zigler-Natta polymerization, mention types of polymers based on tacticity.</li> <li>2) Write a note on By-products of sugar industry.</li> <li>3) Write a note on different raw materials used in soap industry.</li> </ul>	10
	B)	Short note/Solve. Discus manufacture of soap by hot or semi-boiled process.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Explain any four applications of SeO<sub>2</sub> as an oxidizing agent.</li> <li>2) What are PTC? Give their brief account as catalysts.</li> <li>3) Write the steps involved in synthesis of phenol formaldehyde resin and mention its uses.</li> </ul>	80
	B)	<b>Describe/Explain/Solve.</b> Explain paper chromatography with reference to principle, methodology and applications.	80
Q.5	Atte a) b) c)	empt any Two of the following. Give brief account of manufacture of ethyl alcohol from molasses. Give brief account of construction and working of Gas chromatography. Explain concept of Umpolung with reference to use of 1,3-ditiane and give its applications. Write a note on types of ionic liquids with example.	16

	_	
Seat	Sat	D
No.	Set	F

	B.Sc	c. (Se	nester - VI) (New) (CBCS) Examination: March/April-2024 BOTANY (Special Paper – XVI) Nursery, Gardening & Horticulture (19201608)
•			day, 22-04-2024 Max. Marks: 80 To 06:00 PM
Instr	uctio	2) 3)	All questions are compulsory. Draw neat labelled diagram wherever necessary. Figures to right indicate full marks. Use of log table and calculator is allowed.
Q.1	A)	Sele	t the correct alternative from the following.  Nursery is defined as an area where are raised for eventual planting.  a) plants b) animals c) both a and b d) None of these
		2)	Objectives of Nursery occupies an important place in regeneration.  a) artificial b) natural c) both a and b d) None of these
		3)	Green infrastructure is a design strategy based on improving quality. a) soil b) water c) stone d) None of these
		4)	Gardening is the practice of growing and cultivating plants as part of  a) horticulture b) floriculture c) sericulture d) All of these
		5)	Landscape gardening can be defined as the decoration of a tract of  a) sky b) land c) both a and b d) None of these
		6)	A park is an area of space set aside for human enjoyment. a) natural b) semi-natural c) both a and b d) None of these
		7)	Seed plants are the familiar green components of landscapes.  a) wild b) modified  c) managed d) all of these
		8)	A seed is the result of reproduction. a) sexual b) asexual c) vegetative d) All of these
		9)	There are important types of seed. a) four b) Five c) six d) seven
		10)	Rupturing of seed coats or scarification by abrasion through machine  a) threshing b) filing c) chipping d) All of these

	B)	Fill in the blank.	06
	,	1) The hard seed coat is impermeable to water and .	
		2) The characteristics of a seed are laid down during the course of its development.	
		3) Any treatment that weakness the seed coat, is known as scarification.	
		<ul> <li>4) treatment is also an effective method of breaking hard- seed.</li> <li>5) Method of breaking dormancy of light sensitive</li> <li>6) There are methods to break the dormancy of chilling requiring</li> </ul>	
		seeds.	
<b>Q.2</b>		ve any Eight of the following.	16
	a)	What is Nursery?	
	b)	Give the definition of gardening. What is mean by horticulture?	
	c) d)	Define park.	
	e)	What is seed?	
	f)	Define the propagation.	
	g)	Define cutflowers.	
	h)	What is bonsai?	
	i) :\	Give the definition of budding.	
	j)	Define seed bank.	
Q.3	A)	Attempt any Two of the following.	10
	•	1) Explain the objective of nursery.	
		2) Describe the computer application in landscaping.	
		3) Describe the home garden studied by you.	
	B)	Write short notes any Two of the following.  1) Structure of seed	06
		<ul><li>2) Cutting</li><li>3) Genetic erosion</li></ul>	
Q.4	A)	Attempt any Two of the following.	08
		1) Explain the types of layering studied by you.	
		2) Give the types of seeds studied by you.	
		Describe the seed production technology studied by you.	
	B)	Attempt any Two of the following.	80
		<ol> <li>Explain the budding vegetative propagation.</li> <li>Give the weed control method studied by you.</li> </ol>	
		<ul><li>2) Give the weed control method studied by you.</li><li>3) Describe the cutflowers studied by you.</li></ul>	
Q.5	Atte	mpt any Two of the following.	16
	a)	Describe the importance of flower shows and exhibition studied by you.	
	b)	Explain the biopesticides.	
	c)	Explain the factor affecting seed viability.	

Seat	S <sub>04</sub>	В
No.	Set	

				BOTANY (S Biostati	•			
-			-	, 22-04-2024 6:00 PM			Max	. Marks: 80
Insti	ructio	2	) Drav	uestions are compu w neat labelled diag res to right indicate	ram whe		r necessary.	
Q.1	A)			e correct alternativest is developed by		he f	ollowing.	10
		1)	a)	R. A. fisher William Gosset		,	Carl Pearson Laplace	
		2)	a)	nary data is Original data Biased		,	Result of survey Result of inquiry	
		3)	a)	throw of coin 1 1/4	_ is the p	b)	ability of getting tail. 1/2 1/3	
		4)	a) b) c)	diagram is a one dimensional di two dimensional di three dimensional circular diagram	iagram agram			
		5)	a)	le is denoted by $ar{x}$ Mo	sign	b) d)		
		6)	•	is not a measur Mean Median	e of cent	ral to b) d)	Mode	
		7)	is de a)	istical significance o enoted by Degree of freedom Standard deviation	1	babi b) d)	•	nificance
		8)	a)	most repeated obse Mode Mean	ervation i	b)	Median All the above	
		9)	Med a) b) c) d)	lian for arranged dat Mean of first and la Middle most value Most frequent valu Last frequent value	ast value e			

		<ul> <li>10) is not a step in calculation of the Chi- square statistics.</li> <li>a) Formulate the null hypothesis and determine the expected frequency of each answer</li> <li>b) Determine appropriate significance level</li> <li>c) Calculate the sample mean</li> <li>d) Calculate the chi-square value</li> </ul>	
	B)	Answer in one sentence.  1) Define bar graph. 2) Who first worked out Standard deviation? 3) What is range of a set of data? 4) Define histogram 5) Which letter is used for Arithmetic mean? 6) What is a continuous variable in statistics?	06
Q.2	Solva)  b) c) d) e) f) g) h) i)	Find out the mode of following set of number.  17,19,18,17,18,19,11,17,16,19,15,15,17.  What is the meaning of Central tendency?  Write the simple formula of Chi square test.  What did you mean by probability?  Enlist the source of primary data.  Write any two limitation of statistics.  Enlist the types of probability.  What is tabulation?  Write the formula of standard deviation.  Enlist the methods of sampling method.	16
Q.3	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Describe any two kinds of probability.</li> <li>2) Give merits of standard deviation.</li> <li>3) Describe in brief Co-efficient variation.</li> </ul>	10
	B)	Write a note on parts of table.	06
Q.4	A)	<ul> <li>Attempt any Two of the following.</li> <li>1) Write precaution in the use of secondary data.</li> <li>2) Describe functions of statistics.</li> <li>3) An urn contain 10 white, 6 red balls and 10 Black. A ball is drawn at random. What is the probability that the ball is either white or red?</li> </ul>	08
	B)	Describe methods of primary data collection.	80
Q.5	Atte a) b) c)	empt any Two of the following. Discuss various sources of published and unpublished data. Describe types of variables. Explain Student's t test.	16

Seat	Sat	D
No.	Set	P

	B.Sc	:. (Se	mester - VI) (New) (CBCS) ZOOLOGY (Specia Applied Zoology	l Pa	•	ļ
•			nday, 22-04-2024 To 06:00 PM		Max. Mark	(s: 80
Insti	ructio	2	All questions are compulsory.  Draw neat labelled diagram whe Figures to right indicate full marl		er necessary.	
Q.1	A)		ct the correct alternative from to Macrobrachium malcolmsonni s a) prawn c) fish	peci b)	following. es widely used for Culture. crab pearl	10
		2)	Fish tuberculosis is a disease ca a) virus c) fungus	b)	d by bacteria protozoan	
		3)	Hooks and lines are the example a) fish craft c) fish habitat		f fish product fish gear	
		4)	is a powerful tools to an biology and regeneration. a) Silver fish c) Zebra fish		e photoreceptor morphology, cell  Carps Sea star	
		5)	The Rearing of fish in fresh water a) inland fishery c) crustacean fishery	b)	called marine fishery pearl fishery	
		6)	Following is an example of a) Hallikar c) Malvi	b)	ilch breed. Nageri Sahiwal	
		7)	Seed in fisheries refers to a) species c) egg		fish. adult fin	
		8)	a) fish harvesting	b)	nethod of fish preservation fish marketing	
		9)	Rearing of honey bee for honey a) apiculture c) moriculture	b)	bee wax is known as sericulture pisciculture	
		10)	Which of the following silk is ma <ul><li>a) Arundi silk</li><li>c) Muga silk</li></ul>	b)	produced in Assam? Natural silk Tassar silk	

			SLR-GA-265
	B)	Give answer in one sentence.  1) Poultry 2) Diary 3) Pisciculture 4) Sericulture 5) Lac culture 6) Importance honey bee in pollination	06
Q.2	Sol a) b) c) d) e) f) g) h)	ve any Eight of the following.  Fish seed Inland fishery Importance of lac Mulberry as a food of silkworm Transgenic animal Nutritive value of egg Cattle disease Application of remote sensing in fishery Apis indica	16
Q.3	A)	<ul><li>Attempt any Two of the following.</li><li>1) Describe method of bee keeping.</li><li>2) Explain the cast net.</li><li>3) Describe life history of silk moth.</li></ul>	10
	B)	Short note on. Economic importance of silk.	06
Q.4	A)	<ul><li>Attempt any Two of the following.</li><li>1) Explain culture of freshwater prawn.</li><li>2) Explain life history of Apis.</li><li>3) Describe marine fishery.</li></ul>	08
	B)	Describe different type of milk product.	08
Q.5	Atte a) b) c)	empt any Two of the following.  Describe deep litter system of poultry housing.  Explain breeds of dairy animals.  Describe fish by products of fishing industry.	16

Seat	 Set	D
No.	Set	

#### B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS (Special Paper - XVI)** Integral Calculus (19201638-A)

Day & Date: Monday, 22-04-2024 Max. Marks: 80

Time: 03:00 PM To 06:00 PM

**Instructions**: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks
- 3) Use of log tables and calculator is allowed.

