

Seat	
No.	

M.Sc. – I (Semester – I) (CBCS) (New) Examination, 2015 GENETICS (Paper – I) Concepts of Genetics

Day and Date: Monday, 16-11-2015 Total Marks: 70

Time: 10.30 a.m. to 1.00 p.m.

Instructions: 1) Section – I is compulsory.

- 2) From Section II attempt any four.
- 3) All questions carry equal marks.
- 4) Figures to **right** indicate **full** marks.
- 5) **Draw** neat and labeled diagrams.

SECTION-I

1.	A) Re	write the followi	ng sentences by	using correct alte	rnative :	
	1)		chromosomal fraç nosome is called a	•	addition of one or more —	
		A) Duplication		B) Transloca	tion	
		C) Inversion		D) Deletion		
	2)	. •	lifferent traits loca re		oci on the same	
		A) Alleles	B) Linked	C) Pleiomorp	hic D) Mutated	
	3)	Linkage groups	s in maize are			
		A) 20	B) 5	C) 10	D) 15	
	4)		haracters on gen on it is called as		ogether through two or	
		A) Complete li	nkage	B) Continues linkageD) Consistent linkage		
		C) Incomplete	linkage			
	5) The frequency of crossing		of crossing over v	vould be higher if		
		A) Two genes	are located close	ely		
		B) Two genes	far apart on a chr	omosome		
		C) Two genes	located on same	chromosome		
		D) None of the	above			



	6) Who discovered sex chron	nosome?	
	A) Rober Brown	B) M. J. D. White	
	C) Nettle Stevens	D) G. J. Mandel	
	7) When release from ovary, h	numan egg contains	
	A) One Y chromosome	B) Two X chromosome	
	C) One X chromosome	D) XY chromosome	
	B) Answer the following terms:		7
	1) Synapsis		
	2) Meiosis		
	3) Recombination		
	4) X-linked		
	5) Back cross		
	6) Aneuploidy		
	7) Interphase.		
	S	SECTION – II	
At	empt any four :		
2.	Explain in detail : Events involved	I in somatic cell division.	14
3.	Describe X-linked inheritance with	n suitable examples.	14
4.	Explain monohybrid and dihybrid	crosses with suitable example.	14
5.	Answer any two of the following:		14
	1) Add a note on complete linkage	e and incomplete linkage.	
	2) Describe life cycle of human.		
	3) Add a note on Haemophilia.		
6.	Answer any two of the following:		14
	1) Describe synapsis of meiotic of	crossing over.	
	2) Explain induced mutations.		
	3) Write a short on mismatch rep	air in <i>E. Coli</i> .	

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M.Sc. (Part – I) (Semester – I) (C.B.C.S.) (New) Examination, 2015 GENETICS Biostatistics and Population Genetics (Paper – II)

Day and Date: Wednesday, 18-11-2015 Max. Marks: 70

Time: 10.30 a.m. to 1.00 p.m.

Instructions: 1) All question of Section I are compulsory.

- 2) Answer any four questions from Section II.
- 3) Graph paper will be provided on request.
- 4) Use of non-data storage calculator is allowed.

SECTION-I

1.	A) Rewrite the following sentences by choosing the most correct alternative given below.								
		i)		•	oe any one of the fo triplets are	ur bases {A, C, G, T}.			
			a) 4	b) 8	c) 16	d) 64			
		ii)	The decision of r	ejecting H ₀ wher	n it is true is called				
	a) an error c) type I error			b) correct					
				d) type II error					
		iii)	To find out the m	ode value	graph is used.				
			a) frequency cu	irve	b) histogram				
			c) frequency po	lygon	d) Ogive curve				
		iv)	is a g occur together.	roup of genetic t	rait which have hiç	gh fitness when they			
			a) Supergene		b) Epistatic gene				
			c) Co-adapted of	gene	d) Genetic load				

3.

