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M.Sc. – I (Semester – I) (New C.G.P.A.) Examination, 2015
MICROBIOLOGY (Paper – IV)
Microbial Chemistry and Enzymology

Day and Date :
Time :

Max. Marks : 70

- N.B. :** 1) Paper – I question 1 is **compulsory**.
2) Attempt **any four** questions from Part – II.
3) Figures to the **right** indicates **full** marks.
4) Answers to the **two** parts should be written in the **same** answer book.

PART – I

1. Rewrite the sentences after choosing the correct answer from the given alternatives.

14

- 1) Glycogen and starch are _____
a) monosaccharide b) disaccharide
c) heteropolysaccharide d) homopolysaccharide
- 2) The nonprotein low molecular weight dialysable substance associated with enzyme is known as _____
a) cofactor b) coenzymes
c) isoenzyme d) apoenzyme
- 3) Vitamin β_1 contain _____ and _____ molecules.
a) Purine and thiamine b) Purine and thiazole
c) Pyrimidine and thiazole d) Thiamine and thiazole
- 4) Two sugars differ in the configuration around one specific carbon are called _____
a) isomers b) isotopes
c) epitopes d) epimers



c) Interlenkins

d) Porins

PART – II

2. Give an account of types of lipids and their structural aspects. **14**
 3. Explain in detail basic concept, kinetics and significance of reversible and inversible inhibition. **14**
 4. Give an account of types and structure of carbohydrates.
 5. Attempt **any two** of the following : **14**
 - a) Classification of amino acids.
 - b) Lock and key and induced fit hypothesis.
 - c) Terpenes and prostaglandins.
 6. Attempt **any two** of the following : **14**
 - a) Chemistry of leghemoglobin and bacterial rhodopsin.
 - b) Role of metal ions in enzyme function.
 - c) Account of enzyme specificity.
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- 13) Proof reading and mismatch repair in DNA is carried out by _____
- a) DNA polymerase I
 - b) DNA polymerase II
 - c) Exonuclease
 - d) None of the above
- 14) Mendel for his experimental study _____ is frequently used.
- a) Groundnut
 - b) Garden pea
 - c) French bean
 - d) Soyabean.

PART – II

2. Explain types, properties and mechanism of transposition of transposable elements. 14
3. Describe in detail methods of DNA sequencing. Discuss in brief its applications. 14
4. Give the detailed account of deciphering of genetic code and its properties. 14
5. Attempt **any two** of the following : 14
- a) Explain the techniques and applications of DNA foot printing and DNA finger printing.
 - b) Describe in detail nucleic acid as a genetic material.
 - c) Discuss in detail Alternative forms of DNA.
6. Attempt **any two** of the following : 14
- a) Explain the technique and applications of PCR.
 - b) Discuss the process of transcription in prokaryotes.
 - c) Describe in detail the evolution of one gene one polypeptide hypothesis.
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M.Sc. – I (Semester – II) Examination, 2015
MICROBIOLOGY (Paper – VI)
Microbial Physiology and Metabolism

Day and Date : Saturday, 18-4-2015

Max. Marks : 70

Time : 11.00 a.m. to 2.00 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 labelled diagrams.*

SECTION – I

1. Rewrite the following sentences by using correct alternatives. 14

- 1) Mitochondria are discovered by
a) Monod b) Robert Hook c) Khorana d) Eugene Kennedy
- 2) _____ is nothing but microbial hormone.
a) Provitamin b) Pheromone c) Phospholipids d) Porphyrins
- 3) Osmosis is flow of solvent from region of _____ to _____ solute concentration.
a) low, low b) low, high c) high, low d) high, high
- 4) Omega oxidation of hydrocarbons leads to formation of
a) dicarboxylic b) tricarboxylic c) monocarboxylic d) polycarboxylic
- 5) Monooxygenases are involved in degradation of
a) aliphatic amino acids b) proteins
c) carbohydrates d) aromatic amino acids