1) 
$$\int_{0}^{\infty} \frac{dx}{x}$$
 is \_\_\_\_\_.

- a) convergent
- b) oscillatory
- c) divergent
- d) none of these

2) 
$$\int_{a}^{b} \frac{dx}{(x-a)^{m}}$$
 is convergent if \_\_\_\_\_.

a) m > 1

- c)  $m \ge 1$
- b) m = 1d) m < 1

3) 
$$\int_{0}^{\infty} \sin x \, dx$$
 is an improper integral of \_\_\_\_\_.

- a) Second kind
- Third kind b)

c) First kind

Proper integral

4) If 
$$\int_{a}^{\infty} |f(x)| dx$$
 is convergent then the integral  $\int_{a}^{\infty} f(x) dx$  is \_\_\_\_\_.

- a) Conditionally convergent b) Uniform convergent
- c) Absolutely convergent
- d) Divergent

5) 
$$\sqrt{1/4} \cdot \sqrt{3/4} =$$

a)  $\frac{\pi}{\sqrt{2}}$ 

b)  $\sqrt{2}\pi$ 

c)  $\sqrt{2}$ 

d)  $\pi$ 

6) The value of 
$$\int_0^1 x^5 (1 - x^3) dx =$$
\_\_\_\_\_.

a)  $\frac{1}{80}$  b)  $\frac{1}{70}$ 

7) 
$$\int_{0}^{\pi/2} \sin^7 \theta \cdot \cos^8 \theta \, d\theta = \underline{\hspace{1cm}}$$

a) 1547

64

c)  $1547 \times 64$ 

d)

8) 
$$\int_0^2 \int_0^{3y} y \, dy \, dx = \underline{\qquad}.$$

b)

c) 9 d) 4

9) 
$$\int_{0}^{\pi} \int_{0}^{a(1+\cos\theta)} r \, dr. \, d\theta = \underline{\qquad}.$$
a)  $3\pi a^{2}$  b)  $\frac{3}{4}\pi a^{2}$ 
c)  $\frac{3}{5}\pi a^{2}$  d) None of these

- 10) To change a given double integral from Cartesian to polar coordinates we use the formula \_
  - a)  $dxdy = d\theta dr$
- b)  $dxdy = r d\theta dr$
- c)  $dxdy = r^2 drd\theta$
- d)  $r dxdy = d\theta dr$

#### Answer in one sentence.

06

- 1) Define Beta function.
- Evaluate  $\int_{0}^{\infty} x^4 e^{-x} dx$ .
- 3) Define improper integral of second kind.
- 4) State the Abel's test for convergence at ∞.
- Find the value of double integral
- 6) Prove that  $n+1 = n \mid n$

#### Q.2 Attempt any eight from the following.

16

- Show that  $\sqrt{\frac{1}{2}} = \sqrt{\pi}$ a)
- Evaluate  $\int_{0}^{\pi/2} \sqrt{\tan\theta} \, d\theta$
- Evaluate  $\int_{0}^{\pi/2} \sin^{5}\theta \cdot \cos^{3}\theta d\theta$ . c)
- Test the convergence of  $\int_0^1 \frac{dx}{x^3}$ d)
- Test the convergence of  $\int_{1}^{\infty} \frac{x^2 + x + 1}{x^4 + x^2 + 2} dx$ e)
- Define the term conditionally convergent integral.
- Evaluate  $\int_0^1 \int_a^\infty y \, dy \, dx$

- **h)** Evaluate  $\int_0^{\pi} \int_0^{a\theta} r^3 d\theta dr$
- i) Find the limits of the integration  $\iint f(x,y)dy dx$  over the regin y=0, x=2 and  $y=x^2$
- j) Write the formula to find the area bounded by the polar curve  $r = f(\theta)$  and the lines  $\theta = \alpha$  and  $\theta = \beta$
- Q.3 a) Attempt any two of the following:

10

- 1) Find the using double integration the area enclosed between parabolas  $y^2 = 4ax$  and  $x^2 = 4ay$
- 2) Prove that the improper integral of the first kind  $\int_a^\infty \frac{dx}{x^p}$  converges if and only if p > 1.
- 3) Prove that  $\beta(m,n) = 2 \int_0^{\pi/2} \sin^{2m-1}\theta \cos^{2n-1}\theta \, d\theta$  and hence evaluate  $\int_0^{\pi/2} \sin^4\theta \cos^5\theta \, d\theta$
- **b)** Change the polar co-ordinates and evaluate  $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dy \ dx.$
- Q.4 A) Attempt any two of the following:

08

- 1) Change the order of integration and evaluate  $\int_0^1 \int_x^{2-x} \frac{x}{y} dx dy.$
- 2) If f(x) and g(x) are positive functions for all  $x \ge a$  and  $\lim_{x \to \infty} \frac{f(x)}{g(x)} = L$  is a nonzero finite number then prove that  $\int_a^\infty f(x) dx$  and  $\int_a^\infty g(x) dx$  behaves alike.
- 3) Prove that  $\beta(p,q) = \frac{\boxed{p} \cdot \boxed{q}}{\boxed{p+q}}$
- B) Change to polar co-ordinates and hence evaluate  $\int_0^a \int_{a-\sqrt{a^2-y^2}}^{a+\sqrt{a^2-y^2}} xy \ dx \ dy$
- Q.5 Attempt any two of the following.

16

- a) State and prove the Rodrigues Duplication formula for Gamma functions.
- Using the transformation  $u = \frac{x^2 + y^2}{x}$ ,  $v = \frac{x^2 + y^2}{y}$  evaluate  $\iint \frac{(x^2 + y^2)^2}{x^2 y^2} dx dy$  over the area common to circles  $x^2 + y^2 ax = 0$  and  $x^2 + y^2 by = 0$
- c) State and prove the Dirichlet's test for convergence of improper integral of first kind.

Seat	Sat	D
No.	Set	

			MATHEMATICS (Special Paper- XVI) Programming in C (19201638-B)	
-			nday, 22-04-2024 To 06:00 PM	/lax. Marks: 80
Instr	uctio		All questions are compulsory. Figures to right indicate full marks.	
Q.1	A)	Sele 1)	ct the correct alternative from the following.  The 'C' language was developed along with the opera a) LINUX b) MS-office c) UNIX d) XP	<b>10</b> ting system.
		2)	C programs are converted into machin language with the hel a) An editor b) A complier c) An operating system d) None of these	ρ of
		3)	are only in lower case letters.  a) Keyword b) Identifiers c) Variables d) Constant	
		4)	Char data type required bytes of memory. a) 01 b) 02 c) 03 d) 04	
		5)	The meaning of the operator "&&" is  a) AND b) LOGICAL AND c) ADDRESS d) LOGICAL OR	
		6)	Math function for 'Arc cosine of x' is  a) $\cos(x)$ b) $a\cos(x)$ c) $\cosh(x)h$ d) $a\cosh(x)$	
		7)	pictorial representation of algorithm.  a) Algorithm b) Flow chart c) Program d) None of these	
		8)	is conditional statement.  a) Switch b) For c) While d) Dowhile	
		9)	The character 'v' means a) new line b) vertical line c) vector d) none of these	
		10)	What is dimension of the C array int org [10] [5].  a) 2 b) 5 c) 10 d) 50	

	B)	Fill in the blanks.	06
	-	1) With usual meaning expression 14% <sup>-3</sup> evaluate the value is	
		2) operator used as Ternary operator.	
		3) The is the header file contains maths function.	
		4) is jumping statement.	
		5) The range of index for an array of size 'n' is	
		6) is the return type of function if no value returned from the functio	n.
Q.2	Sol	ve any eight of the following.	16
	a)	What does int main (void) mean?	
	b)	If $x = 57$ and $y = 11$ the integer variable then find $x/y$ and $x\%y$ .	
	c)	Write use of size of operator.	
	d)	Give list of some keywords in c.	
	e)	Write the range of unsigned int data and how many bytes used for range of unsigned.	
	f)	Explain Arithmetic operators.	
	g)	Write note on simple if statement.	
	h)	Explain for statement.	
	i)	Give list the types of arrays.	
	j)	Define go to statement and write its syntax.	
Q.3	A)	Attempt any two of the following.	10
		1) What is data type? Explain inbuilt data types.	
		2) Explain relational and logical operators.	
		3) Write program to find odd numbers from 1 to 20 by using for loop.	
	B)	Discuss one and two dimensional arrays.	06
Q.4	A)	Attempt any two of the following.	80
		Describe the term basic structure of C programs.	
		Explain keywords and identifiers.	
		3) Explain increment and decrement operators.	
	B)	Explain ifelse statement, nested ifelse statement and else if ladder.	80
Q.5	Atte	empt any Two of the following.	16
	a)	Explain the while statement, Dowhile statement and for statement.	
	b)	Explain the term formatted input and formatted output.	
	c)	Write a 'c' programme to convert the given temperature in Fahrenheit to	
	-	Celsius using the following conversion formula $C = \frac{F-32}{1.9}$	
		1.8	

