

- (j) Tris buffer (15)
4. Differentiate between the following pairs :
- (a) Cation and anion exchangers
 - (b) Fixed angle and swinging bucket rotors
 - (c) Paper and thin layer chromatography
 - (d) Extrinsic and intrinsic fluorophores
 - (e) Isopycnic and rate zonal gradient centrifugation (15)
5. (a) Describe the principle and applications of affinity chromatography.
- (b) Explain the working of a double beam spectrophotometer with the help of a diagram.
- (c) Write the principle of ion-exchange chromatography and write two applications of this technique. (5,5,5)
6. (a) What are the properties of good matrix used in chromatography? Write two examples of matrices used in gel filtration chromatography.
- (b) Elaborate the principle of isoelectric focusing technique.
- (c) Explain the principle of agarose electrophoresis and cite two examples of its applications.

(1206)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1389

I

Unique Paper Code : 2492011103

Name of the Paper : Biochemical Techniques

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : I

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks. Question no. 1 is compulsory.

1. (a) Justify the following :

(i) Glass cuvettes are not used to measure absorbance of DNA solutions.

P.T.O.

- (ii) A denser particle will have a higher sedimentation coefficient.
 - (iii) All fluorescence compounds have cyclic structures.
 - (iv) Why can be molecular weight of proteins not be estimated by Native-gel electrophoresis but can be calculated by SDS-PAGE?
 - (v) A spacer arm is interposed between ligand and the matrix in affinity chromatography.
 - (vi) Electrophoresis cannot be used for separation of lipids.
- (b) The absorbance of a $12 \times 10^{-5} \text{ M}$ solution at a wavelength of 280 nm is 0.5. The pathlength of the cuvette is 1 cm. Calculate the molar extinction coefficient. (12,3)

2. (a) Define the following :

- (i) Void volume
- (ii) Partition coefficient
- (iii) Exclusion limit
- (iv) Chromophore

- (v) Molar extinction coefficient
 - (vi) Stoke's shift
 - (vii) Retention factor
- (b) Derive Beer-Lambert's Law and discuss its limitations.
- (c) Describe the different types of rotors used for centrifugation. (7,5,3)
3. Mention the role of the following in SDS-PAGE :
- (a) SDS in the sample buffer
 - (b) β -mercaptoethanol
 - (c) TEMED
 - (d) Ammonium persulphate
 - (e) Coomassie Brilliant Blue
 - (f) Separating gel
 - (g) Bromophenol blue
 - (h) Glycerol
 - (i) Glycine

- (iv) Aspartic acid
- (v) Phosphatidyl Choline
- (vi) 7 methyl Guanosine
- (b) Triglycerides are considered as an ideal storage molecule. Comment.
- (c) What do you mean by mutarotation? Explain with the help of example. (9,3,3)
5. (a) What are eicosanoids? Briefly describe the function of three classes of eicosanoids.
- (b) Give the biological function of different forms of RNA.
- (c) Draw the titration curve of glycine and discuss the information you obtained from the titration curve. (5,5,5)
6. Write short notes on the following :
- (a) Lectins
- (b) Biologically important nucleotides
- (c) Glycolipids
- (d) Waxes (3,5,4,3)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1350 I

Unique Paper Code : 2492011101

Name of the Paper : Biomolecules

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : I

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
 2. There are 6 questions. Attempt any 4 questions.
 3. All questions carry equal marks. Question no. 1 is compulsory.
-
1. (a) Identify the following statements as true or false and justify your answer :
 - (i) All other amino acids except proline are optically active.
 - (ii) Melting point of DNA is directly related to GC content.

P.T.O.

(iii) Glycine acts as biological buffer at physiological pH.

(iv) Chitin is an example of storage polysaccharides.

(v) At pH more than p_i amino acids exists in negatively charged form.

(vi) Oleic acid has a higher melting point than stearic acid.

(b) Name the following :

(i) Methyl donor in biological reaction

(ii) Most abundant polysaccharide in biosphere

(iii) Active form of vitamin B1

(iv) An unusual base found in tRNA

(v) An example of ω -3 fatty acid

(vi) A hormone derived from amino acid

(9,6)

2. Differentiate between the following :

(a) Proteoglycans and Glycoproteins

(b) Glycerophospholipids and Sphingophospholipids

(c) Standard and non-standard amino acid

(d) B-DNA and Z-DNA

(e) Water soluble and Fat- soluble vitamins

(3×5=15)

3. (a) Explain why :

(i) Glucose is not stored in monomeric form.

(ii) Glycosaminoglycans have gel like consistency.

(iii) Amino acid can act as both acid and base.

(iv) Arginine is highly soluble in water however tryptophan is poorly soluble.

(v) DNA is resistant to alkali hydrolysis.

(vi) Vitamin K is called an anti-hemorrhagic vitamin.

(b) Give the active form of vitamin D along with its deficiency diseases. (12,3)

4. (a) Draw the structure of the following :

(i) N- acetyl D glucosamine

(ii) Trehalose

(iii) Lysine

- (c) In a double-stranded DNA molecule, the percentage of cytosine is 20%. What would be the percentage of adenine? (5,6,4)
5. Write short notes on the following :
- (a) Biologically important nucleotides
- (b) Biological buffers
- (c) Non-standard amino acids (3×5)
6. (a) Why are Triacylglycerides considered as an ideal storage fuel?
- (b) Explain the role of arachidonic acid in the human body.
- (c) What are epimers? Draw the structure of an example.
- (d) Comment on the features of the peptide bond. Draw the structure of the tripeptide "Gly-Ala-Ala". (4,3,4,4)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3497

I

Unique Paper Code : 2494001001

Name of the Paper : GE: Molecules of Life

Name of the Course : **B.Sc. (Hons.) Biochemistry**

Semester : I

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks.
5. Question no. 1 is compulsory.

