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Your Roll No.....



Sr. No. of Question Paper : 6030

Unique Paper Code : 2494001202

Name of the Paper : Protein and Enzymes

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

Semester : II

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) State whether True or False with justification

(i) Hydrophobic interaction drive protein folding.

P.T.O.

- (ii) Lactate dehydrogenase is an example of isozyme
- (iii) Glycine is found in the turn of α -helix.
- (iv) K_m is inversely proportional to the substrate concentration.
- (v) Enzymes decrease the activation energy of the reaction.
- (vi) Competitive inhibitors are useful as antibiotics.

(b) Mention the contribution of the following scientists :

(i) Linus Pauling

(ii) James B. Sumner

(iii) Max Perutz (12,3)

2. (a) Give various kinds of covalent modifications with example?
- (b) Discuss various non-covalent interactions involved in stabilizing a protein structure.
- (c) Write enzyme classification with one example of each class. (5,4,6)

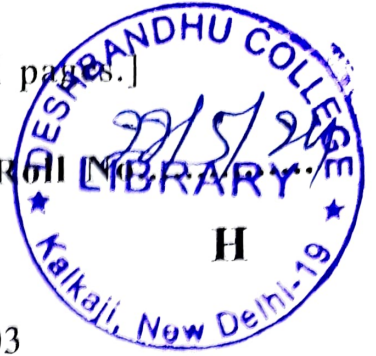
3. Write short notes on :
- (a) Zymogens
 - (b) Alzheimer's disease
 - (c) Parallel and Anti-parallel beta sheets
 - (d) Tertiary structure of protein
 - (e) Allosteric regulation (3×5=15)
4. (a) Explain the significance of Ramchandran plot in determining the structure of proteins.
- (b) Explain the following with examples :
- (i) Competitive and Noncompetitive inhibitors.
 - (ii) Conjugated proteins.
 - (iii) Restriction endonucleases. (6,9)
5. (a) What is irreversible inhibition in enzymatic reaction? Explain by giving example of fdUMP.
- (b) Write the characteristics feature of α -helix.
- (c) What is Lineweaver Burk double reciprocal plot? Discuss its significance. (5,5,5)

6. (a) Differentiate between the following :

- (i) Diagnostic enzymes and Therapeutic enzymes.
 - (ii) Lock- key model and induced fit model.
 - (iii) Prosthetic group and coenzyme.
- (b) Explain the Michaelis-Menten plot and give significance of K_m and V_{max} and show under what conditions $K_m = [S]$. (9,6)

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Your Roll No.



Sr. No. of Question Paper : 6031

Unique Paper Code : 2494001203

Name of the Paper : Techniques in Biochemistry

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

Semester : II

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 **six** questions.
3. Attempt any **four** questions.
4. **All** questions carry equal marks.
5. Question no. **1** is compulsory.

1. (a) Mention the role of the following chemicals used in electrophoresis :

(i) Ammonium persulphate

P.T.O.

- (ii) TEMED
- (iii) Glycerol
- (iv) Ethidium bromide
- (v) Bromophenol blue
- (vi) N, N'- Methylene bis (Acrylamide)

(b) Write reasons for the following :

- (i) Quartz or fused silica cuvettes are used when working with a UV- Spectrophotometer.
- (ii) Swinging bucket rotors allow better separation during centrifugation.
- (iii) Electrophoretic migration of molecules depends on their charges and mass.
- (iv) Absorbance is a unitless parameter.
- (v) Gel filtration chromatography can be used for the determination of molecular mass of a protein.
- (vi) Dialysis can be used for the purpose of the de-salting. (3,12)

2. Differentiate between :

- (a) Isopycnic and rate zonal gradient centrifugation
- (b) SDS-PAGE and Native PAGE
- (c) Salting-in and salting-out
- (d) Single beam and double beam spectrophotometer
- (e) Cation and anion exchange chromatography

(3×5=15)

3. (a) Write a short note on types of rotors used in centrifugation.

(b) Derive Beer-Lambert's law and discuss its limitations.

(c) Discuss the role of the following :

(i) Sucrose in centrifugation

(ii) Ethidium bromide in electrophoresis of DNA

(6,5,4)

4. (a) Write the principle of paper chromatography and mention its limitations.

- (b) Discuss the principle of ion exchange chromatography and explain how can a sample be eluted-out from the ion exchange column.
- (c) Sephadex G-200 has a fractionation range of 5-600 kDa. Draw and explain the Elution profile obtained on separation of Myosin (212 kDa), Ovalbumin (45kDa) and BSA (66.2kDa). (5,5,5)
5. (a) Define sedimentation coefficient and write about the factors that affect sedimentation coefficient.
- (b) If a solution has absorbance of 1.0 and is diluted 1:1, what will be absorbance change? Justify your answer.
- (c) Write a short note on the staining procedures for protein sample in electrophoresis. (5,5,5)
6. Write the principle and any two applications of the following :
- (a) Agarose gel electrophoresis
- (b) Affinity chromatography
- (c) Ultrasonication
- (d) Molecular sieve chromatography
- (e) Thin-layer chromatography (5×3=15)

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Sr. No. of Question Paper : 4109

Unique Paper Code : 2492011202

Name of the Paper : Metabolism of Carbohydrates

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

Semester : II

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) Give the biochemical basis of the following :

(i) Fructose 2, 6-bisphosphate activates glycolysis but inhibits gluconeogenesis.