4.



	v)	Theory of	natural s	election	was give	n by	Theory of natural selection was given by								
		a) Rober	t Hook		b) Hardy \	Weinberg								
		c) Fisher	·		ď	d) Charles Darwin									
	vi)	interbreed		_	oup of in	ndividual	that actually or potentially								
		a) Specie	es b) Hybrid	ls c) Genus	d) Soma clones								
	vii)						aracter that can be used to er in a population.								
		a) a gene	etic mark	er	b) trait									
		c) alleles	}		ď) both (b) and (c)								
	B) Det	fine the foll	owing te	rms.				7							
	i)	i) Biostatistics													
	ii)) Primary data													
	iii)) Null hypothesis													
	iv)	Polymorph	nism												
	v)	Heritability	y												
	vi)	Genotype													
	vii)	Habitat.													
				0	FOTION										
				S	ECTION	I — II									
	Explair	n the statisti	cal metho	ods for ma	apping Q	TL in expe	erimental cross populations.	14							
١	Write a	an essay o	n isolatin	ig mecha	ınism for	speciation	on.	14							
	Find th	ne correlati	on coeffi	cient bet	ween X a	and Y fro	m the following data.	14							
ı			1	1											
	X	7	9	13	15	19									
	Υ	15	17	29	33	40									

Interpret the correlationship between them.



5. Answer any two of the following.

14

- a) Give an account on Hardy-Weinberg equation with any one suitable example.
- b) The following table represents the number of patients with different diseases from a particular hospital.

Disease	Heart disease	Renal failure	Accidents	Jaundice	Asthma	General fever
Number of Patients	4	3	7	4	10	8

Represent the above data by pie-chart.

- c) Discuss the various types of species and concept of species.
- 6. Write short note on any two of the following.

14

- a) Write a note on standard deviation. Enlist the merits and demerits of using it.
- b) Associative mapping and Genomic selection.
- c) Calculate the arithmetic mean of the following data.

Class Interval	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	3	5	10	15	5	12



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M.Sc. – I (Semester – I) (New) (CBCS) Examination, 2015 GENETICS

Cytogenetics and Genome Organization (Paper - III)

Day and Date: Friday, 20-11-2015 Max. Marks: 70

Time: 10.30 a.m. to 1.00 p.m.

Instructions: 1) Section I is compulsory.

- 2) From Section II attempt any four.
- 3) All questions carry equal marks.
- 4) Figures to the **right** indicate **full** marks.
- 5) Draw neat and labeled diagrams wherever necessary.

	SECTION	-1	
1. A) R	Rewrite the following sentences by using	g correct alternative :	7
1)	The 30 nm diameter stage during pack known as	aging of eukaryotic DNA molecule is	
	a) Nucleosome fiber	b) Solenoid fiber	
	c) Chromatid	d) Folded domains	
2)	Polytene chromosomes are specifical	ly found in	
	a) Human being	b) Chironomous	
	c) Frog	d) House fly	
3)	is an agent of Cytoplas	mic or extra-nuclear inheritance.	
	a) Mitochondria	b) Chloroplast	
	c) Plasmids	d) All of these	
4)	Cytoplasmic or extra-nuclear inheritation first discovered by	ance in plants through plastid were	
	a) Watson	b) Morgan	
	c) Angstrom	d) Carl Correns	
5)	In blood clotting is abse	ent or taking place very slowly.	
	a) Hemophilia	b) Color blindness	
	c) Hypertrichosis	d) Night blindness	

SLR-MM – 317 6) In birds _____ is homogametic for sex chromosomes. a) Only male b) Only female c) Both male and female d) None of these 7) SINEs are a) Short Interspersed Nuclear Sequences b) Small Interspersed Nuclear Sequences c) Short Intervening Nuclear Sequences d) Small Interspersed Nucleolar Sequences B) Answer the following terms: 7 1) What is Y chromosome? 2) What is primary constriction? 3) What is FISH? 4) What is R banding? 5) What is partitioning in plasmids? 6) What are jumping genes? 7) What is satellite DNA? SECTION - II Answer any four: 14 2. Describe genome organization in bacteria and viruses. 14 3. Describe maternal and chloroplast inheritance with suitable examples. 4. Explain types of transposable elements in eukaryotes with suitable examples. 14 14 5. Answer any two of the following: 1) Describe structure of X chromosome. 2) Explain somatic cell hybridization. 3) Describe P elements in drosophila. 6. Answer any two of the following: 14 1) Explain G banding of chromosomes. 2) Describe the sex determination in plants. 3) Explain structure and importance of giant chromosomes.