1. (a) Define the following :

- (i) Isoelectric point
- (ii) Anomer
- (iii) Essential fatty acids
- (iv) Chargaff's Rule
- (v) Mutarotation

(b) Identify the following statements as true or false and justify your answer :

- (i) Maltose is a non-reducing sugar.
- (ii) Stearic acid has a lower melting point than oleic acid.
- (iii) Cholesterol provides fluidity to the cell membrane.
- (iv) Proline is a helix breaker.
- (v) Uracil is present in DNA. (5,10)

2. Differentiate between the following :

- (a) Phospholipids and Sphingolipids
- (b) Cellulose and Starch

(c) mRNA and tRNA

(d) Storage lipids and structural lipids

(e) Essential amino acids and non-essential amino acids (3×5)

3. (a) Name and draw the structure of the following :

(i) Phosphatidic acid

(ii) Deoxy-Ribose

(iii) Stearic acid

(iv) α -D-Glucopyranose

(v) Lactose

(vi) Cysteine

(b) Explain different levels of protein structure.

(9,6)

4. (a) How do the chain length and level of unsaturation affect the properties of fatty acids ?

(b) Explain the differences between the structure and function of DNA and RNA.

- (ii) Alzheimer's Disease
- (iii) Supersecondary structures
- (iv) Sickle cell Anaemia
- (v) Mb structure

(15)

(200)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1370

I

Unique Paper Code : 2492011102

Name of the Paper : Proteins (DSC-2)

Name of the Course : B. Sc. (H) Biochemistry

Semester : I

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks. Question no. 1 is compulsory.

P.T.O.

1. (a) Justify the following statements (**any five**) :

- (i) Glycine and Proline are often present at turns of polypeptide chain.
- (ii) Negatively charged and positively charged amino acids are often present near the amino and Carboxy terminal end of the helical segment respectively.
- (iii) Iron should be present in ferrous form in heme part of the hemoglobin.
- (iv) Rotation around peptide bond is restricted.
- (v) Fetal Hb has high affinity for oxygen binding as compared to adult.

(ii) Reaction with Edman reagent gives PTC-Val adduct formation.

(iii) CNBr treatment released :

(i) Tetrapeptide having Val, Met, Lys and Asp.

(ii) Dipeptide having Gly and Met.

(iii) Free amino acid was released as Leu.

(d) Trypsin treatment released :

(i) Tripeptide containing Val, Lys and Asp

(ii) Tetrapeptide containing Gly. Leu and Met (5,6,4)

6. Write short note on :

(i) Ramachandran plot

(b) Describe the structure and function of α -Keratin.

(b) Proteins are diversified in their Biological functions. Explain. (6,5,4)

5. (a) Discuss the experiment which explained that primary structure of proteins contains all the necessary information of protein folding.

(b) Mention the important forces/bonds responsible for stabilizing the protein structure.

(c) Determine the sequence of small peptide based on the following observations :

(i) Complete hydrolysis revealed that heptapeptide peptide contain following amino acids: Val, Asp, Lys, Met, Gly, Leu.

(vi) Collagen forms left handed alpha-helix secondary structure.

(b) Define the following proteins with example.

(i) Conjugated proteins

(ii) Multimeric proteins

(iii) Fibrous proteins

(iv) Membrane proteins

(v) Globular proteins (10,5)

2. (a) Differentiate the following :

(i) Parallel and Antiparallel β -pleated sheets.

(ii) Protein sequence and structure databases.

(iii) Conceited and sequential model.

(iv) R and T-state of Hb.

(v) Motif and Domain.

(b) What are the important features of peptide bond?

(c) Mention the effects of following chemicals on protein structure/functions :

(i) Hydrazine

(ii) Performic acid (10,3,2)

3. (a) Describe the steps involved in the synthesis of a dipeptide Gly-Ala using Solid-Phase Peptide synthesis.

(b) Discuss the various accessory proteins/enzymes involved in protein folding and prevent their misfolding or aggregation.

(c) Discuss the contributions of following Scientists :

(i) Linus Pauling

(ii) Frederick Sanger

(iii) Robert Bruce Merrifield

(iv) John Kendrew

(v) Christian Anfinsen (5,5,5)

4. (a) Define the cooperativity effect. Discuss the effect of following on binding of oxygen to hemoglobin: CO_2 , BPG, H^+ .

1479

4

5. (a) Elaborate the citric acid cycle and its regulation. (12)

(b) Describe the induced fit model of enzyme action. (3)

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

(a) Disaccharides

(b) Steroids

(c) Glucose -Alanine cycle

(d) Glycogenolysis

(500)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1479 I

Unique Paper Code : 223252230

Name of the Paper : Biochemistry : Basic concepts of Metabolism

Name of the Course : **B.Sc. (Prog.) Life Science, Zoology Examination**

Semester : III (ZOO-LS-DSC-09)

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Draw neat, well labeled diagrams, wherever required.
3. Attempt **Four** questions in all.
4. Question No. 1 is compulsory.

P.T.O.

1. (i) Define the following terms (**any four**) : (4)

- (a) Epimerase
- (b) Glucogenic amino acids
- (c) Amphibolic Pathway
- (d) Zwitterion
- (e) Triglycerides
- (f) Glycogenesis

(ii) Differentiate between (**any three**) : (6)

- (a) Hexokinase and Glucokinase
- (b) Transamination and Deamination
- (c) Synthase and Synthetase
- (d) Saturated Fatty acid and Unsaturated Fatty acid
- (e) Alpha helix and Beta pleated structure of Proteins

(iii) Give the structure of the following : (5)

- (a) Citrulline
- (b) Triacylglycerol
- (c) Alanine
- (d) Uridine diphosphate glucose
- (e) Glyceraldehyde 3 phosphate

2. (a) Briefly describe the six major classes of enzymes. (6)

(b) Give a detailed account of beta-oxidation of Palmitic acid. (9)

3. Describe the pentose phosphate pathway. (15)

4. (a) Describe the electron flow through various complexes of electron transport chain. (8)

(b) Describe urea cycle with the help of chemical structures. (7)

- (c) Discuss the general properties of allosteric enzymes and how do they differ from traditional enzymes? (5,5,5)
6. (a) Explain why do allosteric enzymes show sigmoidal saturation kinetics? Write the complete biochemical reactions catalyzed by the enzymes that use biotin and pyridoxal phosphate as coenzymes.
- (b) On studying the plot given below, which of the two (A/B) depicts the activity of the enzyme in the presence of an inhibitor? Give reasons and identify the type of inhibitor (competitive/non-competitor/uncompetitive) that is depicted to inhibit the enzyme activity. (6,9)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5840

I

Unique Paper Code : 32581301

Name of the Paper : Biochemistry

Name of the Course : B.Sc. (H) Biomedical Science (LOCF)

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. Give illustrations and examples wherever required.
4. Question No. 1 is compulsory

1. (a) Write short note on the following (**any three**) :
(2×3=6)

(i) Futile cycle

(ii) Substrate level phosphorylation

(iii) Gout

(iv) Ketone bodies

P.T.O.