Seat No. Set P
----------------

		•	Qua	STÁTISTIĆŠ (Speći ality Management and			
-				, 22-04-2024 6:00 PM		Max. Marks	s: 80
Instr	uctio	2	) Drav ) Figu	uestions are compulsory.  w neat labelled diagram who res to right indicate full mar of log table and calculator i	ks.	•	
Q.1	A)	Sele 1)	Whi	e correct alternative from charts are particularly modern $P$ -charts $X \otimes S$ chart	ore e b)	following. ffective for sample size One? C-charts CUSUM Chart	10
		2)	a)	rage Total Inspection for sin $n^*P + N^*(1-P)$ $N^*P + n^*(1-P)$	b)	$n^* P_a + N^* (1 - P_a)$	
		3)	Con a) c)	trol Chart is a Process monitoring tool Both a and b		Process control tool None of these	
		4)		trol? Pareto chart	b)	cent tools for Statistical Process  Flow chart  2 <sup>k</sup> factorial design	
		5)	syst a)	em is known as	b)	ing ensures the functioning of the cut set minimal cut set	
		6)	a)	sumer's risk is probability of Accepting lot of good quali Accepting lot of bad quality Rejecting lot of good quality Rejecting lot of bad quality	ty / :y		
		7)		purpose of Acceptance san Estimate lot quality Estimate lot defectives	b)	Sentence lots	
		8)		structure function of a binar sible values. 4 3	b) d)	stem <i>S</i> takes any one of 2 None of these	
		9)	Whica)	ch of the following is not a D Performance Check sheet		nsion of quality? Aesthetics Features	

	10) EWMA charts are better than Shewhart control charts in detecting the					
	a) Small process b) Medium process					
	, , , , , , , , , , , , , , , , , , , ,					
В)	<ol> <li>Fill in the blanks.</li> <li>Number of dimensions of quality is</li> <li>Deming's philosophy had principles.</li> <li>AQL stands for</li> <li>EWMA Control charts first introduced by</li> <li>In double sampling plan, if the numbers of defects is in between the two c off numbers C1 d C2 then</li> <li>Average Sample number for single sampling plan is</li> </ol>	<b>06</b> :ut				
Sol		16				
b)	What is producer's risk?					
d)						
e)	What is ATI?					
-	· ·					
h)	What is six sigma?					
ı) j)	State magnificent tools of statistical Process Control (SPC).  Explain scatter plot or diagram in short.					
A)		10				
	<ol> <li>Write a note on BMAIC cycle.</li> <li>Write a note on magnificent tool of quality- Control Chart.</li> <li>Show that hazard rate of a series system of components having independent life times is summation of component hazard rates.</li> </ol>					
B)	Explain single sampling plan.	06				
A)		80				
	· ·	art				
B)	Explain Six-Sigma methodology.	80				
Atte a) b) c)	Explain Exponentially Weighted Moving Average control chart. Write a note on magnificent tool of quality- Cause and effect diagram. Find the failure rate function (hazard rate) for a 2-out-of-3 system, where components are independent and life time $T_i$ of $i^{th}$ component is exponentially	<b>16</b>				
	Solv a) b) c) d) e) f) g) h) i) j) A)  B) Atter a) b) c)	shift. a) Small process b) Medium process c) Large process d) Every process  B) Fill in the blanks. 1) Number of dimensions of quality is				

Seat No.	Set	Р
•	VI) (New) (CBCS) Examination: March/April-2024	

STATISTICS (Special Paper-XVI) Time Series Analysis (19201651) Day & Date: Monday, 22-04-2024 Max. Marks: 80 Time: 03:00 PM To 06:00 PM **Instructions:** 1) All questions are compulsory. 2) Draw neat labelled diagrams wherever necessary. 3) Figures to right indicate full marks. 4) Use of log table and calculator is allowed. Q.1 A) Select the correct alternative from the following. 10 In time series values are arranged in order. a) increasing b) chronological c) decreasing d) both a) and c) Linear trend means 2) no change a) constant change b) c) changes are in geometric progression none of the above Least square method \_\_\_\_\_. 3) a) reduces the calculations b) does not give estimate of future reduces the sum of squares of errors c) d) is subjective In time series analysis the method of moving averages, is used to estimate 4) seasonal variations b) trend cyclical variations d) irregular variations c) Prosperity, Recession, Depression and Recovery in a business is an 5) example of . a) irregular trend b) secular trend cyclical trend d) seasonal trend c) A fire in a factory delaying production for some weeks is . . 6) irregular trend secular trend b) cyclical trend c) d) seasonal trend Seasonal variations are 7) short term variation b) long term variation sudden variation none of the above c) d) In moving average method, we cannot find trend values of some \_\_\_\_\_. 8) end points middle points b) starting and end periods starting periods c) d) In time series analysis, method of ratio to trend is used to estimate 9)

trend

cyclical variations

a)

seasonal variations

irregular variations

b)

d)

		<ul> <li>In autoregressive model we assume that</li> <li>a) the successive values in time series to be dependent</li> <li>b) the successive values in time series to be independent</li> <li>c) the regression analysis is better than time series analysis</li> <li>d) the values in time series are non-normal</li> </ul>	
	B)	Fill in the blanks.  1) The link relative is defined as  2) In time series additive model gives Y =  3) In time series multiplicative model gives Y =  4) Increase sales due to Diwali is due to component time series.  5) Increasing population is component of time series.  6) For testing of randomness test is used.	06
Q.2	Define the following terms. (Any Eight)  a) Trend  b) Write note on irregular variations. c) What do you mean by stationarity? d) Define autocorrelation function. e) Explain the term 'season'. f) Describe the term 'Business cycle'. g) State the four components of time series. h) Write the difference between seasonal variations and cyclical variation write first order moving average MA (1) model. j) Write first order autoregressive model AR (1) model.		16
Q.3	A) B)	<ul> <li>Attempt any two of the following.</li> <li>1) Describe the progressive average method.</li> <li>2) Discuss the importance and utility of time series analysis in various fields.</li> <li>3) Describe the procedure of method of simple average.</li> <li>Describe the procedure of single exponential smoothing.</li> </ul>	10 06
Q.4	<b>A</b> )	<ul> <li>Attempt any two of the following.</li> <li>1) Describe the procedure of double exponential smoothing.</li> <li>2) Explain how to fit AR (1) model.</li> <li>3) Explain moving average method.</li> </ul>	08
	B)	Illustrate with examples of the following term.  1) Secular trend 2) Seasonal variations 3) Cyclical variations 4) Irregular variations	80

#### Q.5 Attempt any Two of the following.

- Describe the procedure of link relative method.
- b)
- Describe the procedure of curve fitting least square method.

  Obtain the seasonal indices for the quarters by ratio to moving average c) method.

Year		Quarters No.				
		II	III	IV		
2017	37	41	33	35		
2018	37	39	36	36		
2019	40	41	33	31		
2020	33	44	40	40		

16

Seat	Sat	D
No.	Set	P

		(55		GEOLOGY Geocher	-	•	
-			-	22-04-2024 6:00 PM		Max. Mar	ks: 80
Instr	uctio	2	) Drav ) Figu	uestions are compu v neat labelled diag res to right indicate v neat labelled diag	ram whereve full marks.	•	
Q.1	A)	Sele 1)	Whi	e correct alternative ch of the following meralogical composition Feldspar  Quartz	nineral is mo	st abundant in average	10
		2)		radioactive decay o sotopic composition Stable isotope Radiogenic isotope	of the daug b)	uclides, which causes variation in nter products. Isotopes None of the above	
		3)	Chal a) c)	cophile elements ha silicate sulphide liquid	ave an affinit b) d)	y for a phase. metallic liquid volatile	
		4)		type of chemical bo trons is called as Molecular bond Ionic bond		S when atoms give away or take  Covalent bond  Compound bond	
		5)	Whice a) c)	ch of the following is Smoke Cheese	an aerosol? b) d)	Milk Butter	
		6)	mag			ules consisting of hydrated iron p to 10% of complex organic  Carbonaceous chondrites  None of the above	
		7)	The a) c)	meteorites consist o  Siderites Aerolites	of average 50 b) d)	0% metal and 50% silicate are Siderolites Tektites	
		8)	Whice crus a)	•	the second b) d)	most abundant elements of earth Carbon Hydrogen	l
		9)	,		,	following daughter isotopes? Uranium-235 Nitrogen-14	