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M.Sc. (Part – I) (Semester – I) Examination, 2015 (New – CBCS) GENETICS

	Paper N	GENE o. – IV : Cellular		Biology	
Day and F	Date : Monday, 2	23-11-2015		Max. Marks : 7	7 0
•	•			Wax. Warks .	· O
Time . To.	30 a.m. to 1.00	p.m.			
	,	Section – I compul Answer any four q	_	ction — II .	
		SEC	CTION – I		
,	ewrite the sente ernatives :	nce after choosing	the correct answe	er from the given	7
1)	RNA polymera	se III is located in			
	a) Cytoplasm	b) Nucleoplasm	c) Nucleolus	d) Mitochondria	
2)	is a	a common second n	nessenger.		
	a) cAMP	b) cGTP	c) cMHC	d) cATP	
3)	rece	eptor is a seven tran	smembrane rese	otor.	
	a) hedgehog		b) G protein		
	c) patched		d) None of the a	above	
4)	Essential com	ponents of eukaryo	tic cistron are		
	a) Introns		b) exons		
	c) operons		d) operator of re	egulatory genes	
5)	Clover leaf mo	del belongs to			
	a) tRNA	b) DNA	c) Centriole	d) Flagella	
6)	enz the nucleus.	yme is called mitoc	hondrial polymera	ase and is encoded in	
	a) DNA polym	erase α	b) DNA polyme	rase β	
	c) DNA polym	erase γ	d) DNA polyme	rase δ	
7)	G-proteins are				

a) dimeric b) trimeric c) tetrameric d) pentameric

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	B) Define the following terms :	7
	1) Okazaki fragments.	
	2) RNA polymerase.	
	3) Codon usage.	
	4) Cadherins.	
	5) Antiscence.	
	6) Si RNA.	
	7) Transcription.	
	SECTION - II	
2.	Explain in detail Transcription of Prokaryotes with neat labeled diagram.	14
3.	Describe the process of protein synthesis in detail with neat labeled diagram.	14
4.	Discuss signal transduction. Give a detail account on Hedgehog signaling pathway.	14
5.	Answer any two of the following:	14
	a) Explain in detail types of replication with neat labeled diagram.	
	b) Describe in detail structure and functions of endoplasmic reticulum and Golgi apparatus.	
	c) Genetic code and its properties.	
6.	Write short notes on any two of the following:	14
	a) G protein coupled receptor pathway.	
	b) Membrane trafficking.	
	c) Discuss in brief "Fluid mosaic model" with diagram.	

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M.Sc. – II (Semester – III) Examination, 2015 GENETICS (CGPA) Paper – I: Immunology

Day and Date: Monday, 16-11-2015 Marks: 70

Time: 2.30 p.m. to 5.00 p.m.

Instructions: 1) Section I is compulsory.

- 2) From Section II attempt any four.
- 3) All questions carry equal marks.
- 4) Figures to the **right** indicate **full** marks.
- 5) Draw neat labelled diagrams wherever necessary.

SECTION-I

1. A) Rewrite the following sentences by using correct alternative: 1) The specificity of an antibody is due to A) Its heavy chain B) Its light chain C) Variable portion of heavy and light chain D) Its 33 hinge region 2) The main players of humoral immunity are A) B-lymphocytes B) T-lymphocytes C) Macrophages D) Thelper cells 3) A living pathogen with reduced pathogenecity is known as A) Attenuated B) Toxiod C) Virulent D) Denatured



	4) In human MHC genes are located on					
		A) Segment of short arm of chromosome 6				
		B) Segment of long arm of chromosome 6				
		C)	Segment of short arm of chro	mosome 2		
		D)	Segment of short arm of chro	mosome 22		
	5)		nunoglobulin heavy chain ge ments of the genome.	ne segment is composed of		
		A)	V and D	B) C and J		
		C)	V, D and J	D) V, D, J and C		
	6)	Per	forins are produced by			
		A)	Cytotoxic T cells	B) Suppressor cells		
		C)	Plasma cells	D) Helper T cells		
	7)	The	e most sensitive test for antige	n detection is		
		A)	RIA	B) ELISA		
		C)	Immunofluorescence test	D) Agglutination test		
B)	De	fine	the following terms:	7		
	1)	Red	combinant vaccine.			
	2)	Infla	ammation.			
	3)	Moi	noclonal antibodies.			
4) Agglutination.						
	5)	Ant	igen.			
	6)	Aut	ograft.			
	7)	Pha	agocytosis.			