(b) Differentiate between the following (any three) :
(3×3=9)

(i) Transamination reaction and deamination reaction

(ii) Paper chromatography and thin layer chromatography

(iii) Lock and key and induced fit theory of enzyme-ligand binding

(iv) Enzyme and coenzyme

2. (a) What is the principle of SDS PAGE? A protein has a molecular mass of 200 kDa as estimated by size exclusion chromatography. When SDS PAGE is carried out in presence of beta-mercaptoethanol, three bands are observed with molecular weight of 45, 80 and 30 kDa. Determine the subunit composition of protein.

(b) What is the significance of FAD in the carbohydrate metabolism? Draw the structure of FAD and enlist its functions. (8,7)

3. (a) Explain how Pentose phosphate pathway helps in maintaining the reducing environment of the cytosol, why is this pathway more active in RBCs, fast dividing cells and in Adipose tissue?

(b) Draw a diagram depicting Cori's cycle and explain its significance. (9,6)

4. (a) Explain the role of fructose-2,6 bisphosphate in reciprocal regulation of Glycolysis and Gluconeogenesis.

(b) Explain how the flow of electrons in the ETC contributes to the proton gradient using a suitable diagram.

(c) Explain the biochemical basis of allopurinol as drug of choice in the treatment of Gout. (5,6,4)

5. (a) Discuss the ligand binding cooperativity of enzymes with examples.

(b) What are the common types of covalent modifications, and how do they influence enzyme activity?

4. (a) Discuss the structure and function of $\text{Na}^+\text{-K}^+$ ATPase.
- (b) Discuss receptor-mediated endocytosis with the help of an example.
- (c) Discuss the structure and mechanism of Aquaporins. (5,5,5)
5. (a) Diagrammatically elaborate on me RBC cytoskeleton and briefly mention the role of different cytoskeletal proteins.
- (b) Discuss the key events that led to an understanding of the structure of the biological membrane.
- (c) Briefly describe a technique to explain the transverse movement of lipids in a membrane. (6,5,4)
6. Write short notes on the following :
- (i) Lipid Rafts
 - (ii) Homeoviscous adaptation
 - (iii) Membrane fusion
 - (iv) Asymmetry of lipid bilayer
 - (v) FRAP technique (3×5)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1147

I

Unique Paper Code : 2492012303

Name of the Paper : Membrane Biology

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks.
5. Question no. 1 is compulsory.

P.T.O.

1. (a) Define the following terms :

- (i) Caveolae
- (ii) Fence and gate model
- (iii) Planar bilayer
- (iv) Lipid anchored proteins
- (v) Symport
- (vi) Facilitated diffusion
- (vii) Single Particle Tracking
- (viii) Critical micelle concentration

(b) Give contributions of the following scientists :

- (i) Bert Sakmann
- (ii) S. J. Singer and G. L. Nicolson
- (iii) James E. Rothman (12,3)

2. (a) Give explanations for the following :

- (i) RBCs are good models for studying biological membranes.
- (ii) Integral membrane proteins require detergents for their solubilization.

(iii) MDR pumps are also called molecular vacuum cleaners.

(iv) Critical micellar concentrations of ionic detergents decrease with the addition of electrolytes.

(v) Hydropathy plots are useful for predicting membrane-spanning segments of a peptide.

(vi) Cholesterol plays an important role in the structure and function of the biological membranes.

(b) Discuss the roles of enzymes in catalyzing trans-bilayer translocations of phospholipids. (12,3)

3. Differentiate between the following :

- (i) Peripheral proteins and Integral membrane proteins
- (ii) COPI and COPII coated vesicles
- (iii) Ion channels and Ionophores
- (iv) P-Type and F-Type ATPases
- (v) Primary Active and Secondary Active transport (3×5)

- (c) Explain the metabolic shifts that occur during starvation and the well-fed stage. (5×3)
6. (a) Describe Malate-Aspartate shuttle system.
- (b) Give an example each of a reaction requiring the following coenzyme/cofactor :
- (i) Biotin (ii) PLP
- (iii) Coenzyme A (iv) NADH
- (v) NADPH
- (c) Write various ATP associated reaction steps in Glycolysis. (5×3)
7. (a) Describe the reactions of pyruvate dehydrogenase complex.
- (b) Briefly explain the steps involved in cholesterol biosynthesis.
- (c) Describe the synthesis of plasmalogens. (5×3)
8. (a) Describe the glyoxylate cycle in plants.
- (b) What are glycogen storage diseases? Elaborate with examples.
- (c) Discuss the process of Lipid digestion, absorption and transport. (5×3)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5839

I

Unique Paper Code : 32491301

Name of the Paper : Metabolism of Carbohydrates and Lipids

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

- Write your Roll No. on the top immediately on receipt of this question paper.
 - There are **eight** questions.
 - Attempt any **5** questions.
 - All** questions carry equal marks. Question no. **1** is compulsory.
- (a) Justify the following statements. (**Any 5**)
 - Triglycerides are more suitable energy reserves of the cell than carbohydrates.
 - Glucokinase reaction doesn't occur at equilibrium under normal intracellular conditions.

P.T.O.