		one of the most illustrative examples of diadochy between two ions of similar charge is a pair of  a) Fe <sup>2+</sup> and Mg <sup>2+</sup> b) Si <sup>4+</sup> and Al <sup>3+</sup> c) Mg <sup>2+</sup> and Al <sup>3+</sup> d) Na <sup>2+</sup> and K <sup>+</sup>							
	B)	<ol> <li>Fill in the blanks.</li> <li>When a minor element has small charge and ionic radius similar to a major element it as being in the crystal lattices containing the major element.</li> <li>According to the cosmic abundance which of the following element is abundant.</li> <li>The most susceptible mineral to chemical weathering is</li> <li> isotopes have proven to be a particular useful tracer to indicate whether magma that formed an igneous rock originated in the crust or the mantle.</li> <li>The water loving colloids are called as:</li> <li>The time that it takes a given amount of a radioactive isotope to be reduced by one-half is called the isotopes</li> </ol>	06						
Q.2	Solv a) b)	Name the two types of siderolites. List the four most abundant elements in average composition of igneous	16						
	c) d) e)	rocks. Give the example of hydrogen ion bonding. Define isomorphism. Name the planet and their satellites that rotate in retrograde rotation							
	f) g) h) i)	direction. Give the examples of hydrophobic sol. Name the high field strength elements. Define siderite. List the four chalcophile elements of geochemical classification. Give the examples of evaporates in secondary environment.							
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Write note on Aerolite type of meteorite.</li> <li>2) Explain the carbon dating method of radioactivity.</li> <li>3) Discuss in short the average chemical composition of igneous rocks.</li> </ul>	10						
	B)	Explain in detail the geochemical cycle with suitable diagram.	06						
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Define stable isotopes. Explain in brief the types of stable isotopes.</li> <li>2) Describe the types of chemical bonding with coordination number.</li> <li>3) Explain in brief cosmic abundance of elements with suitable diagram.</li> </ul>	80						
	B)	Describe in brief the Goldsmith's classification of geochemical elements.	80						
Q.5	Atte a) b)	empt any Two of the following.  Explain in brief the trace elements in igneous rocks and its applications.  Discuss any four radiogenic methods used for dating geologic events.  Define colloids. Explain in types of colloids with suitable example.	16						

Seat	Sat	D
No.	Set	P

				MICROBIOLO Environmental			- '	
-			•	, 22-04-2024 06:00 PM			Max. Marks:	80
nstr	uctio	2	) Dra	questions are compo w neat labelled diag ures to right indicate	gram wher		necessary.	
Q.1	A)	Sele 1)	pigr	e correct alternation  waste has dark  nent.  Paper and pulp  Distillery			llowing. due to presence of melanoidins  Textile  Dairy	10
		2)	a) c)	is most hazardo Lead Iron	ous metal	pollu b) d)	ition of automobile exhaust. Copper Mercury	
		3)	mic a) c)	is the process or roorganisms. Disintegration Bioleaching	of extracti	ng m b) d)	etals from ore bearing rocks by usir Transformation Biodegradation	ıg
		4)	Imp a) c)	ingement in liquid n Water Sewage	nethod is i	used b) d)	for analysis of Soil Air	
		5)	In C a) c)	COD test is Feso4 Ferroin	used as s	strong b) d)	g oxidising agent. K2Cr2O7 KMnO4	
		6)	a) c)	will not cause a	atmospher	ric po b) d)	llution. CO SO <sub>2</sub>	
		7)	a) c)	degree Celsius 50 37	temperat	ure is b) d)	s used for incubation in BOD test. 29 20	
		8)		rophication of water nly due to non-avail Food Oxygen		ading b) d)	g to killing of aquatic animals  Minerals Carbon	
		9)	The a) c)	waste generated b CSL SWL	y Sugar ir	ndust b) d)	ry is called PAP Molasses	
		10)	Psy a) c)	chrophilic microorga Alkali Salinity	anisms ar	e gro b) d)	wing at low Temperature Acid	

1) The dust with pathogenic microorganisms is called 2) Dairy waste is rich in protein. 3) Sieve Device method is used for examination. 4) protect us from harmful effects of ultraviolet ra 5) is considered as an indicator of faecal pollution 6) is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic is the major gas present in clean and non-pollic in the two examples of Thermophilic microorganisms. c) Give the two characteristics of Barophilic organisms. f) What is Carbon sequestration? g) Give the significance of Bio aerosols. h) Define Bioremediation. i) Give the two examples of organisms involved in Iron Leaching in Give the two examples of organisms involved in Iron Leaching. i) What are the factors affecting survival of microorganisms in Give the role and objectives of Recombinant DNA Advisional in Write note on Acidophilic microorganisms. 2) Write note on Microbially enhanced oil recovery. 3) Give the role and objectives of Recombinant DNA Advisional Eutrophication process.  Q.4 A) Attempt any two of the following. 1) Describe in detail BOD test. 3) Write on sources of microorganisms in Air. B) Describe various methods to study Air borne microorganisms. b) Describe in detail Bioremediation.		06
3) Sieve Device method is used for examination. 4) protect us from harmful effects of ultraviolet ra 5) is considered as an indicator of faecal pollution 6) is considered. 6) is considered. 7)	dust.	
4) protect us from harmful effects of ultraviolet ra 5) is considered as an indicator of faecal pollution 6) is the major gas present in clean and non-pollic  Q.2 Solve any eight of the following. a) What are the droplet nuclei? b) Give two examples of Thermophilic microorganisms. c) Give the types of lakes. d) Define Biosafety. e) Give the two characteristics of Barophilic organisms. f) What is Carbon sequestration? g) Give the significance of Bio aerosols. h) Define Bioremediation. i) Give the two examples of organisms involved in Iron Leaching in the factors affecting survival of microorganisms   Q.3 A) Attempt any two of the following. 1) Write note on Acidophilic microorganisms in Air. B) Describe in detail Eutrophication process.  Q.4 A) Attempt any two of the following. 2) Describe in detail BOD test. 3) Write on sources of microorganisms in Air. B) Describe various methods to study Air borne microorganisms. C.5 Attempt any Two of the following. a) Write an essay on Marine microorganisms. b) Describe in detail Bioremediation.		
5) is considered as an indicator of faecal pollution 6) is the major gas present in clean and non-pollic stem and pollution is the major gas present in clean and non-pollic stem and pollution is the major gas present in clean and non-pollic stem and non		
5) is considered as an indicator of faecal pollution 6) is the major gas present in clean and non-pollic stem and pollution is the major gas present in clean and non-pollic stem and pollution is the major gas present in clean and non-pollic stem and non	adiations.	
<ul> <li>G.2 Solve any eight of the following. <ul> <li>a) What are the droplet nuclei?</li> <li>b) Give two examples of Thermophilic microorganisms.</li> <li>c) Give the types of lakes.</li> <li>d) Define Biosafety.</li> <li>e) Give the two characteristics of Barophilic organisms.</li> <li>f) What is Carbon sequestration?</li> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching in What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms.</li> <li>Q.3 A) Attempt any two of the following.</li> <li>1) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisorable in detail Eutrophication process.</li> </ul> </li> <li>Q.4 A) Attempt any two of the following. <ul> <li>1) Describe in detail Eutrophication process.</li> </ul> </li> <li>Q.5 Attempt any Two of the following. <ul> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul> </li> </ul>	on of water.	
<ul> <li>a) What are the droplet nuclei?</li> <li>b) Give two examples of Thermophilic microorganisms.</li> <li>c) Give the types of lakes.</li> <li>d) Define Biosafety.</li> <li>e) Give the two characteristics of Barophilic organisms.</li> <li>f) What is Carbon sequestration?</li> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching.</li> <li>j) What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in White note on Acidophilic microorganisms.</li> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisory.</li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganisms.</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
<ul> <li>b) Give two examples of Thermophilic microorganisms.</li> <li>c) Give the types of lakes.</li> <li>d) Define Biosafety.</li> <li>e) Give the two characteristics of Barophilic organisms.</li> <li>f) What is Carbon sequestration?</li> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching.</li> <li>j) What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms.</li> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisorable in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in detail Eutrophication and treatment of sugar waste.</li> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		16
<ul> <li>c) Give the types of lakes.</li> <li>d) Define Biosafety.</li> <li>e) Give the two characteristics of Barophilic organisms.</li> <li>f) What is Carbon sequestration?</li> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching.</li> <li>j) What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms.</li> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisory.</li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in brief Characteristic and treatment of sugar waste.</li> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
<ul> <li>d) Define Biosafety.</li> <li>e) Give the two characteristics of Barophilic organisms.</li> <li>f) What is Carbon sequestration?</li> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching.</li> <li>j) What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms.</li> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisorable.</li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in brief Characteristic and treatment of sugar waste.</li> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
<ul> <li>e) Give the two characteristics of Barophilic organisms.</li> <li>f) What is Carbon sequestration?</li> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching.</li> <li>j) What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms.</li> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisory.</li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in brief Characteristic and treatment of sugar waste.</li> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
f) What is Carbon sequestration? g) Give the significance of Bio aerosols. h) Define Bioremediation. i) Give the two examples of organisms involved in Iron Leachij) What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms. 2) Write note on Microbially enhanced oil recovery. 3) Give the role and objectives of Recombinant DNA Advisus B) Describe in detail Eutrophication process.  Q.4 A) Attempt any two of the following. 1) Describe in brief Characteristic and treatment of sugar waste. 2) Describe in detail BOD test. 3) Write on sources of microorganisms in Air. B) Describe various methods to study Air borne microorganisms Q.5 Attempt any Two of the following. a) Write an essay on Marine microorganisms. b) Describe in detail Bioremediation.		
<ul> <li>g) Give the significance of Bio aerosols.</li> <li>h) Define Bioremediation.</li> <li>i) Give the two examples of organisms involved in Iron Leaching.</li> <li>j) What are the factors affecting survival of microorganisms in Write note on Acidophilic microorganisms.</li> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisorable.</li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in brief Characteristic and treatment of sugar waste.</li> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
h) Define Bioremediation. i) Give the two examples of organisms involved in Iron Leachij) What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms.  1) Write note on Acidophilic microorganisms. 2) Write note on Microbially enhanced oil recovery. 3) Give the role and objectives of Recombinant DNA Advisorable in detail Eutrophication process.  Q.4 A) Attempt any two of the following. 1) Describe in detail BOD test. 3) Write on sources of microorganisms in Air. B) Describe various methods to study Air borne microorganisms. Q.5 Attempt any Two of the following. a) Write an essay on Marine microorganisms. b) Describe in detail Bioremediation.		
<ul> <li>i) Give the two examples of organisms involved in Iron Leaching) What are the factors affecting survival of microorganisms in What are the factors affecting survival of microorganisms in Q.3 A) Attempt any two of the following. <ol> <li>Write note on Acidophilic microorganisms.</li> <li>Write note on Microbially enhanced oil recovery.</li> <li>Give the role and objectives of Recombinant DNA Advisus.</li> </ol> </li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following. <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following. <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ul>		
<ul> <li>What are the factors affecting survival of microorganisms in</li> <li>Q.3 A) Attempt any two of the following. <ol> <li>Write note on Acidophilic microorganisms.</li> <li>Write note on Microbially enhanced oil recovery.</li> <li>Give the role and objectives of Recombinant DNA Advises.</li> </ol> </li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following. <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganisms</li> <li>Q.5 Attempt any Two of the following. <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ul>		
<ul> <li>Q.3 A) Attempt any two of the following. <ol> <li>Write note on Acidophilic microorganisms.</li> <li>Write note on Microbially enhanced oil recovery.</li> <li>Give the role and objectives of Recombinant DNA Advises.</li> </ol> </li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following. <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganisms.</li> <li>Q.5 Attempt any Two of the following. <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ul>	ning.	
<ol> <li>Write note on Acidophilic microorganisms.</li> <li>Write note on Microbially enhanced oil recovery.</li> <li>Give the role and objectives of Recombinant DNA Advises.</li> <li>Describe in detail Eutrophication process.</li> <li>A) Attempt any two of the following.         <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganisms.</li> <li>Q.5 Attempt any Two of the following.         <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ol>	n Air?	
<ul> <li>2) Write note on Microbially enhanced oil recovery.</li> <li>3) Give the role and objectives of Recombinant DNA Advisible Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following.</li> <li>1) Describe in brief Characteristic and treatment of sugar waste.</li> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		10
<ul> <li>3) Give the role and objectives of Recombinant DNA Advis</li> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following. <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following. <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ul>		
<ul> <li>B) Describe in detail Eutrophication process.</li> <li>Q.4 A) Attempt any two of the following. <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following. <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ul>		
<ul> <li>Q.4 A) Attempt any two of the following. <ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> </ol> </li> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following. <ol> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ol> </li> </ul>	isory Committee.	
<ol> <li>Describe in brief Characteristic and treatment of sugar waste.</li> <li>Describe in detail BOD test.</li> <li>Write on sources of microorganisms in Air.</li> <li>Describe various methods to study Air borne microorganism</li> <li>Attempt any Two of the following.         <ul> <li>Write an essay on Marine microorganisms.</li> <li>Describe in detail Bioremediation.</li> </ul> </li> </ol>		06
waste. 2) Describe in detail BOD test. 3) Write on sources of microorganisms in Air.  B) Describe various methods to study Air borne microorganism  Q.5 Attempt any Two of the following. a) Write an essay on Marine microorganisms. b) Describe in detail Bioremediation.		08
<ul> <li>2) Describe in detail BOD test.</li> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>	and distillery	
<ul> <li>3) Write on sources of microorganisms in Air.</li> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
<ul> <li>B) Describe various methods to study Air borne microorganism</li> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
<ul> <li>Q.5 Attempt any Two of the following.</li> <li>a) Write an essay on Marine microorganisms.</li> <li>b) Describe in detail Bioremediation.</li> </ul>		
<ul><li>a) Write an essay on Marine microorganisms.</li><li>b) Describe in detail Bioremediation.</li></ul>	ns.	80
b) Describe in detail Bioremediation.		16
- /		
<ul><li>c) Describe in Detail Microbial leaching.</li></ul>		