- 6) First step in pyrimidine biosynthesis is catalysed by
- a) aspartate kinase b) aspartate lyase
c) aspartate synthase d) aspartate transcarbamylase
- 7) One gram lipids on oxidation releases _____ kilocalories of heat.
- a) – 9.3 b) + 9.3 c) – 9.9 d) + 9.9
- 8) Emulsification is the property of _____ when they are added in water.
- a) fats b) carbohydrates
c) proteins d) amino acids
- 9) _____ is stereospecific.
- a) Facilitated diffusion b) Simple diffusion
c) Active transport d) Passive transport
- 10) The best function of phosphotransferase system is transport of _____ across plasma membrane.
- a) amino acids b) sugars c) Na⁺ d) K⁺
- 11) In biosynthesis of saturated fatty acids basic adding unit is
- a) Malonyl CoA b) Acetyl CoA c) Adenyl CoA d) Malonate CoA
- 12) Cytochromes are conjugated proteins consisting of _____ as a prosthetic group.
- a) amino b) acyl c) formyl d) haeme
- 13) In _____ ATPs are synthesized from ADP and inorganic phosphate.
- a) Heterotactic fermentation b) Homolactic fermentation
c) Oxidative phosphorylation d) Photosynthesis
- 14) _____ ATP molecules are generated in TCA cycle.
- a) 12 b) 30 c) 38 d) 10



SECTION – II

Attempt **any four**.

2. Write an essay on different permeation systems in E. coli. **14**
 3. Write an essay on mitochondrial electron transport chain. **14**
 4. Give an account of amino acid synthesis of Pyruvate family. **14**
 5. Write an essay on 'oxidation of alkanes'. **14**
 6. Answer **any two** of the following. **14**
 - i) Group translocation.
 - ii) Components of electron transport system.
 - iii) Valerate pathway.
 7. Answer **any two** of the following. **14**
 - i) Aerobic and anaerobic electron transport chain.
 - ii) Energy gain and amphibolic nature of TCA cycle.
 - iii) β keto adipate pathway.
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M.Sc. (Part – I) (Semester – II) Examination, 2015
MICROBIOLOGY (Paper – VII)
Biophysics and Bioinstrumentation

Day and Date : Tuesday, 21-4-2015
Time : 11.00 a.m. to 2.00 p.m.

Max. Marks : 70

- N. B. :** 1) Part – I question 1 is **compulsory**.
2) Attempt **any four** questions from Part – II.
3) Figures to the **right** indicates **full** marks.
4) Answers to the **two** parts should be written in the **same** answer book.

PART – I

1. Rewrite the following sentence by selecting the correct answer from given alternatives :

14

- 1) X-ray penetrate human body because it is _____ radiation.
- a) Electromagnetic radiation b) Longer wavelength
c) Shorter wavelength d) Invisible
- 2) The region of an infrared spectrum where many absorption takes place is known as _____
- a) fingerprint region b) functional group region
c) foot print region d) hand print region
- 3) The direct ELISA test requires
- a) known antibody b) known antigen
c) complement d) patients antibody
- 4) In _____ instrument intensity of transmitted light is used for measurement of concentration of substance.
- a) Nephelometry b) Turbidometry
c) Raman d) None of these



PART – II

Attempt **any four** questions :

2. Explain with respect to principle, instrumentation and application infra-red spectroscopy. **14**
 3. What is the principle of ELISA ? Explain the different types of ELISA methods and give their applications. **14**
 4. What is the importance of ionization in mass spectrometry ? How sample is ionized, separated and detected in mass spectrometry ? **14**
 5. Write short answers (**any two**) : **14**
 - a) Define pH. Comment on working of combined pH electrode.
 - b) Describe the importance of gas sensing electrode.
 - c) What is Ramchandran Plot ? Give its significance.
 6. Write short notes on (**any two**) : **14**
 - a) Quaternary structure of protein.
 - b) Principle and application of NMR.
 - c) Applications of tracer technique.
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M.Sc. – I (Semester – II) Examination, 2015
MICROBIOLOGY
Paper – VIII : Microbial Ecology and Diversity

Day and Date : Thursday, 23-4-2015
Time : 11.00 a.m. to 2.00 p.m.