- (iii) Gluconeogenesis does not occur in adipocytes.
- (iv) Acetyl CoA can't leave the mitochondria on its own.
- (v) High levels of cholesterol in blood leads to atherosclerosis.
- (vi) Intermediates of glycolysis are not able to leave the cells in which they are formed.

(b) Identify the following :

- (i) Prosthetic group of Pyruvate carboxylase.
- (ii) Disease caused due to deficiency of Lysosomal glucosidase enzyme.
- (iii) The membrane bound enzyme of TCA cycle.
- (iv) Disease caused due to deficiency of Glucose-6-phosphatase enzyme.
- (v) Hormone involved in regulation of glycogen synthase. (10,5)

2. (a) Describe the structure of Fatty Acid Synthase (FAS) in mammals.

(b) Discuss the amphibolic nature of the TCA cycle.

- (c) What is the significance of the Pentose phosphate pathway? Describe the fate of Glucose-6-phosphate when the need for NADPH exceeds that of Ribose-5-phosphate. (15)

3. Write short notes on :

- (i) Cori and Cori cycle
- (ii) Ketogenesis and its significance
- (iii) Photorespiration (5×3)

4. Differentiate between the following :

- (i) Alpha and omega oxidation
- (ii) Type I and Type II diabetes
- (iii) HDL and LDL cholesterol
- (iv) Catabolism and anabolism (4,4,4,3)

5. (a) Explain the role of insulin and glucagon on glucose metabolism.

(b) Calculate the number of ATP molecules produced when one molecule of Palmitate is completely oxidized.

1071

4

diabetes and starvation?

- (c) What are the various ways by which cholesterol biosynthesis is regulated? Elaborate. (5×3)

6. Write short notes on the following :

(a) Plasmalogen Synthesis

(b) Fatty Acid Synthase Complex

(c) Artherosclerosis (5×3)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1071

I

Unique Paper Code : 2492012301

Name of the Paper : Metabolism of Lipids (DSC)

Name of the Course : **BSc (Hons) Biochemistry (NEP)**

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks. Question no. 1 is compulsory.

1 (a) Justify the following :

- (i) Triacylglycerol is especially suitable as a storage fuel.

(200)

P.T.O.

(ii) An individual with a genetic defect in enoyl CoA isomerase will have difficulty in metabolizing oil.

(iii) Linoleic and linolenic acids are essential to mammals.

(iv) Two isoenzymes of HMG CoA synthase are known.

(v) Fatty acid biosynthesis in rat liver homogenate is severely added. inhibited when avidin is added.

(vi) Brain, erythrocytes and adrenal medulla cannot utilize fatty acids for energy requirements.

(b) Write the reactions catalyzed by the following enzymes :

(i) HMG CoA Lyase

(ii) Acetyl CoA carboxylase (12,3)

2. Differentiate between the following :

(a) Alpha and omega oxidation.

(b) Endogenous and Exogenous pathway of lipid

transport.

(c) Fatty acid oxidation in mitochondria and peroxisome. (5×3)

3. (a) Calculate the net number of ATP generated on complete oxidation of oleic acid.

(b) Give an overview of the digestion and absorption of lipids.

(c) With the help of a diagram explain the process by which a fatty acid is transported to mitochondria for its complete oxidation. (5×3)

4. Give the following conversions :

(a) Acetyl CoA to mevalonate

(b) Dihydroxyacetone phosphate to phosphatidic acid

(c) CDP-diacylglycerol to phosphatidylethanolamine (5×3)

5. (a) What are the various classes of lipoproteins? How do they differ from each other in terms of lipid composition?

(b) What are Ketone bodies and what are their uses? What is the significance of ketone bodies during P.T.O.

- (c) Discuss the characteristic features of Prions and Virioids? Give examples of any two diseases caused by them. (6,5,4)
5. (a) Describe the basic design of a fermenter. Differentiate between continuous and discontinuous culture?
- (b) Diagrammatically explain the following :
- (i) Two methods of isolation of a pure culture
- (ii) Effect of temperature on microbial growth (9,6)
6. (a) Explain the various processes involved in the treatment of sewage. Mention the role of microbes in the wastewater treatment.
- (b) Define the doubling time and the mean growth rate constant. Calculate the mean growth rate and generation time of a culture that increases in the exponential phase from 5×10^2 to 1×10^8 in 12 hours.
- (c) What is Biogenesis? Give an experiment in support of it. (7,5,3)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1272

I

Unique Paper Code : 2493012003

Name of the Paper : DSE – Microbiology

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks.
5. Question no. 1 is compulsory.

P.T.O.

1. (a) Give the contribution of following Scientists.

(i) Alexander Fleming

(ii) Louis Pasteur

(iii) Paul Ehrlich

(iv) Sergei Winogradsky

(v) Martinus W. Beijerinck

(b) Justify the following statements :

(i) Agar-Agar is a better solidifying agent as compared to gelatin.

(ii) Blood agar is both selective and enriched medium.

(iii) Archaeobacteria is similar to both prokaryotes and Eukaryotes.

(iv) Chlorine treatment should be avoided in water containing organic matter.

(c) What do you mean by "fermented food" and discuss with two suitable examples. (5,6,4)

2. (a) Compare the Gram positive and Gram-negative cell wall of the bacteria. What is the mechanism of Gram staining?

(b) What are psychrophile and mesophiles? Discuss briefly dry heat and wet heat method of sterilization.

(c) Why would microbial cells that are vigorously growing when inoculated into fresh culture medium have a shorter lag phase than those that have been stored in a refrigerator? (6,6,3)

3. (a) Discuss transduction and transformation bacterial gene transfer methods with suitable diagram.

(b) What do you mean by gene mapping in bacteria? Discuss the method and significance.

(c) Give the mechanism of action and application of Ethanol and UV in controlling microbial growth. (6,6,3)

4. (a) What do you understand by Human Microbiome. How does it influence gut health?

(b) Schematically explain the industrial preparation of wine.

[This question paper contains 2 printed pages.]

Your Roll No.....

आपका अनुक्रमांक.....