Seat No. Set I
----------------

# B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 ELECTRONICS (Special Paper- XVI) Modern Communication Systems (19201684)

			Mod	ern Communication	Syst	ems (19201684)	
-			nday, 2: To 06:0	2-04-2024 00 PM		Max. Marks: 8	30
Instr	uctio	2) 3)	Draw r Figure	estions are compulsory. neat labelled diagram whe s to right indicate full marl logtables and calculators	ΚS.	•	
Q.1	A)	Selection 1)	The real	correct alternative from the fractive index of core isess than reater than			10
		2)	a) N	gh speed data transmissio leon lamp sulb	b)	is the best light source. LASER diode LED	
		3)	For sat a) R c) Li		b) d)		
		4)	freque a) C	munication band with upli ncy of 4 is known as c-band a-band		quency of 6GHz and downlink  X-band  Ku-band	
		5)	regions a) e	oile communication the ge s called as lement ase station	b)	cell exchange	
		6)	a) si b) si c) so	oile phones SIM stands for ubscriber identity module ystem identity module ource identity module one of these	r		
		7)	,	_ is a microwave device. ener diode Gunn diode	b)	LED None of these	
		8)	a) a	on tube is based on the pr mplitude hase	inciple b) d)	e of modulation. frequency velocity	
		9)	a) A b) P c) b	SK modulation is/a mplitude hase oth amplitude and phase one	are us	sed.	

		entire network is affected.  a) star b) ring c) bus d) none of these	
	B)	Answer in one sentence.  1) Fiber optic communication is based on the principle of  2) is the main part of satellite.  3) orbit is used for communication satellites.  4) The process of transferring an active call from one cell to another is called as  5) What is modem?  6) What is protocol?	<b>06</b> s
Q.2	Solva) b) c) d) e) f) g) h) i)	ve any eight of the following.  Define bit rate and baud rate.  What is splicer?  What are step index and graded index fibers?  Draw the block diagram of transponder.  Give the uplink and down link frequencies in Ku-Band.  What is geostationary satellite? Give its importance.  Draw the block diagram of mobile transmitter.  What are the advantages of microwave communication?  What is wave guide? In which frequency range it is used?  What are LAN and MAN?	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain optical transmitter with suitable diagram.</li> <li>2) Give the operational procedure of mobile communication.</li> <li>3) Explain QPSK modem.</li> </ul>	10
	B)	Write a note on Gunn diode.	06
Q.4	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain the working of Klystron.</li> <li>2) Discuss any two applications of satellite communication.</li> <li>3) Write a note on cavity resonator.</li> </ul>	08
	B)	Explain different computer network topologies.	08
Q.5	Atte a) b)	empt any Two of the following.  Explain fiber optic communication system with block diagram.  With the help of block diagram explain earth station in satellite communication.	16
	c)	Explain pulsed radar system with the help of block diagram.	

	_	
Seat	Set	D
No.	Set	

		. (00		COMPUTER SC Advanced P	IENC	•	•	<b></b>
•			•	, 22-04-2024 6:00 PM	-		·	Max. Marks: 80
Instr	uctio	2)	) Drav	luestions are compulso w neat labelled diagrar ures to right indicate ful	m wher		necessary.	
Q.1	A)	Mult 1)	-	choice questions. rect way to draw a line line() create_line(canvas)		vas t b) d)	canvas.create_line()	10
		2)	a) b)	at is Django's staticfiles Serving static files lik Generating dynamic Handling user auther Storing data in cache	e image HTML ntication	es, C		
		3)	a) c)	method to change t Title() Resizable()		and b) d)	location of the windo Geometry Attributes	W.
		4)	Nan a) c)	ne the method which is fetchmany fetchall		or di b) d)	splaying only one res fetchno fetchone	ultset.
		5)	a)	at is the use of SAX in Defining the format o Validating the XML fil Parsing XML docume None of the above	f an XN le			
		6)	a) c)	is highest level GU Root window Container		one b) d)	nt in Tkinter. Canvas Frame	
		7)	a) c)	is used to create a Admin.py Urls.py	•	user b) d)	registering model in o Forms.py Views.py	django.
		8)	How a) b) c) d)	v pack() function works According to x,y coor According to row and According to left,right None of the above	dinate I colum	n vis		
		9)	Ren a) c)	der function takes 1 3		aran b) d)	neters. 2 4	

		<ul> <li>10) is used to draw pictures and other complex layout like graphics, text and widgets.</li> <li>a) Frame</li> <li>b) Canvas</li> <li>c) Button</li> <li>d) Label</li> </ul>	
	B)	<ul> <li>Fill in the blanks</li> <li>1) are used to arranging widgets in the frame.</li> <li>2) A is object that enables to work with database in python</li> <li>3) DOM stands for</li> <li>4) is used to input the single line text from the user in Tkinte</li> <li>5) method of cursor object is used to execute SQL comman python.</li> <li>6) A is a built-in feature of Django that allows you to constrables, fields, and constraints.</li> </ul>	er. ids in
Q.2	Solv a) b) c) d) e) f) g) h) i)	What is model in Django? What is SAX parser? What is the use of makemigrations command in Django? What is a spinbox in Tkinter? What is a Socket? What is a frame? Which method and model is used to connect MySql? Which are the various general socket methods? How to bind event? What is superuser in django?	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Explain pack layout Manager.</li> <li>2) Explain server socket methods with example.</li> <li>3) Explain the Django project directory structure.</li> </ul>	10
	B)	Explain XML parser Architecure.	06
Q.4	A)	<ol> <li>Attempt any two of the following.</li> <li>Explain difference between MVC and MVT design patterns.</li> <li>Write a Python program to create a Tkinter window with a canvas widget that displays a blue rectangle.</li> <li>Explain in detail the steps of database connectivity of MySql.</li> </ol>	<b>08</b>
	B)	Write a program to print IP address.	08
Q.5	Atte a) b)	empt any Two of the following.  Explain Container class of Tkinter with Example.  Write a program to create a table and inserting record in table by usir python.	<b>16</b>
	c)	Explain Django's architecture.	