Max. Marks : 70

- N.B. :** I) *Part I question 1 is compulsory.*
II) *Attempt **any four** questions from Part II.*
III) *Figures to the **right** indicate **full** marks.*
IV) *Answer to the **two** parts should be written in the **same** answerbook.*

PART – I

1. Rewrite the following sentences by selecting the correct answer from given alternatives :

14

- i) _____ is a modern approach for bacterial taxonomy.
a) Biochemical properties b) Genetic properties
c) Staining properties d) Morphology
- ii) _____ is a free living hetero trophic N₂ fixer.
a) Streptococcus b) Rhizobium
c) Azotobacter d) Clostridium
- iii) Usnea is a common example of
a) Lichens b) Algae
c) Fungi d) Bacteria
- iv) VAM help the plants in
a) Phosphate nutrition b) Absorption of minerals
c) Nitrogen fixation d) CO₂ fixation
- v) _____ is absent in prokaryotic cell.
a) Mesosome b) Mitochondria
c) Cell wall d) Cytoplasmic membrane



- vi) VAM was discovered by
- a) Barbera Moose
 - b) Alexander
 - c) Dr. Norman Borlang
 - d) Haberlant
- vii) A better idea of the productivity of an ecosystem can be obtained by
- a) Pyramid of energy
 - b) Pyramid of biomass
 - c) Pyramid of number
 - d) Inverted Pyramid
- viii) The term ecosystem was first introduced by
- a) Aurther Stanely
 - b) Aurther Tansely
 - c) Alexander
 - d) Rachel Carson
- ix) An ecosystem refers to
- a) The part of earth and atmosphere capable of inhibiting the living organisms
 - b) The biotic factor in a habitat
 - c) The community of organism together with the environment in which they live
 - d) A community of organisms interacting with one another
- x) _____ represent the largest population in an ecosystem.
- a) Decomposers
 - b) Consumers
 - c) Top consumers
 - d) Producers
- xi) Lichens are described as indicators of
- a) Air pollution
 - b) Xerophytic succession
 - c) Water pollution
 - d) Mesophytic succession
- xii) Marine bacteria grow best at salt concentration _____ %.
- a) 0.5 to 1.5
 - b) 2.5 to 4
 - c) 1.5 to 2.0
 - d) 0.1 to 1.25
- xiii) Rhizobium in legume root nodules fixes nitrogen in the form of
- a) Nitrate
 - b) Nitrite
 - c) Ammonia
 - d) Glutamic acid
- xiv) In a grass land top consumers are
- a) Carnivores
 - b) Fungi
 - c) Herbivores
 - d) Bacteria



PART – II

Attempt **any four** questions :

2. Write an essay on Microbe-plant interactions. **14**
 3. Give general characteristics of purple and green sulphur bacteria. **14**
 4. Give an account of Alkalophilic and thermophilic microorganisms. **14**
 5. Write short answers (**any two**) : **14**
 - a) List out general characteristics of Yeast and Lichens.
 - b) Give identification methods for uncultured organisms.
 - c) Explain microbes in acid mine drainage.
 6. Write short notes on (**any two**) : **14**
 - a) Xenobiotics.
 - b) Concept of autotrophy.
 - c) Magneto tactic bacteria.
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M.Sc. – II (Semester – IV) Examination, 2015
MICROBIOLOGY (Paper – XIII) (New CGPA Pattern)
Immunology and Immuno-Technology

Day and Date : Thursday, 16-4-2015
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Part – I, question 1 is **compulsory**.
2) Attempt **any four (4)** questions from Part – II.
3) Figures to **right** indicate **full** marks.
4) Answers to Part – I and Part – II are to be written in **same** answer booklet **only**.

PART – I

1. Rewrite the sentences after choosing correct answer from the given alternatives. **14**
- i) Immunity mediated by antibodies produced in the human or body fluids such as plasma or lymph is known as _____ immunity.
- a) Cell mediated b) Humoral
c) Natural active d) Artificial active
- ii) Treatment of autoimmune disease includes
- a) Metabolic control
b) Use of anti-inflammatory drugs
c) Use of immunosuppressive drugs
d) All of these
- iii) _____ antibody production is resulted in hypersensitivity.
- a) IgG b) IgE c) IgA d) IgM
- iv) Allergy of infection is an example of _____ hypersensitive reaction.
- a) Type – I b) Type – II c) Type – III d) Type – IV
- v) Autoantibodies against acetyl-choline receptors are produced in _____
- a) Rheumatoid arthritis b) Myasthenia gravis
c) Goodpasture's syndrome d) Pernicious anaemia