Sr. No. of Question Paper : 5722

I

Unique Paper Code : 32173907/42173922

Name of the Paper : SEC : Analytical Clinical
Biochemistry

Name of the Course : B.Sc (H)/ B.Sc (Prog)

Semester : III/V

Duration : 2 Hours

Maximum Marks : 38

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any four questions from the five Questions
1. (a) Discuss the biological importance of carbohydrates.
- (b) What is metabolism? Discuss its types and functions.
- (c) Explain the Watson-crick model of DNA(3,3,3.5)

P.T.O.

2. (a) What are the different units that constitute nucleic acids?

(b) Discuss in detail the lactic acid fragmentation.

(c) Explain the different types of enzyme inhibition.
(3,3,3.5)
3. Differentiate between:

(a) Nucleosides and nucleotides.

(b) Liposome and lipoprotein.

(c) Primary and secondary structure of proteins.
(3,3,3.5)
4. (a) What are Polysaccharides? Explain with example

(b) Difference between Coenzymes and cofactors.

(c) Why Biocatalyst are important in chemical industries?
(3,3,3.5)
5. (a) What are the factors which influence enzyme action?

(b) Discuss the compositions of blood and its functions.

(c) What is m-RNA How it is important in transcription and translation.
(3,3,3.5)

- 5 (i) Write down the principle and two applications of thin layer chromatography.
- (ii) A solution containing 2 gm/L of a light absorbing substance in a 1 cm cuvette transmits 75% of the incident light of a certain wavelength. Answer the following:
- (a) What is the transmittance of the solution containing 4 gm/L?
- (b) If the molecular weight of the compound is 250, calculate the molar extinction coefficient.
- (iii) Describe the principle of a spectrofluorometer.
(5, 4, 3.5)
6. (i) Describe the principle of SDS-PAGE and write two applications of this technique.
- (ii) Explain the working of a double beam spectrophotometer with the help of a diagram.
(6, 6.5)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

आपका अनुक्रमांक.....

Sr. No. of Question Paper : 5705

I

Unique Paper Code : 32493301

Name of the Paper : Biochemical Techniques (SEC)

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 2 Hours

Maximum Marks : 50

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks. Question no. 1 is compulsory.

P.T.O.

1. Explain the following statements (**any five**):

- (i) Molecular weight of unknown protein can be determined by SDS-PAGE but not by Native-PAGE.
- (ii) Sedimentation velocity is directly proportional to the density of the particle.
- (iii) Quartz or fused silica cuvettes are used while working with a UV- Spectrophotometer.
- (iv) It is not important where the sample is applied in isoelectric focusing.
- (v) Absorbance is a unitless parameter.
- (vi) Gel filtration chromatography can be used for the determination of molecular mass of a protein. (2.5×5)

2. (a) Mention the role of the following (**Give suitable reaction if required**):

- (i) Agarose in DNA separation.
- (ii) Sucrose in centrifugation.
- (iii) Ninhydrin in amino acids separation by TLC.
- (iv) 1-anilinonaphthalene-8-sulfonate (ANS) in Fluorescence.
- (v) TEMED in PAGE

- (b) The absorbance of a 12×10^{-5} M solution at a wavelength of 280 nm is 0.5. The pathlength of the cuvette is 1 cm. Calculate the molar extinction coefficient. (10,2.5)

3. Differentiate between the following pairs:

- (i) Cation and anion exchangers.
- (ii) Fixed angle and swinging bucket rotors
- (iii) SDS-PAGE and Native PAGE
- (iv) Rate zonal and isopycnic centrifugation
- (v) Extrinsic and intrinsic fluorophore (2.5×5)

4 (i) Derive Beer-Lambert's Law and discuss its limitations.

- (ii) Explain the principle of gel filtration chromatography and write two applications of this technique.

(iii) Suggest a suitable ligand to supporting matrix for the following:

- (a) Viral RNA
- (b) NAD dependent dehydrogenase
- (c) Lipoprotein (4.5, 5, 3)

- (c) What are nonparametric tests. Discuss in brief.
(5, 4, 3.5)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5706 I

Unique Paper Code : 32493302

Name of the Paper : Biostatistics (SEC)

Name of the Course : **B.Sc. (Hons.) Biochemistry**

Semester : III

Duration : 2 Hours

Maximum Marks : 50

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Use of non-scientific calculator/log tables is allowed.
3. There are 6 questions.
4. Attempt any 4 questions.
5. All questions carry equal marks.
6. Question no. 1 is compulsory.

1. (a) State whether the given statements are True or false:

(i) Histogram is used for representing discontinuous variables.

(ii) Quota sampling is a kind of non-random sampling method.

(iii) Weight and height are examples of quantitative variables.

(iv) P-value measures the probability that the deviation between observed and expected values is not due to chance.

(v) Coefficient of correlation can be negative.

(b) Why do we perform student's t-test? How is ANOVA different from student's t-test?

(c) What are different non-probability sampling methods? Discuss in brief. (5, 4, 3.5)

6. (a) Find the coefficient of correlation between height of fathers and their sons from the following table:

Height of the fathers	65	66	67	68	158	69	70	71
Height of their sons	67	68	66	69	60	72	72	69

(b) Citing suitable examples, describe different types of data.

5706

6

Height in cm	150	152	154	156	158	160	162	164	166
No. of students	28	40	52	100	60	48	32	20	7

Find the interquartile range of the height distribution.

(c) A bag contains 5 white and 7 red flowers. Find out the probability of taking out of the bag of each type of flowers. (4, 5, 3.5)

5. (a) The mortality rate of certain disease is 5 persons per 1000 in a human population. What is the probability of just 3 deaths due to this disease in a group of 600 people? (Given $e^{-3} = 0.05$).

5706

3

(b) Define the following (any four) -

(i) Qualitative Variable

(ii) Inter-quartile range

(iii) Mode

(iv) Convenience sampling

(v) Coefficient of variance

(c) What are the different types of random sampling methods? Explain by giving suitable examples. (5, 4, 3.5)

2. (a) Write short notes on the following (any two)

(i) Measures of central tendency

P.T.O.