					SLR-GA-2	15		
Seat No.					Set	Р		
В	B.Sc. (Semester - VI) (New) (CBCS) Examination: March/April-2024 Software Testing (19201671-01)							
	Day & Date: Tuesday, 23-04-2024 Max. Marks: 8 Time: 03:00 PM To 06:00 PM							
Instru	ctio	2)	All questions are compulso Draw neat labelled diagra Figures to right indicate fu	ms whereve	er necessary.			
Q.1	A)		iple choice questions.	offware too	ting?	10		
		1)	Which is non-functional s a) Unit Testing c) Performance Testing	b)	Block box testing Regression testing			
		2)	Which of the following is Life Cycle?  a) Requirement Phase		phase of Software Development  Testing closure			
			c) Deployment phase	d)				
		3)	loops fall between cases.	single and	nested loops with respect to test			
			<ul><li>a) Simple</li><li>c) Nested</li></ul>	b) d)	Concatenated None of these			
		4)	Which of the following mounderstandable and defin		for if requirements are easily			
			a) Prototyping Model c) Waterfall Model	b)	V-Model Spiral Model			
		5)	Which Test Document is a) Test Summary Report c) Test Case		fine the Exit Criteria of Testing? Defect Report Test Plan			
		6)	are those software	e mistakes t	that occurred during the coding			
			phase? a) Bugs c) Defects	b) d)	Failures Errors			
		7)	What is functional testing	?				

- a) Testing the functionality of the software system
- b) Testing the performance of the software system
- Testing the security of the software system
- Testing the compatibility of the software system
- Which of the following is NOT a characteristic of good test cases? 8)
  - a) Independent

b) Repeatable

c) Traceable

- d) Complex
- Which is the most important feature of spiral model? 9)
  - a) Quality management
  - b) Risk management
  - c) Performance management
  - d) Efficiency management

		<ul><li>10) Equivalence partitioning uses test cases to cover maximum requirements.</li><li>a) fewest</li><li>b) few</li></ul>	
		c) many d) some	
	B)	<ul> <li>Fill in the blank.</li> <li>1) In software, a occurred when the expected output does not match the output provided by the software.</li> <li>2) Cyclomatic Complexity is measured by</li> <li>3) Decision coverage = /total number of outcomes *100.</li> <li>4) is a type of software testing, where the discrete component of the software is tested.</li> <li>5) document is usually prepared by the test leads after the entire application process is completed?</li> <li>6) Writing a test summary report is a major task of</li> </ul>	06
Q.2	Solva)  a) b) c) d) e) f) g) h) i)	List the various iterations of Loop testing? What are the errors uncovered by black box testing? What is Peer Review? List out components of defect report? What is Soak Testing? Define pre-condition and post-condition. Distinguish between Alpha & Beta Testing. What is Hybrid Model? Define Exploratory Testing. What is State transition testing?	16
Q.3	A)	<ol> <li>Explain path testing with suitable example.</li> <li>Explain Regression Testing?</li> <li>What are the goals of integration test? Compare Top-down and Bottom-up Integration Testing.</li> </ol>	10
	B)	How Smoke Testing works. Explain with example?	06
Q.4	A)	Attempt any Two of the following.  1) What are advantages and disadvantages of Prototype Model?  2) Why stress testing is needed? Explain with example.  3) Explain the components of test plan.	80
	B)	Design a Test case for simple calculator.	80
Q.5	Atte a) b)	empt any Two of the following.  Explain Defect Life Cycle.  Define Performance testing? What is the goal of performance testing?  Explain different parameters are used for performance testing.	16
	c)	How to prepare Requirement Traceability Matrix? Explain with example.	

Seat No.							S	et	P	
I	B.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024 CHEMISTRY (Paper - VII) Physical Chemistry (22221444)									
,			day, 05-04-2 l To 11:00 Al		•	•	Max. Max. Max. Max. Max. Max. Max. Max.	arks:	: 40	
Instru	Instructions: 1) All questions are compulsory.  2) Draw neat diagrams and give equations wherever necessary.  3) Figures to the right indicate full marks.  4) Use of logarithmic tables and calculator is allowed.  (At. Wts. H = 1, C = 12, O = 16, N = 14, Na = 23, Ag = 108, Cl = 35.5)									
Q.1		ose t	he most co	rect alternativ	e.				08	
	1)	The a)	ionic product [H <sup>+</sup> ] × [OH]	rect alternativ t of water is giv	en by b)		[H+] = [OH-]			
		c)	$[H^{+}] + [OH]$	' -]	d)		$[H^{+}] - [OH^{-}]$			
	2)	The	distribution la	aw for the solut	es under	goir	ng dissociation in one of the			
			•	$is\; K = \underline{\qquad}.$	<b>L</b> .		<i>C.</i>			
		a)	$\frac{c_1}{C_2}$		D)		$\frac{C_1}{\sqrt{C_2}}$			
		c)	$\frac{C_1}{C(1-\alpha)}$		d)		none of these			
	3)	The a) c)	entropy of po infinite non-zero	erfectly crystalli	ne substa b) d)		e at absolute zero Kelvin is zero all of these			
	4)	Whic		wing is comple	tely soluk					
		a) c)	NaCl AgCl		b) d)		PbSO <sub>4</sub> BaSO <sub>4</sub>			
	5)	If the	e transport nu	umber of anion	is 0.75, th	hen	T. N. of cation is			
		a) c)	0.50 1.25		b) d)		0.25 1.75			
	6)	In ca	se of uni-un	ivalent electroly	rtes, the e	qu	ivalent and molecular conducta	ance	<b>!</b>	
		a)	unequal	L	b)		equal			
	<b>7</b> \	C)	both a and		d) detalling i		none of these			
	7)	a)	plastic	wing solid is cr	ystaiiile i b)		rubber			
		c)	glass		d)		common salt			
	8)	Distr a)	ibution law w Henry	as given by	 b)		Ostwald			
		c)	Nernst		d)		Van't Hoff			

Q.2	Answer	anv four	of the	following
w	A1131161	uiiy ioui	OI LIIC	1011011111

- a) State third law of thermodynamics.
- b) What is crystallography? Name three fundamental laws of crystallography.
- c) Define the terms:
  - i) Equivalent conductance
  - ii) Molecular conductance
- d) Explain:
  - i) Lattice planes
  - ii) Unit cell
- e) What are the types of conductors?

#### Q.3 Write short notes on any two of the following

08

08

- a) The entropy change in mixing of gases
- b) The moving boundary method
- c) The process of extraction

#### Q.4 Answer any two of the following

08

- a) Define entropy. Give physical significance of entropy.
- **b)** Discuss the factors affecting the value of transport number.
- c) What are the limitations of distribution law.

Benzoic acid ( $C_6H_5COOH$ ) has its normal molecular weight in water. In the distribution of acid between water and benzene, the following results were obtained.

Cwater	0.0148	0.020	0.018
CBenzene	0.329	0.390	0.365

Calculate the molecular weight of benzoic acid in benzene.

#### Q.5 Answer any one of the following.

80

- a) Discuss in detail crystal structure of NaCl on the basis of Bragg's equation.
- b) Discuss in detail the Kohlrausch law.

Calculate the ionic mobilities of  $\rm K^+$  and  $\rm OH^-$  ions at infinite dilution. The limiting ionic conductivities of  $\rm K^+$  and  $\rm OH^-$  ions are  $73.50\times 10^{-4}~\rm S.~m^2.~mol^{-1}$  and  $197.6\times 10^{-4}~\rm S.~m^2.~mol^{-1}$  respectively. (F =  $965000~\rm C.mol^{-1})$ 

Seat	Sat	D
No.	Set	

	D.30	•	ZÓ	DLOĠŶ (Spećia	I Pa	-	
_					nage	ement (19201523)	
•			urday, 13-04-20 To 6:00 PM	024		Max. Marks: 8	30
Instr	uctio	2		ire compulsory. elled diagrams whe right indicate full m		<u> </u>	
Q.1	A)	<b>Mul</b> 1	,		b) d)	World Wildlife Foundation	10
		2)	a) predation	decreasing due to on of habitat	b) d)	cutting down forest hunting	
		3)	b) Global po c) Global po	SPS  ositioning solar ositioning sector ositioning section ositioning system			
		4)	Which is the for particular region a) fern c) flora	•	b) d)	denote animal species of a fauna femina	
		5)	Which one of t a) Western c) Southern	Ghats	in Ind b) d)	dia is a hotspot of biodiversity? Gangetic Plain Eastern Ghat	
		6)	<ul><li>a) responsik</li><li>b) conserve</li></ul>	s not included in ecole travel to natural the environment of wellbeing of local fanimal	area		
		7)	World Environ a) 4 <sup>th</sup> June c) 6 <sup>th</sup> June	mental Day celebra	ated o b) d)	on 5 <sup>th</sup> June 7 <sup>th</sup> June	
		8)	Which of the formal a) primary control		mum b) d)	<b>3</b> ,	
		9)	a) Upright in	ollowing is the divendex ed index	rsity i b) d)		