SECTION-II

Attem	pt anv	four:

2.	What is antigenecity? Discuss the various factors affecting antigenecity.	14
3.	What are MHC molecules? Describe the structure and function of MHC I and MHC class II molecules.	14
4.	Discuss in detail the B-cell generation, maturation and differentiation.	14
5.	Write an essay on autoimmunity.	14
6.	Answer any two of the following:	14
	1) Applications of monoclonal antibodies.	
	2) Types of transplants.	
	3) IgM.	
7.	Answer any two of the following:	14
	1) Alternate complement activation pathway.	
	2) Atopy.	
	3) Recombinant vaccines.	

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M.Sc. II (Semester - III) Examination, 2015 **GENETICS (CGPA)**

Paper - II: Molecular Medicine

Day and Date : Wednesday, 18-11-2015	Total Marks: 70	
Time: 2.30 p.m. to 5.00 p.m.		
Instructions: 1) Section I is compulsory.		
2) From Section II attempt any four.		
3) All questions carry equal marks		

3) All questions carry equal marks.4) Figures to right indicate full marks. 5) Draw neat and labeled diagrams.

			SECTION	– I			
1. A) Re	ewrite the follow	ving sentences by	usi	ng correct alternat	ive:	7
	1)	In Genetics to disease.	erm, Ducenne Mu	usc	ular Dystrophy is	type of	
		a) Autosomal	Dominant	b)	Autosomal Reces	ssive	
		c) X linked Do	ominant	d)	X linked Recessiv	ve	
	2)	Adult stem cel	ls are	_			
		a) unipotent	b) multipotent	c)	pluripotent	d) all of these	
	3)	•	osis patient the mu ions.	ICOL	us is dehydrated be	ecause of improper	
		a) Chloride	b) Pottasium	c)	Calcium	d) Sodium	
	4)		disease in which the able to make antib	•		ell mediated immune	
		a) DMD		b)	SCID		
		c) Thalassaer	mia	d)	Sickle cell anaem	nia	
	5)	C	ells are the only cel	lls w	hich can develop ir	nto whole organism.	
		a) Pluripotent		b)	Multipotent		
		c) Totipotent		d)	Unipotent		



	6) In Gene therapy retrovirus vec	tors can only be u	sed for	_cells.
	a) dividing b) non-dividing	c) stem	d) cancer	
	7) The first step in drug discovery	/ is		
	a) target validation	b) lead identific	cation	
	c) target identification	d) lead optimiz	ation	
	B) Answer the following terms:			7
	 DNA fingerprinting 			
	2) Differentiation			
	3) Blood group antigens			
	4) Plasticity			
	5) Regenerative medicine			
	6) Gene therapy			
	7) Pharmacogenetics.			
	SEC	CTION – II		
	(Attem	pt any four)		
2.	Write an essay on prenatal diagnosis	3.		14
3.	Describe Huntington's disease.			14
4.	Explain in detail about the steps invo	lved in drug disco	very.	14
5.	Describe in detail non-viral methods	of gene therapy.		14
6.	Answer any two of the following.			14
	Explain embryonic stem cells.			
	2) Write a note on magic bullet cells	as drug delivery s	svstem.	
	3) Explain Human genome project.	,	., .	
7.	Answer any two of the following.			14
	Describe microarray technology.			
	2) Describe applications of pharmac	ogenetics.		
	3) Explain down syndrome.	- 9		
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M.Sc. Genetics – II (Semester – III) Examination, 2015 Paper – III: ANALYTICAL INSTRUMENTS AND TECHNIQUES (CGPA)

Day and Date: Friday, 20-11-2015 Max. Marks: 70

Time: 2.30 p.m. to 5.00 p.m.

Instructions: 1) Section – I is compulsory.

- 2) From Section II attempt any four.
- 3) All questions carry equal marks.
- 4) Figures to right indicate full marks.
- 5) **Draw** neat and labeled diagrams.