- vi) Cytokines _____
- a) are lymphokines
 - b) are monokines
 - c) help to control and regulate immune response
 - d) all of these
- vii) Cytokines produced by virally infected cells are called _____
- a) interferons
 - b) chemokines
 - c) interleukins
 - d) IL-42
- viii) The ability of an antigen to react with antibody produced by it is referred to as _____
- a) Immunogenicity
 - b) Immunogens
 - c) Antigenic determinants
 - d) Immunologic specificity
- ix) _____ cell has maximum phagocytic activity.
- a) Mast cells
 - b) Basophil
 - c) Monocyte
 - d) Macrophage
- x) In an autoimmune disease pernicious anaemia, antibodies are produced against _____
- a) folic acid
 - b) vitamin B12
 - c) intrinsic factor
 - d) none of these
- xi) The MHC is a collection of genes located on chromosome No. _____ in humans.
- a) 15
 - b) 17
 - c) 6
 - d) None of these
- xii) IgM is produced by _____ cells.
- a) Macrophage
 - b) T cells
 - c) B cells
 - d) Mast cells
- xiii) T-helper cells carry _____ molecules as its specific marker.
- a) CD4
 - b) CD8
 - c) CD9
 - d) CD3
- xiv) _____ is secondary lymphoid organ.
- a) MALT
 - b) Spleen
 - c) Lymph node
 - d) All of these



PART – II

Attempt **any four (4)** questions from Part – II.

2. Write essay on “Cytokines”. **14**
 3. Write in detail on “Major Histocompatibility (MHC) antigens and genes of human”. **14**
 4. Write in detail on “Innate/natural and acquired immunity and differentiate between active and passive immunity”. **14**
 5. Write in short on **any two** of the following : **14**
 - a) Theories of origin of autoimmunity
 - b) Characteristics of cancer cell
 - c) Physical and mechanical factors in innate immunity.
 6. Write short notes on **any two** of the following : **14**
 - a) Antibody diversity
 - b) Lymphocytes
 - c) HLA typing.
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M.Sc. – II (Semester – IV) Examination, 2015
MICROBIOLOGY (Paper – XIV) (New CGPA Pattern)
Bioinformatics and Biometry

Day and Date : Saturday, 18-4-2015
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Part – I, Question 1 is **compulsory**.
2) Attempt **any four** questions from Part – II.
3) Figures to **right** indicate **full** marks.
4) Answers to Part – I and Part – II are to be written in **same** answer booklet only.

PART – I

1. Rewrite the sentences after choosing correct answer from the given alternatives :

14

- i) DNA microarrays allow detection of Gene mutations using ?
a) Polymerase Chain Reaction b) Cloning
c) Southern Blotting d) Hybridization
- ii) The mean of 100 observations is 50. What is the new mean of 5 is added to each observation ?
a) 5 b) 105
c) 100 d) None of these
- iii) The process of finding relative location of gene on a chromosome is called _____
a) Gene tracing b) Genome mapping
c) Genome walking d) Chromosome walking
- iv) The computational methodology that tries to find the best matching between two molecules, a receptor and ligand is called _____
a) Molecular matching b) Molecular docking
c) Molecular fitting d) Molecular affinity checking



- v) Laboratory work using chemicals, drugs etc. Using water is referred as _____
- a) Dry lab
 - b) Wet lab
 - c) In vitro
 - d) In Silico
- vi) Margaret Dayhoff developed the first protein sequence database called _____
- a) SWISS PROT
 - b) Atlas of protein sequence and structure
 - c) Protein sequence data bank
 - d) PDB
- vii) The alignment method suitable for finding out conserved patterns in DNA or protein sequences is _____
- a) Multiple sequence alignment
 - b) Pair wise alignment
 - c) Global alignment
 - d) Local alignment
- viii) The procedure of aligning two sequences by searching for patterns that is in the same order in the sequences
- a) Sequence alignment
 - b) Pair wise alignment
 - c) Multiple sequence alignment
 - d) All of these
- ix) All the following are protein sequence databases EXCEPT _____
- a) PIR
 - b) PSD
 - c) SWISS PROT
 - d) EMBL
- x) Literature databases include _____
- a) MEDLINE and PubMed
 - b) MEDLINE and PDB
 - c) PubMed and PDB
 - d) MEDLINE and PDS
- xi) Which of these would not be a valid reason that use of microarray technology to differentiate between closely related bacterial species and subspecies is important ?
- a) Certain strains of bacteria are more pathogenic than other related strains
 - b) Some strains of bacteria are more active in bioremediation than other related strains
 - c) Infection by different strains of bacteria may require different therapeutic approaches
 - d) In many cases, critical information about characteristics of a bacterium causing an infection needs to be immediately available



