PGIS-N 1051-A B - 15

M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Biomolecules)

Paper - HCT : 1.1

(New)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

Answer Question **No. One** and any **Four** of the Following.

1.   Answer the following: (10×2=20)

a)   What is ionic product of water?

b)   Write the optical isomers of Glucose and Lactose.

c)   Write the structure of cellobiose and its importance.

d)   What are sphingolipids? Write them functions.

e)   Write the properties of peptide bond.

f)   What is Bohr effect?

g)   How does ninhydrin react with amino acids.

h)   Write the structure of BPG and its effect on hemoglobin.

i)   Explain syn and anti conformation of nucleotides.

j)   What is Tm ? Give its significance.

2.   a)   Derive Henderson - Hasselbalch equation and explain its importance in buffer
preparation.   (3×5=15)

b) Give the classification of monosaccharides giving suitable example for each.

c) Describe the bacterial cell wall structure.

3. a) Write the classification of lipids giving one suitable example for each class with their structure. (3×5=15)

b) Explain the nicalson lipid bilayer structure.

c) Explain the merrifield solid phase synthesis of peptide.

4. a) Explain the steps involved in the determination of the primary structure of a protein. (3×5=15)

b) Explain the structural features of keratins.

c) Describe the Ramachandran plot and its significance.

5. a) How is the structure of myoglobin elucidated? Explain. (3×5=15)

b) Derive an equation showing the hemoglobin is an allosteric proteins.

c) Explain the role of chaperonins in protein folding.

6. a) Explain the structural features of B-DNA. (3×5=15)

b) Describe the structure and functions of t-RNA.

c) Describe the chemical synthesis of Oligonucleotides.

7. Write notes on any three of the following : (3×5=15)

a) Glucose amino glycans.

b) Prostaglandins.

c) Abnormal hemoglobins.

d) Nucleic and hybridization.

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M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Analytical Biochemistry)

Paper - HCT : 1.2

(New)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

Answer Question **No. 1** and any **Four** of the remaining.

1.   Answer the following: (10×2=20)

   a)   Define svedberg coefficient?

   b)   What is ultrafiltration? Mention its uses.

   c)   What is affinity chromatography?

   d)   Give the principle and applications of pulse field electrophoresis.

   e)   Write the principle of TLC.

   f)   What are stable isotopes? Give two examples.

   g)   What is autoradiography?

   h)   State Beers-Lambert's Law? Mention its limitations.

   i)   Give the principle and uses of NMR.

   j)   Write the principle of ESR.

2.   a)   Write an account of density gradient centrifugation.   (7+8=15)

   b)   What is differential centrifugation? How is it useful in sub-cellular fractionation?

3. a) Discuss the principle and applications of gel filtration chromatography. (7+8=15)

   b) With a neat diagram explain the principle and applications of GLC.

4. a) Describe the principle and applications of SDS-PAGE. (8+7=15)

   b) Explain the measurement of radioactivity by liquid scintillation counter.

5. a) Give an account of applications of radioisotopes in biological sciences. (8+7=15)

   b) Write a note on agarose gel electrophoresis.

6. a) Explain the construction and applications of UV-VIS spectrophotometer. (6+5+4=15)

   b) What is ORD? How is it useful in the elucidation of structure of proteins?

   c) Write a note on infrared spectroscopy.

7. Write notes on any **three** of the following : (3×5=15)

   a) Types of rotors used in centrifuges.

   b) HPLC.

   c) SEM.

   d) MALDI-TOF.

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M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Cell biology and Microbiology)

Paper - HCT : 1.3

(New)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

Answer question **No. 1** and any **Four** of the remaining.

1. Answer the following: (10×2=20)

   a)   What is a capsule? What is its role in bacteria?

   b)   Differentiate between bacteriostatic and bactericidal agents?

   c)   State Fick's law. Write its significance.

   d)   What is F-Type AT Pase? What is its role?

   e)   What is olfaction? What is its significance?

   f)   Distinguish between pilli and fimbriae?

   g)   What are prions? How do they differ from viruses?

   h)   Write the characteristic features of actinomycetes.

   i)   What is selective enrichment culture technique?

   j)   What are food preservatives? Give two examples.

2. a)   Explain the detailed structure of eukaryotic cell.   (7+8=15)

   b)   Describe the structure of microtubules.