(ii) Chi-square test

(iii) Regression analysis

- (b) Two pea plants having round seeds were crossed, and they produced 74 plants having round seeds and 31 pea plants having wrinkled seeds. Use a chi-square test to determine whether these numbers fit a 3:1 ratio. (Critical value of Chi square at 5% level of significance and 1 degree of freedom = 3.841).

(6,6.5)

3. (a) Differentiate between the following (any three):

(i) Binomial distribution and Poisson distribution.

(ii) Simple random sampling and Systematic sampling.

(iii) Type I errors and Type II errors.

(iv) Correlation analysis and Regression analysis.

- (b) What is normal distribution? How is standard normal distribution different than normal distribution? What are the values of mean and standard deviation in standard normal distribution?

(6, 6.5)

4. (a) The number of patients that visited a doctor for consultation for 10 consecutive days is arranged in an increasing order in the following table. Find out the median number of the patients that visited the doctor.

8	10	12	14	16	18	19	20	22	25
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- (b) Frequency distribution of heights in cm of 387 students in a school is given in the following table:

5707

4

B. Explain the benefits of practicing ethics in research.

C. What is orai presentation and how it benefits a researcher? (4, 4.5, 4)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

आपका अनुक्रमांक.....

Sr. No. of Question Paper : 5707

I

Unique Paper Code : 32493303

Name of the Paper : Research Methodology (SEC)

Name of the Course : B.Sc. (Hons.) Biochemistry

Semester : III

Duration : 2 Hours

Maximum Marks : 50

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 5 questions.
3. Attempt any 4 questions.
4. All questions carry equal marks. Question no. 1 is compulsory.

P.T.O.

1. A. What is a research? Explain any two types of research.

B. Discuss the following types of research designs:
 - i. Exploratory
 - ii. Descriptive
 - iii. Experimental
 - iv. Survey
 - v. Case study (2.5, 10)
2. A. Explain the differences between observation, questionnaire, and interview methods of data collection.

B. Discuss the different steps involved in writing a scientific report. (6, 6.5)
3. A. What do you understand by primary and secondary data collection? Explain their advantages and limitations.

- B. What do you understand by plagiarism and what are the ways to avoid it? Mention two commonly used tools to identify plagiarism.
 - C. Comment on the characteristics of a good sampling design. (5, 5.5, 2)
4. A. With the help of an example, explain the importance of adherence to biosafety in laboratories.

B. Write short notes on the following (any 4)
 - i. Central tendency
 - ii. Randomization of study
 - iii. Bibliography
 - iv. Technical report
 - v. Review of literature (4.5, 8)
5. A. What is a patent? Explain its significance in research.

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3905

I

Unique Paper Code : 2416000005

Name of the Paper : SOCIAL MEDIA MARKETING

Name of the Course : SEC

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. All questions carry equal marks.
3. Answers may be written either in English or Hindi; but the same medium should be used throughout the paper.

छात्रों के लिए निर्देश

1. इस प्रश्न-पत्र के मिलते ही ऊपर दिए गए निर्धारित स्थान पर अपना अनुक्रमांक लिखिए।
2. सभी प्रश्नों के अंक समान हैं।
3. इस प्रश्न-पत्र का उत्तर अंग्रेजी या हिंदी किसी एक भाषा में दीजिए, लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

1. (a) Discuss the branding strategies of social media? (10)
(b) How will you create an effective Social Media Strategy? (10)

OR

As an educator who has just started his career at a famous institution of your city, you want to expand your horizon and educate students who can access your content on any time anywhere basis, keeping this goal in mind how will you select a right Social Media Platform for yourself? (20)

P.T.O.

(क) सोशल मीडिया की ब्रांडिंग रणनीतियों पर चर्चा कीजिए?

(ख) आप एक प्रभावी सोशल मीडिया रणनीति कैसे बनाएंगे?

या

एक शिक्षक के रूप में जिसने अभी-अभी अपने शहर के एक प्रसिद्ध संस्थान में अपना करियर शुरू किया है, आप अपने क्षितिज का विस्तार करना चाहते हैं और ऐसे छात्रों को शिक्षित करना चाहते हैं जो आपकी सामग्री को कभी भी कहीं भी एक्सेस कर सकें, इस लक्ष्य को ध्यान में रखते हुए आप अपने लिए एक सही सोशल मीडिया प्लेटफॉर्म कैसे चुनेंगे?

2. How to create and share events in LinkedIn? (20)

OR

What is the difference between Blogging, Streaming Video and Podcasting? (20)

लिंकडइन में ईवेंट कैसे बनाये और शेयर किये जाते हैं?

या

ब्लॉगिंग, स्ट्रीमिंग वीडियो और पॉडकास्टिंग में क्या अंतर है?

3. Explain Current scenario of Social Media Marketing? (20)

OR

(a) What are the challenges of using social media as a marketing platforms? (10)

(b) Explain various types of communities in Social Media Marketing? (10)

सोशल मीडिया मार्केटिंग के वर्तमान परिदृश्य की व्याख्या कीजिए?

या

(क) मार्केटिंग प्लेटफॉर्म के रूप में सोशल मीडिया का उपयोग करने की चुनौतियाँ क्या हैं?

(ख) सोशल मीडिया मार्केटिंग में विभिन्न प्रकार के समुदायों की व्याख्या कीजिए?

5821

12

- (iii) Allopatric and sympatric speciation
- (iv) Narrow and broad sense heritability
- (v) Generalized and Specialised transduction
(5×3=15)

[This question paper contains 12 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5821 I

Unique Paper Code : 32491501

Name of the Paper : Concepts in Genetics

Name of the Course : **B.Sc. (Hons.) Biochemistry**

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 8 questions.
3. Attempt any 5 questions.
4. All questions carry equal marks.
5. Question no. 1 is compulsory.

1. (a) Mention the term that best describes the following statements :

- (i) A gene present on Y chromosome responsible for a human embryo to develop as a male.
- (ii) An allele that causes death frequently at an early developmental stage, resulting in a missing genotype among the progeny.
- (iii) An autosomal trait expressed in one gender only.
- (iv) The appearance or manifestation of a character.
- (v) First individual being diagnosed with a trait/disease shown in pedigree is denoted by a symbol.
- (vi) The test/tool used for analyzing genetic crosses in which one individual of unknown genotype is crossed with another individual with a homozygous recessive genotype for the trait in question.