- xii) The DNA microarrays technology that indicates which genes are transcribed is called
 - a) DNA variation screening
 - b) Gene expression profiling
 - c) Microarray comparative genomic hybridization
 - d) Antisense
- xiii) The range of simple correlation coefficient is
 - a) (0, 1)
 - b) $(-\infty, \infty)$
 - c) $(-1, 1)$
 - d) $(0, \infty)$
- xiv) With help of histogram we can get _____
 - a) mean
 - b) median
 - c) mode
 - d) coefficient of kurtosis

PART – II

Answer **any four** :

- 2. Give an account of : Open access bibliographic resources and literature databases special reference to PUBMED. 14
 - 3. Write an essay on : DNA microarray. 14
 - 4. Write an essay on : “Use of Bioinformatics in major research areas”. 14
 - 5. Write short answer of **any two** from the following : 14
 - a) Hypothesis testing.
 - b) Application of genomics
 - c) Application of biostatistics.
 - 6. Write short notes on (**any two**) : 14
 - a) Mean and Mode
 - b) Analysis of variance
 - c) Applications of protein microarrays.
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**M.Sc. (Part – II) (Semester – IV) Examination, 2015
MICROBIOLOGY (New CGPA Pattern)
Waste Management Technology (Paper – XV)**

Day and Date : Tuesday, 21-4-2015

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- N.B. :** 1) *Part – I Question 1 is compulsory.*
2) *Attempt **any four** questions from Part – II.*
3) *Figures to the **right** indicates **full** marks.*
4) *Answer to the **two** Parts should be written in the **same** answer book.*

PART – I

1. Rewrite the following sentences by selecting correct answer from given alternatives :

14

- i) In industrial waste treatment _____ method is used for liquid-solid separation.
- a) Activated sludge process b) Sedimentation
c) Flocculation d) Oxidation ponds
- ii) Generally textile waste is deficient in _____
- a) Carbon b) Nitrogen
c) Phosphorous d) Sulfur
- iii) Zoogloea ramigela organism play important role in _____ treatment process.
- a) Oxidation ponds b) Trickling filter
c) Screening d) Activated sludge process
- iv) The lake rich in nutrient is called _____ lake.
- a) Eutrophic b) Oligotrophic
c) Mesotrophic d) All of these
- v) Melanoidin pigments are present in _____ industry waste water.
- a) Distillery b) Textile
c) Paper and pulp d) Cyanide

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PART – II

Answer **any four** questions :

2. Discuss in detail types of characteristics of industrial wastes. **14**
 3. Write an essay on 'Water Tracing'. **14**
 4. Discuss in detail characteristics and treatment of textile industry waste water. **14**
 5. Write short answers (**any two**) : **14**
 - a) Global warming and EL Nino
 - b) Characteristics of distillery wastes
 - c) Preservation and applications of genetically engineered microorganisms.
 6. With short notes on (**any two**) : **14**
 - a) Impact of pollutant on biotreatment
 - b) Eutrophications
 - c) EIA and EA.
-



xiii) A crop that is grown and incorporated into the soil to increase the fertility is called _____

- a) Compost
- b) Humus
- c) Green manure
- d) Manure

xiv) Azolla is used as biofertilizer for _____

- a) Rice
- b) Soyabean
- c) Maize
- d) Sugarcane

PART – II

- 2. Describe in detail “Production and application of Bioinsecticide”. **14**
 - 3. Describe in detail root modulation process. **14**
 - 4. Describe in detail composting process. **14**
 - 5. Describe **any two** of the following : **14**
 - a) Microbial composition of soil
 - b) Production and applications of Green Manure
 - c) Carbon cycle.
 - 6. Describe **any two** of the following : **14**
 - a) Vermiculture and its uses
 - b) Frankia induced nodulation
 - c) Nitrogen cycle.
-