SECTION-I

		OLO	TION I	
1.	A) Re	ewrite the following sentences b	y using correct al	ternative :
	1)	is the process not in physical size.	of enlarging some	ething only in appearance
		a) Magnification	b) Resolving po	wer
		c) Numerical aperture	d) Focal length	
	2)	A biologically insignificant radio	active isotope is	
		a) ³⁵ S b) ¹⁵ O	c) ¹⁵ N	d) ³² P
	3)	Migration rate under unit potent	tial gradient is kno	own as
		a) Intensity	b) Resistivity	
		c) Mobility	d) Absorptivity	
	4)	is extensively use base composition of nucleic ac		ic technique to determine
		a) Adsorption	b) Affinity	
		c) Gel permeation	d) Ion exchange)
	5)	X ray diffraction can only be app	olied to	
		a) Solid, Crystalline material	b) Gas	
		c) Liquid	d) Organic solv	ent
	6)	is a radioactive	e compound form	l .
		a) Radium	b) Potassium ur	ranylsulphate
		c) Thorium	d) Uranium	

	7)	The wavelength of an absorption electromagnetic spectrum does	•	
		a) Infrared	b) Radio wave	
		c) Ultraviolet-Visible	d) Microwave	
	B) De	efine the following terms :		7
	1)	Focal length.		
	2)	Half life.		
	3)	Electrophoretic mobility.		
	4)	Flow rate.		
	5)	Bending vibrations.		
	6)	Curie.		
	7)	Constructive interference.		
		SEC	TION – II	
At	tempt	any four :		
2.	Desc	ribe construction and image form	nation by compound light microscope.	14
3.	Discu excita		rement of radioactivity based on gas	14
4.	-	uin the chromatographic techniqu ounds.	e used for separation of volatile	14
5.		ribe the instrumentation of Infrarcations.	ed spectroscopy and enlists its	14
6.	Answ	er any two of the following:		14
	1) W	rite a note on transmission elect	ron microscopy.	
	2) Ex	xplain paper electrophoresis.		
	3) Di	scuss general column chromatog	graphic technique.	
7.	Answ	er any two of the following:		14
	1) Di	scuss western blotting.		
	-	cplain the applications of Colorim		
	3) De	escribe electrophoresis on cellula	ar gels.	



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M.Sc. (Part – II) (Semester – III) (C.G.P.A.) Examination, 2015 GENETICS

	Paper – IV : Bio	GENETIC pinformatics and	_	odology
-	eate : Monday, 23-1 ⁻¹ 0 p.m. to 5.00 p.m.	1-2015		Max. Marks : 70
In	iii) Al	nswer any four que I questions carry e c	stions from Section	j − I I.
		SECTION -	- I	
•	ewrite the following so low :	entences by choosir	ng the most correct a	alternative given 7
i)	comp	osite database is th	e default database o	of NCBI BLAST.
	a) NRDB		b) OWL	
	c) MIPSx		d) Swiss Prot +Tr	EMBL
ii)	Organisms are cla	assified into a a healthy human a	· ·	based on their
	a) two	b) four	c) six	d) eight
iii)	The information at GenBank flat file for		gene is included in	of
	a) Header part		b) Accession line	
	c) Feature table		d) Sequence line	
iv)	a single, continuou		NCBI data model, v r nucleic acid or pro	
	a) SEQ-ID		b) BIO-SEQ	
	c) SEQ-ANNOT		d) SEQ-DESCR	

 v) An alignment that essentially spans the part of the input sequer called a alignment. 					ut sequences is		
		a) pair-wise		b)	global		
		c) local		d)	multiple		
	vi)		tool is used for pre	diction of	motifs and patte	erns.	
		a) Compute pl/MW		b)	b) PropSearch		
		c) MOWSE		d)	ProfileScan		
	vii)	ii) In traditional report writing normally Times New Roman font with size and double line spacing is used.					
		a) 10	b) 12	c)	20	d) 24	
	B) De	efine the follow	ving terms :				7
	i)	i) Entrez					
	ii)	ii) Multiple alignment					
	iii)	iii) Specialized structures					
	iv)	v) Research					
	v)	v) Literature					
	vi)	Discussion					
	vii)	PRINT.					
SECTION - II							
An	swer a	any four :					
2.	Descr	cribe in detail about structural classification database and structural databases.				14	
3.	Discuss about FASTA and BLAST, the tools used for sequence similarity searching.				14		
4.	Expla	Explain in detail the prediction of tertiary structure of protein from sequence.				14	
5.	. Give an account on experimental design.					14	



6.	Answer any	/ two	of the	following
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14

- a) Describe the term SEQ-ANNOT.
- b) Write a note on plagiarism.
- c) Explain the substitution matrices used in alignment.

7. Answer any two of the following:

14

- a) Write a note on components of research.
- b) Illustrate the methods, strategies and considerations for prediction of DNA sequences.
- c) Describe the socio-economic and ethical consideration in research.