(c) State the Hardy Weinberg law. Calculate the allelic, genotypic and phenotypic frequencies in a population of 30,000 individuals in which 65 individuals are diagnosed positive for autosomal recessive disorder. (5,6,4)

7. Write short notes on the following :

- (i) Penetrance and expressivity
- (ii) Genetic basis of flower development in Arabidopsis
- (iii) Complementation test with an example
- (iv) Dosage compensation with a suitable example (4,4,4,3)

8. Differentiate the following :

- (i) Maternal genetic effect and cytoplasmic inheritance
- (ii) Sex limited characteristic and sex influenced characteristic

- (iv) An allotetraploia formed from species I and species II (4,7,4)

6. (a) Elaborate on somatic-cell hybridization. A panel of cell lines was created from human-mouse somatic-cell fusions. Each line was examined for the presence of a human chromosome and for the production of a human protein. The following results were obtained :

Cell Line	Human Protein	Human Chromosomes						
		1	2	3	14	15	16	21
A	-	+	-	+	-	+	-	-
B	+	+	-	+	-	-	+	-
C	+	+	-	-	-	+	+	-
D	-	+	+	-	-	+	-	-

On the basis of these results, justify which human chromosome carries the gene for protein.

- (b) Mention different types of chromosomal mutations and explain any one with the help of a diagram. What is the cause of Bar eye phenotype in *Drosophila melanogaster*?

- (vii) The phenomenon responsible for appearance of white-eyed females and red-eyed males in the F₁ progeny of drosophila flies in a cross between a white-eyed female and a red-eyed male.

- (viii) One of the methods that determine the physical location of the genes on the chromosomes.

- (b) Define the following :

(i) Phenocopy

(ii) Molecular markers

(iii) QTL

(iv) LOD score

- (c) Give contribution of the following scientists :

(i) Thomas Hunt Morgan

(ii) Lederberg and Zinder

(iii) Walter Sutton

(4,8,3)

2. (a) In four Hfr strains of bacteria, all derived from an original F^+ culture grown over several months, a group of hypothetical genes was studied and shown to be transferred in the order shown in the following table :

Hfr Strain	Order of Transfer
1	<i>A. B. C. D. E. F</i>
2	<i>D. E. F. G. H. I</i>
3	<i>H. I. A. B. C. D</i>
4	<i>B. A. I. H. G. F</i>

- (i) Assuming that F is the first gene along the chromosome, determine the sequence of all genes shown. Also show point of origin, and direction of gene transfer.
- (ii) One strain creates an apparent dilemma. Which one is it? Explain why the dilemma is only apparent, not real.
- (b) In rabbits, curled ears result from an allele (Cu) that is dominant over an allele (cu) for normal ears. Golden colour results from an independently

- (i) Determine the order of the genes on the chromosome. Justify which gene is in the middle.
- (ii) Calculate the distance between the three loci.
- (iii) Determine the coefficient of coincidence and the interference for these three loci.
- (iv) What does the interference tell us about the effect of one crossover on another?
- (c) Given: Species I has $2n = 14$ and species II has $2n = 20$. Give all possible chromosome numbers that may be found in the following individuals:
- (i) An autotriploid of species I
- (ii) An autotetraploid of species II
- (iii) An allotriploid formed from species I and species II

- (b) In *D. melanogaster*, cherub wings (ch), black body (b), and cinnabar eyes (cn) result from recessive alleles that are all located on chromosome 2. A homozygous wild-type fly was mated with a cherub, black, and cinnabar fly, and the resulting F_1 females were test-crossed with cherub, black, and cinnabar males. The following progeny were produced from the testcross :

ch	b ⁺	cn	109
ch ⁺	b ⁺	cn ⁺	757
ch ⁺	b	cn	45
ch ⁺	b ⁺	cn	7
ch	b	cn	761
ch	b ⁺	cn ⁺	45
ch ⁺	b	cn ⁺	105
ch	b	cn ⁺	8

assorting allele (Y) that is dominant over an allele for yellow (y). A yellow rabbit homozygous for curled ears is mated with a homozygous golden rabbit with normal ears. All the golden F_1 rabbits are golden and have curled ears.

- (i) If two of the F_1 rabbits mate, what phenotypes and proportions are expected in the F_2 ?
 - (ii) An F_1 rabbit mates with a stray rabbit that is yellow and possesses normal ears. What phenotypes and proportions of progeny are expected from this cross?
 - (c) Define epistasis. Explain with a suitable example, the genetic and biochemical basis for a modified dihybrid ratio of 9:7. Write down all the possible genotypes and phenotypes. (4,5,6)
3. (a) Mohan is colour blind. Both his mother and father have normal vision, but his mother's father (Mohan's maternal grandfather) is colour blind. The other grandparents of Mohan have normal

colour vision. Mohan has three sisters—Seeta, Heetali, and Reena—all with normal color vision. Mohan's oldest sister, Seeta is married to a man with normal colour vision; they have two children, a 12-year old colour blind boy Ankit and a 7 year old girl Sheen with normal colour vision.

- (i) Using standard symbols and labels, draw a pedigree of Mohan's family.
- (ii) What is the most likely mode of inheritance for colour blindness in Mohan's family?
- (iii) If Ankit marries a woman who has no family history of colour blindness, what is the probability that their first child will be a colour-blind boy?
- (iv) If Ankit marries a woman who is a carrier of the colour-blind allele, what is the probability that their first child will be a colour-blind boy?
- (v) If Seeta and her husband have another child, what is the probability that the child will be a colour-blind boy.

(b) Describe the origin of F' bacteria and formation of merozygotes.

(c) What is Barr body and the cause of its formation? How many Barr bodies will a male with XXXYY chromosome have in each of his cells?

(6,6,3)

4. (a) Describe the sex determining system in *Drosophila* and *C. elegans*.