		<ul> <li>10) Which one of the following has the highest number of species in nature?</li> <li>a) Insect</li> <li>b) Bird</li> <li>c) Mammal</li> <li>d) Reptile</li> </ul>	
	B)	Answer the following in one sentence.  1) Ecotourism 2) Pug mark 3) Wildlife 4) National Park in India 5) Carrying capacity 6) Climax	06
Q.2	a) b) c) d)	wer the following. (Any Eight)  Negative values of wildlife Care of injured and diseased animal Great Indian bustard Sanctuaries in India Topography Diversity indices Steps in succession GIS Importance of wildlife conservation CITES	16
Q.3	A)	<ul> <li>Attempt any two of the following.</li> <li>1) Population estimation with the help of faecal analysis of ungulates and carnivores.</li> <li>2) Describe the preservation of general genetic Diversity.</li> <li>3) Give important feature of protected areas in India.</li> </ul>	10
	B)	Short Notes. Explain wildlife tourism in forest.	06
Q.4	A)	Attempt any two of the following.  1) Describe positive values of wildlife.  2) Explain biotelemetry of wild animal.  3) Describe Wildlife Protection Act 1972.	80
	B)	Describe great Indian bustard sanctuaries and their management challenges in India.	80
Q.5	Atte a) b) c)	mpt any two of the following.  Explain tiger reserves in India.  Describe Shannon and Simpsons diversity indices.  Explain in detail on grazing, logging and mechanical treatment as habitat management practices.	16

### Seat No.

### B.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2024 **MATHEMATICS** (Paper - II) **Calculus (22221117)**

Day & Date: Monday, 03-06-2024

Max. Marks: 40

Time: 12:00 PM To 02:00 PM

**Instructions:** 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Choose the correct alternative for each of the following. Q.1

80

If  $y = \cos(ax + b)$  then  $y_n = \underline{\hspace{1cm}}$ .

a) 
$$a^n \sin(ax + b + \pi/a)$$

b) 
$$a^n \cos (ax + b + \pi/2)$$

c) 
$$-a^n \sin(ax + b + \pi/2)$$

a) 
$$a^n \sin(ax + b + \pi/2)$$
 b)  $a^n \cos(ax + b + \pi/2)$  c)  $-a^n \sin(ax + b + \pi/2)$  d)  $-a^n \cos(ax + b + \pi/2)$ 

If  $y = \log(\sin x)$  then  $y_2 = \underline{\hspace{1cm}}$ . 2)

a) 
$$\frac{1}{\sin^2 x}$$

b) 
$$-\frac{1}{\sin^2 x}$$

c) 
$$\frac{1}{\cos^2 x}$$

d) 
$$-\frac{1}{\cos^2 x}$$

3) An expression in *X* and *Y* is said to be homogeneous if sum of the degrees of x and y in every term is \_\_\_\_\_.

If Z is homogenous function of degree 'n' in x and y and z = F(u) then 4)  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \underline{\hspace{1cm}}$ 

a) 
$$n F(u)$$

b) 
$$n F'(u)$$

c) 
$$\frac{n F(u)}{F'(u)}$$

d) 
$$\frac{n F'(u)}{F(u)}$$

5)  $\int_{0}^{\infty} \cos^5 x dx = \underline{\qquad}.$ 

a) 
$$\frac{15}{8}$$

b) 
$$\frac{15}{8}$$
:

c) 
$$\frac{8}{15}$$

d) 
$$\frac{8}{15}\pi$$

 $\int x^5 \sin^{-1} x dx = = \underline{\qquad}$ 

a) 
$$\frac{11}{192}$$

b) 
$$\frac{11 \pi}{192}$$

c) 
$$\frac{5\pi}{192}$$

d) 
$$\frac{5}{192}$$

- 7) If  $\nabla \cdot \overline{F} = 0$  where  $\overline{F}$  is vector point function then  $\overline{F}$  is called as \_\_\_\_\_.
  - a) solenoidal

b) null

c) irrotational

- d) unit
- 8) If  $\bar{r} = xi + yj + zk$  then div  $\bar{r} = \underline{\hspace{1cm}}$ 
  - a) 0

b) 1

c) 3

- d) 2
- Q.2 Attempt any four of the following.

08

- a) Solve  $\lim_{x\to 0} \frac{3^X-2^X}{X}$
- **b)** If  $z = x^3y^2$  then find  $\frac{\partial^2 z}{\partial x \partial y}$
- c) Solve  $\int_0^{\pi/6} \sin^6(3x) \, dx$
- **d)** If  $\bar{A} = xz^3i 2x^2yzj + 2yz^4k$  then find div  $\bar{A}$  at (1, -1, 1)
- e) Solve  $\int_0^{\pi/2} \sin^8 x \cos^4 x dx$
- 3 Attempt any two of the following. 08
  - a) Solve  $\int_{0}^{a} \frac{x^4}{\sqrt{a^2 x^2}} dx$
  - **b)** If z is homogenous function of degree n then show that  $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = nz$
  - **c)** Prove that  $\nabla^2 \left(\frac{1}{r}\right) = 0$  where  $r = \sqrt{x^2 + y^2 + z^2}$
- Q.4 Attempt any two of the following.

08

- a) Find expansion of  $\cos x$  in power of x
- **b)** If u = f(x + ay) + g(x ay) then show that  $\frac{\partial^2 u}{\partial y^2} = a^2 \frac{\partial^2 u}{\partial x^2}$
- **c)** If  $\phi(xyz) = 3x^2y y^3z^2$  find grad  $\phi$  at (1, -2, -1)
- Q.5 Attempt any one of the following questions.

08

- a) State and prove Leibnitz's theorem.
- **b)** i) If  $\bar{A} = -\frac{y}{x^2 + y^2}i + \frac{x}{x^2 + y^2}j$  then find curl  $\bar{A}$ 
  - ii) If  $u = \log\left(\frac{x^3 + y^3}{x^2 + y^2}\right)$  show that  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$

Sea No.	-	Set	Р
	R Sc. (Samostar	I) (Now) (CRCS) Examination: March/April 2024	

	٥.ر	BOTANY (Pa			φι II-202 <del>4</del>
		Fungi and Archegor	•	•	
		ate: Monday, 03-06-2024 00 PM To 05:00 PM			Max. Marks: 40
Instr	uctio	ons: 1) All questions are compulsory. 2) Figures to the right indicate full 3) Draw neat diagrams and give e			ıry.
Q.1		Itiple choice questions.  Term Archegoniates includes  a) Bryophytes  c) Pteridophytes	b) d)	Gymnosperms All of these	08
	2)	Fungi are a) Autotrophic c) heterotrophic	b) d)	Photosynthetic None of these	
	3)	is used as fungal biofertilizer.  a) BGA c) NPK	b) d)	VAM All of these	
	4)	Common mould that spoils jams and b a) Puccinia c) Penicillium		ls is Aspergillus Mucor	
	5)	Class Hepaticae belongs to  a) Bryophytes c) Pteridophytes	b) d)	Gymnosperms None of these	
	6)	Fermentation of sugars is done by a) Saccharomyces c) Penicillium	 b) d)	Aspergillus Mucor	
	7)	is an ornamental plant. a) Cycas c) Ulva	b) d)	Oscillatoria Laminaria	
	8)	The <i>Selaginella</i> shows sporoph a) homosporous c) Monosporous	yte. b) d)	heterosporous tetrasporous	
Q.2	a) b) c) d)	swer any four of the following.  Write any four general characters of an classify yeast  Enlist parts of archegonium  Name any two fungal SCP  What is fragmentation?	che	goniates?	08

		SLR-GA-RE-2
Q.3	<ul> <li>Write short notes on any two of the following</li> <li>a) Morphology of Sporophyte of selaginella</li> <li>b) Economic importance of gymnosperms</li> <li>c) Budding in yeast</li> </ul>	ng. 08
Q.4	<ul> <li>Answer any two of the following.</li> <li>a) Explain anatomy of cycas leaflet with suite</li> <li>b) Describe asexual reprodution methods in</li> <li>c) Write any four General characters of Pter</li> </ul>	Mucor.
Q.5	<ul><li>Answer any one of the following.</li><li>a) Explain Sexual reproduction in Riccia alor</li><li>b) Describe Role of fungi in agriculture.</li></ul>	08 ng with labeled diagrams.