3. a) Explain the structure and function of ABC-transporter.   (5+5+5=15)

   b) Describe the function of Acetyl Choline receptor.

   c) Explain the structure of skeletal muscle.

4. a) Explain the cell wall structure of Gram Negative of bacteria.   (5+5+5=15)

   b) Describe the identification of bacteria by 16S rRNA sequencing.

   c) Write an account on isolation of bacterial viruses.

5. a) Describe the isolation and maintenance of pure cultures.   (7+8=15)

   b) Depict bacterial growth curve add a note on various factors affecting bacterial growth.

6. a) Explain different stages of mitosis.   (5+5+5=15)

   b) Describe the process of contraction of cardiac muscle.

   c) Give an account on fungal classification with example.

7. Answer any **three** of the following :   (3×5=15)

   a) Cell cycle.

   b) Protein kinesis.

   c) Assay of animal virus.

   d) Synchronous growth.

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M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Food and Nutrition)

Paper - SCT : 1.1

(New)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

Answer Question **No. 1** and **Four** of the remaining.

1.   Answer the following: (10×2=20)

   a)   Give structure and significance of cholesterol.

   b)   What are food preservatives? Give any two examples.

   c)   What are essential fatty acids? Give examples.

   d)   Mention any two physiological roles of Calcium and magnesium.

   e)   Define food fortification with an example.

   f)   What are anti-nutritional factors? Give an example.

   g)   Define emulsifying agents with an example.

   h)   What is hypervitaminosis?

   i)   Define BMR and mention the average BMR for Indians.

   j)   What are goitrogens? Give an example.

2.   a)   How is energy value of food determined? Discuss.   (7+8=15)

   b)   Give a detailed account on different methods of food preservation.

3. a) Discuss causes, symptoms and prevention of protein calorie malnutrition. (7+8=15)

   b) Describe the different methods used to evaluate the nutritive value of proteins.

4. a) Explain the sources, functions and deficiency syndrome of vitamin A. (7+4+4=15)

   b) Write a note on naturally occurring toxicants in foods.

   c) Discuss electrolyte balance in human body.

5. a) Explain the nutrition for infants. (5+5+5=15)

   b) Discuss the use of iron fortification for anemia.

   c) Explain the methods for detecting the adultrants in food.

6. a) Discuss nutritional role of iodine and iron. (7+4+4=15)

   b) Discuss the dietary essentiality of the carbohydrates.

   c) Write a note on regulation of water balance in human body.

7. Write notes on any **three** of the following : (3×5=15)

   a) Proximate analysis of foods.

   b) Geriatric nutrition.

   c) Consumer education.

   d) Dietary fibers.

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M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Analytical Biochemistry and BioStatistics)

Paper - HCT : 1.1

(Old)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

Answer Question **No. 1** and any **Four** of the remaining.

1. Answer the following: $(10 \times 2 = 20)$

    a) What is autoradiography?

    b) Define Svedberg coefficient?

    c) What is gel permeation? Give its applications.

    d) What is the principle of isotachophoresis?

    e) What is β-particle? Give its significance in biology.

    f) What is ESR? Write the principle of ESR.

    g) What is histogram?

    h) What is the significance of student T test?

    i) What are ion exchangers? Give examples of strong ion exchangers.

    j) What is the matrix used in ionization and name the fluid used in scintillation counting.

2. a) What is adsorption chromatography? Describe the method of separation of small molecules by column chromatography. $(7 + 8 = 15)$

    b) Describe the process of separation of proteins by 2-D gel electrophoresis.

3. a) Describe the process of measurement of radioactivity by liquid scintillation counter and GM counter. $(7+8=15)$

   b) Describe the principle and process of separation of proteins by gel chromatography?

4. a) Describe the working and applications of fluorescence spectrophotometry. $(7+8=15)$

   b) What is standard deviation? Mention its applications.

5. a) Explain the working and applications of NMR. $(7+8=15)$

   b) Discuss the working principle and applications of capillary electrophoresis.

6. a) Describe different methods of representation of scientific data. $(7+8=15)$

   b) Describe the significance of analysis of variance with example.