(b) With a suitable example explain how the alleles encoding different traits separate independently. Show the genotypes as well as phenotypes.

(c) Explain the basis of non-disjunction as a proof for chromosomal theory of inheritance.

(6,5,4)

5. (a) Albinism, a recessive trait results because of lack of pigment in hair and skin. What is the probability of a couple having seven children, three with albinism and four with normal pigmentation? Justify your answer.

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8

(iii) Protein disordered region

(iv) Genome Browsers

(4,4,4,3)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1171

I

Unique Paper Code : 2493010008

Name of the Paper : In-silico Tools in Proteomics
and Genomics

Name of the Course : **B.Sc. (Hons.) Biochemistry**

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are 6 questions in all.
3. Attempt any 4 questions.
4. Question no. 1 is compulsory.
5. All questions carry equal marks.

1. (a) Expand the following terms –

(i) HTML

(ii) OMIM

(iii) DDBJ

(iv) CDS

(v) KEGG

(vi) PDB

(vii) PIR

(b) Comment on the following –

(i) Sequence similarity is different from
sequence identity

5. (a) What is Yeast two hybrid (Y2H) technique? What
are its advantages?

(b) Discuss the current approaches employed in the
drug discovery process emphasizing target
identification, target validation, lead identification
and lead optimization.

(c) Discuss the difference between local and
global alignment with suitable examples.

(5,5,5)

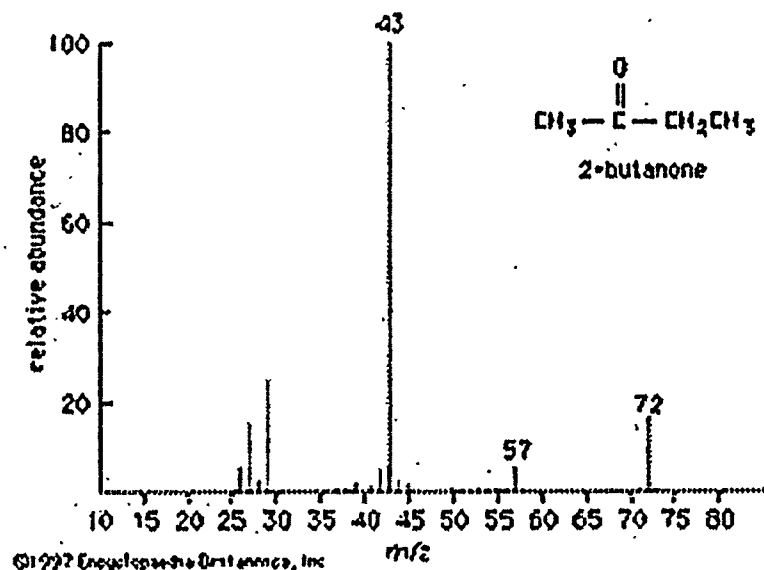
6. Write short notes on the following :

(i) Role of AI in Genomics

(ii) Human Genome Project

(b) You have a polynucleotide sequence. Describe the 6 reading frames that can be generated?

(c) Describe the principle of mass spectrometry. The figure above has mass spectrometry data for 2-butanone. Explain each of the peaks obtain in the spectra.



(6,3,6)

(ii) NCBI is a composite database.

(iii) Lipinsky's rule of 5 distinguishes drug-like and non-drug-like molecules

(iv) FASTA is a sequence file format

(c) Fill in the following blanks –

(i) _____ is a protein visualization tool.

(ii) Demis Hassabis and John M. Jumper won the 2024 Nobel Prize in Chemistry for their work on _____, an AI tool that predicts protein structures.

(iii) _____ tool can be used for predicting secondary structures in proteins.

- (iv) GLIMMER is a tool for predicting _____ in microbial DNA, especially the genomes of bacteria, archaea, and viruses.

(7,4,4)

2. (a) Differentiate between the following :

- (i) Primary and Secondary Databases
- (ii) Prokaryotic and eukaryotic genome organization
- (iii) Functional Genomics and Comparative Genomics
- (iv) Pairwise Sequence Alignment & Multiple Sequence Alignment

- (b) Describe Ramachandran plot. Explain how it is useful in protein modelling. (12,3)

3. (a) Describe Next Generation Sequencing (NGS).

What are its advantages and disadvantages?

- (b) Expand and describe BLAST. What is the difference between BLASTN and TBLASTN?

- (c) Describe any 2 applications of Bioinformatics.

(6,6,3)

4. (a) You have a protein of unknown function from a bacterium. You have made a knock-out mutant, but the bacteria die immediately without the corresponding gene. You have sequenced the protein. Describe the methods to predict the structure of the protein using in silico tools.

[This question paper contains 2 printed pages.]

Your Roll No.....

आपका अनुक्रमांक.....

Sr. No. of Question Paper : 5722

I

Unique Paper Code : 32173907/42173922

Name of the Paper : SEC : Analytical Clinical
Biochemistry

Name of the Course : B.Sc (H)/ B.Sc (Prog)

Semester : III/V

Duration : 2 Hours

Maximum Marks : 38

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any four questions from the five Questions
1. (a) Discuss the biological importance of carbohydrates.
- (b) What is metabolism? Discuss its types and functions.
- (c) Explain the Watson-crick model of DNA(3,3,3.5)

P.T.O.

2. (a) What are the different units that constitute nucleic acids?

(b) Discuss in detail the lactic acid fragmentation.

(c) Explain the different types of enzyme inhibition.
(3,3,3.5)
3. Differentiate between:

(a) Nucleosides and nucleotides.

(b) Liposome and lipoprotein.

(c) Primary and secondary structure of proteins.
(3,3,3.5)
4. (a) What are Polysaccharides? Explain with example

(b) Difference between Coenzymes and cofactors.

(c) Why Biocatalyst are important in chemical industries?
(3,3,3.5)
5. (a) What are the factors which influence enzyme action?

(b) Discuss the compositions of blood and its functions.

(c) What is m-RNA How it is important in transcription and translation.
(3,3,3.5)