Seat	Set	D
No.	Set	١

	B.Sc		ster - III) (OId) (CBCS) COMPUTER SCIEN Design Analysis and Al	ICE	` - '	
•			03-06-2024	9	Max. Marks	: 40
Instr	uction	2) Figu	uestions are compulsory. res to the right indicate full r w neat diagrams and give ed			
Q.1	Multi <sub>l</sub> 1)	no algorithm a) Big-0	Notation (O-notation)	b)	Omega Notation (Ω-notation)	80
	2)	Dijkstra's a) Netv	a Notation (⋳-notation) Algorithm is used to solve _ vork lock air shortest path	,	problems.	
	3)	a) Divid	ethod is used to solve the op le and conquer amic problem	otimiza b) d)	•	
	4)	a) Undi b) Undi c) Dire	rshall's Algorithm can be ap rected and unweighted grap rected graphs cted graphs clic graphs	-	on	
	5)	a) Prob	nd bound is a lem solving technique ng algorithm	b) d)	data structure type of tree	
	6)	a) A sp	lling salesman problem can anning tree nan - Ford algorithm	b)	olved using A minimum spanning tree DFS traversal	
	7)	making. a) back	oroblem is a type ofa tracking e Force	algorit b) d)	hm that is used in decision divide and conquer none of these	
	8)	a) divid	algorithm is a e and conquer algorithm dy algorithm	b) d)	dynamic programming algorithm approximation algorithm	
Q.2	a) \b) [ c) [ d) \ e) \	Vhat is Al Differentia list out ad Vhat do y Vhat is Di	ur of the following. gorithm? te Time complexity and Spa vantages of the greedy algo ou mean by Huffman code? vide and Conquer? im's algorithm?	rithm		80

Q.3	<ul><li>Write short notes on any Two of the following.</li><li>a) What are the types of Asymptotic notation?</li><li>b) What are the Applications of Divide and Conquer Approach?</li><li>c) What is Kruskal Algorithm?</li></ul>	08
Q.4	<ul> <li>Answer the any two of the following.</li> <li>a) What is the Dijkstra's algorithm and use of Dijkstra's algorithm?</li> <li>b) Explain n-queen Problem with example.</li> <li>c) Difference between linear search and binary search.</li> </ul>	08
Q.5	<ul> <li>Answer any one of the following.</li> <li>a) Explain Knapsack Problem with example.</li> <li>b) What is backtracking and explain how does Backtracking work?</li> </ul>	08

Seat No.					Set	Р
	Sc.	(Sen	nester - VI) (New) (CBC CHEMISTRY (Sp Inorganic Cher	ecial Pape	er - XIV)	24
			onday, 03-06-2024 I To 03:00 PM		Max. Mark	<s: 80<="" td=""></s:>
Instru	ctio	2	) All questions are compulso ) Figures to the right indicate ) Draw neat labelled diagran ) Use of log table and calcul	e full marks. ns wherever		
Q.1 <i>i</i>	A)	<b>Cho</b> 1)	ose the correct alternative All lanthanons show a come a) +2 c) +4	mon stable _ b) +	oxidation state.	10
		2)	In diborane, 3c-2e b a) two c) four	b) t		
		3)	Name of HC = CNa is a) ethynyl sodium c) sodium acetylene	b) a	acetylene sodium sodium ethanide	
		4)	Atmospheric corrosion invo a) liquid-solid c) solid-gas	b) li	heterogeneous system. iquid-gas solid-solid	
		5)	Tinning is type of many electrolytic c) alloying	b) r	otection of metals. non-electrolytic electroplating	
		6)	The electronic configuration a) 5f <sup>4</sup> 6d <sup>1</sup> 7s <sup>2</sup> c) 5f <sup>3</sup> 6d <sup>1</sup> 7s <sup>2</sup>	b) 5	um is 5f <sup>3</sup> 6d <sup>2</sup> 7s <sup>2</sup> 5f <sup>4</sup> 6d <sup>0</sup> 7s <sup>2</sup>	
		7)	In the preparation of YBa <sub>2</sub> C contains  a) Argon, oxygen and wat b) Argon and oxygen c) Oxygen and water vapod) Argon and water vapod	er vapour our	rconductor the carrier gas	
		8)	O-S-O bond angle is $SO_2$ is a) $120^{\circ}$ c) $104^{\circ}$	b) 1	109 <sup>0</sup> 119.5 <sup>0</sup>	

		metal in solvent.  a) inert  b) polar  c) aqueous  d) non-aqueous				
		10) Passivity is a phenomenon. a) natural b) chemical c) surface d) electrochemical				
	B)	Fill in the blanks.	06			
		1) is the most suitable method to prepare transuranium				
		elements.  2) In separation of lanthanons by ion exchange method, eluting solution used is				
		3) When 'In' is doped in 'Ge', it produces semiconductor.				
		4) The outer P-O distance in P <sub>4</sub> O <sub>10</sub> molecule is Å.				
		5) Generally organometallic compounds are produced by				
		reactions. 6) The process of coating of zinc on iron by hot dipping is called as				
		6) The process of coating of zinc on iron by hot dipping is called as				
		<del></del> ·				
Q.2	Ans a)	nswer the following (Any Eight):  Which elements are called as Super Heavy Elements (SHE).				
	b)	What is Meissner effect?				
	c)	Give any two differences between borazine and benzene.				
	d)	What are carbonyls? Give general methods of preparation of metal carbonyls.				
	e)	n periodic table, lanthanide series lies between which two elements.				
	f)	hat do you mean by doping of silicon?				
	g)	Draw the structure of P <sub>4</sub> O <sub>6</sub> molecule.				
	h)	Define the terms- Metallizing and Cementation.				
	i) :\	Which inhibitors are used to reduce corrosion? What are the different types of immersed corrosion?				
	j)	What are the different types of infiniersed corrosion:				
Q.3	A)	Answer the followings (Any Two):	10			
	•	What are the methods used for individual separation of				
		lanthanides. Discuss in detail ion exchange method.				
		2) Discuss the properties of metallic solids.				
		3) Comment on structure and bonding in XeO <sub>4</sub> molecule				
	B)	Write note on electro-chemical theory of corrosion.	06			
Q.4	A)	Answer the followings (Any Two):	08			
	,	1) Write note on occurrence of lanthanides.				
		2) Explain the classification of solids on the basis of band theory.				
		Explain different types of passivity				
	B)	What are the oxides of sulphur. Discuss their structure and bonding.	80			

16

- Q.5 Answer the following (Any Two).a) Explain in detail the preparation and structure of ceramic superconductor.
  - b) What are transunranium elements? Discuss in detail their preparation.
  - Discuss preparation, properties and uses of alkyl aluminium compounds c)

Seat	Sat	D
No.	Set	L

			CHEMISTRY (Special Organic Chemistry		
-			onday, 03-06-2024 1 To 06:00 PM	Max. Ma	rks: 80
Instr	uctio		) All questions are compulsory. 2) Figures to the right indicate full r	marks.	
Q.1	A)	<b>Cho</b> 1)	ose the most correct alternative is used as antidiabetic. a) Isoniazid	e for each of the following.  b) Ethambutal	10
			c) palludrin	d) Tolbutamide	
		2)	<ul><li>stimulates latex productio</li><li>a) Carbaryl</li><li>c) Monocrotophos</li></ul>	on in trees. b) Sevin d) Ethophan	
		3)	In an organic compound the unstable bonds are called as		
			<ul><li>a) auxochromes</li><li>c) chromophores</li></ul>	<ul><li>b) heterochromes</li><li>d) homochromes</li></ul>	
		4)	<ul><li>is laevo-rotatory broad-sp</li><li>a) Ibuprofen</li><li>c) Chloromycetin</li></ul>	pectrum antibiotic. b) Isoniazid d) Penicillin	
		5)	Pyrrole on nitration gives a) 1 c) 3	nitro pyrrole. b) 2 d) tetra	
		6)	Isomers of the type of $\beta$ - and $\alpha$ -gape a) dimers c) anomers	glucosides are termed as b) enantiomers d) monomers	
		7)	Vat dye is an example of a) water soluble c) reactive	b) water insoluble	
		8)	In Cellulose, glycosidic li a) $\beta$ -1-4 c) $\alpha$ -1-4	inkage is present. b) $\beta$ -1-2 d) $\alpha$ -1-2	
		9)	Glucose on reaction with HI in pra a) n-hexane c) hexene	resence of red P gives b) 2-hexane d) heptane	
		10)	Pyrrole is in nature. a) acidic c) amphoteric	b) basic	

	B)	Define the following  1) Heterocyclic compounds  2) Hormones  3) Mutarotation  4) Agrochemicals  5) Dyes  6) Antimalarial drugs	06
Q.2	Ans a) b) c) d) e) f) g) h) i)	wer the following questions. (Any Eight)  Why pyridine is less reactive than benzene in electrophilic substitution reactions.  Give any one method of synthesis of pyrrole.  Draw the structure of thyroxine.  What are CNS drugs? Give any two types of CNS drugs.  Define insecticides with example.  State four qualities of good drug.  Give any two objections to open chain structure of glucose.  Draw the structure of sucrose.  What are the qualities of good dye?  Which acid will be produced on the ozonolysis of vitamin-A?	16
Q.3	A)	<ul> <li>Answer the following questions. (Any Two)</li> <li>1) Explain Skraup's synthesis of Quinoline.</li> <li>2) Give synthesis and uses of Methoxychlor and Indole 3-acetic acid.</li> <li>3) Discuss the analytical evidences put forth in the support of structure of adrenaline.</li> </ul>	10
	B)	Discuss classification of synthetic dyes based on method of application.	06
Q.4	A)	Answer the followings (Any Two):  1) Give the synthesis and uses of Phenolphthalein.  2) Explain alkaline hydrolysis of Penicillin.  3) How will you prove open chain structure of D-glucose.	80
	B)	Define carbohydrates. How are they classified? Draw structure and state uses Starch and Cellulose.	80
Q.5	Ans a) b) c)	wer the following (Any Two).  Define Vitamins. How they are classified? Write a synthesis of vitamin-A. What are the qualities of an ideal drug? Write synthesis and uses of Phenobarbitone and Ibuprofen.  Give any one method of preparation of pyridine. Explain with reaction the action of following on pyridine?  i) KNO <sub>3</sub> / H <sub>2</sub> SO <sub>4</sub> , 300°C  ii) SO <sub>3</sub> / H <sub>2</sub> SO <sub>4</sub> iii) Br <sub>2</sub> / charcoal  iv) NaNH <sub>2</sub> / 100°C	16