7. Answer any **three** of the following : $(3\times5=15)$

   a) Gas chromatography.

   b) Agarose - gel electrophoresis.

   c) IR spectroscopy.

   d) Hypothesis testing methods.

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M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Biomolecules)

Paper - HCT : 1.2

(Old)

Time : 3 Hours   Maximum Marks : 80

Instructions to Candidates :

Answer Question **No. 1** and any **Four** of the remaining.

1. Answer the following: (10×2=20)

    a)   What is the ionic product of water?

    b)   What are enantiomers? Give an example.

    c)   What are antifreeze glycoproteins? Give an example.

    d)   Give structure of any two non-protein amino acids.

    e)   What are glycolipids? Give an example.

    f)   Give the structural differences between starch and cellulose.

    g)   How are sugars linked to amino acids in glycoproteins?

    h)   Give the structural feature of collagen.

    i)   What is T_m? What are the factors that affect T_m?

    j)   What is supercoiled DNA?

2. a)   Discuss the importance of water in biological systems.   (5+5+5=15)

    b)   Discuss the structure of lactose and cellobiose in detail.

    c)   Give a detailed account on the structure of glycogen.

3. a) Classify lipids and write biochemical significant of structural lipids. (5+5+5=15)

   b) Discuss the biological role of fatty acids.

   c) Discuss the structure of liposomes and micelles. Add a note on their uses.

4. a) Explain Ramachandran plot and give its significance. (5+5+5=15)

   b) Discuss the various factors that stabilize tertiary structure of proteins.

   c) What is protein folding? Discuss the role of chaperons.

5. a) What is protein denaturation? Discuss the factors affecting the denaturation.
   (5+5+5=15)

   b) Discuss the quaternary structure of protein by taking hemoglobin as an example.

   c) What are abnormal hemoglobins? Add a note on sickle cell anemia.

6. a) Discuss the nucleic acid hybridization and super helix topology. (5+5+5=15)

   b) Discuss the isolation and purification of nucleic acids.

   c) Give an account on chemical synthesis of oligo nucleotides.

7. Write short notes on any **three** of the following : (3×5=15)

   a) Glycoproteins.

   b) Glycosaminoglycans.

   c) Solid phase peptide synthesis.

   d) Henderson - Hasselbalch equation.

PGIS-O 1053 B - 15

M.Sc. Ist Semester (CBCS) Degree Examination

Biochemistry

(Enzymology)

Paper - HCT : 1.3

(Old)

Time : 3 Hours
Maximum Marks : 80

Instructions to Candidates :

Answer Question **No. 1** and **Four** of the remainings.

1. Answer the following: $(10\times2=20)$

    a) Define K_m and V_{max}. Mention their significance.

    b) What is turnover number of an enzyme?

    c) Distinguish between specificity and specific activity.

    d) Write the coenzyme functions of TPP.

    e) What are isoenzymes? Mention their significance.

    f) What is suicide inhibition? Give one example.

    g) What is Scatchard plot? Give its significance.

    h) Write the effect of pH on enzyme activity.

    i) What is covalent catalysis? Give one example.

    j) What are enzyme biomarkers? Give two examples.

2. a) Describe the IUB classification of enzymes with suitable examples. $(5+5+5=15)$

    b) Discuss the effect of pH and temperature on enzyme activity.

    c) Discuss the coenzyme action of NAD and FAD.

3. a) Discuss multi-enzyme complex with a suitable example. (5+5+5=15)

   b) Discuss different types of enzyme assays.

   c) Write a note on the mechanism of action of ribonuclease.

4. a) Explain the 3-Dimensional features of active sites as revealed by X-ray analysis.
   (5+5+5=15)

   b) Describe the process of purification of enzymes based on molecular size.

   c) Give an account on AT Case as an allosteric enzyme.

5. a) Derive Michaelis-Menten equation based on steady state approach. (7+8=15)

   b) What is enzyme inhibition? How are different enzymes kinetically distinguish.

6. a) What is covalent catalysis? Explain with example. (5+5+5=15)

   b) Discuss the regulation of enzyme activity by reversible covalent modifications.

   c) Give an account on primary and secondary plots.

7. Write notes on any **three** of the following : (3×5=15)

   a) Ping-Pong mechanism.

   b) Industrial applications of enzymes.

   c) Biosensors.

   d) Zymogen activation.