(ii) Glycogenesis needs a primer to initiate itself.

P.T.O.

(iii) Patients suffering from Von Gierke's disease manifest hypoglycemia.

(iv) Iodoacetate is a suicide inhibitor of Glycolysis.

(b) Give the reaction for the following :

(i) Give the reaction generating NADH in Glycolysis.

(ii) Reaction catalyzed by phosphoglucomutase.

(iii) Dehydration reaction in Glycolysis.

(iv) Reaction involved in substrate level phosphorylation in TCA cycle.

(v) Reaction that introduces branching in Glycogen. (2.5×4,1×5)

2. (a) Differentiate between the following :

(i) Catabolism and Anabolism

(ii) Aldolase A and Aldolase B

(iii) Lactose fermentation and alcohol fermentation

(iv) Hexokinase and Glucokinase (3,4,4,4)

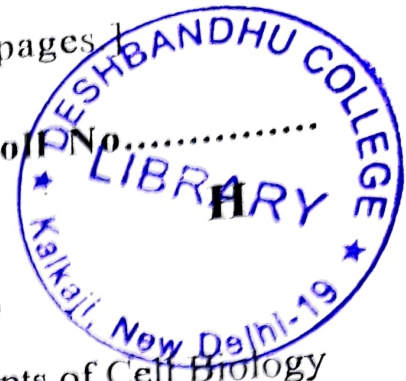
3. (a) Show schematically the role of 3 enzymatic activities and 5 Coenzymes in the conversion of Pyruvate to Acetyl CoA by Pyruvate dehydrogenase complex.
- (b) Show how Pyruvate is converted to Phosphoenol pyruvate. Give the enzymes, coenzymes and the regulators involved in the reactions.
- (c) Conversion of galactose 1- phosphate to glucose 1- phosphate requires two nucleotide derivatives. Explain. (6,6,3)
4. (a) Give the steps involved in Glycogenolysis with the generation of Glucose-1-P and glucose.
- (b) Show how Glycogenolysis and Glycogen synthesis are counter regulated to prevent futile cycles.
- (c) Give the ATP utilizing steps in Gluconeogenesis. (6,6,3)
5. (a) What are Anaplerotic reactions? Give examples.
- (b) Give the reactions of Oxidative phase of Pentose phosphate pathway. Give the biological importance of these reactions.

- (c) Name the key regulatory enzymes of TCA cycle. Show how they are regulated by product inhibition and allosteric feedback regulation. (4,5,6)
6. (a) Give the cause and symptoms of the following diseases :
- (i) Lactose intolerance
 - (ii) Pompe's disease
 - (iii) Cori's disease
- (b) Give an overview of Starve feed cycle. (3×3, 6)

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Your Roll No.....



Sr. No. of Question Paper : 4147

Unique Paper Code : 2492011203

Name of the Paper : Basic Concepts of Cell Biology

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

Semester : II

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) Name the following :

- (i) An actin binding protein
- (ii) A protein forming nuclear lamina
- (iii) A Lysosomal storage disease

P.T.O.

(iv) The place of ribosome assembly

(v) The disease caused due to defect in peroxisome biogenesis

(b) Define the following :

(i) Magnification

(ii) Importin

(iii) Fixative

(iv) MTOC

(v) Cell adhesion molecules

(c) Give the location and function of the following :

(i) Integrin

(ii) Catalase

(iii) Connexin

(iv) Succinate Dehydrogenase

(v) Keratin

(5,5,5)

2. Differentiate between the following :
- (i) Mitosis and Meiosis
 - (ii) Animal cell and plant cell
 - (iii) Peroxisomes and Lysosomes
 - (iv) Endocytosis and Exocytosis
 - (v) Gap junctions and Plasmodesmata (5×3=15)
3. (a) Chloroplast is a semi-autonomous organelle that has prokaryotic origin. Comment.
- (b) Give the structure and function of Nuclear Pore Complex.
- (c) What are actin binding proteins and how do they regulate the organization of Microfilaments.
- (d) What property of Glycosaminoglycans allows them to form hydrated gel? (3,5,5,2)
4. (a) Define Resolution and what factors affect Resolution of a Microscope. Describe the different types of stain used in Light microscopy.

- (b) What are the different components of extracellular matrix? Explain briefly.
- (c) Explain the process of assembly, organization and role of intermediate filaments. (5,5,5)
5. (a) Give principle and merits of Phase contrast microscope over Bright field microscopy.
- (b) Explain the role of Ran GTP in the regulation of nuclear import and export.
- (c) Describe the organization of Tight Junctions and why are tight junctions important for Maintaining the integrity of polarized cell? (5,5,5)
6. Write Short notes on :
- (i) Mitochondrial Genome
 - (ii) Functions of SER
 - (iii) Focal adhesions
 - (iv) Treadmilling of Microfilaments
 - (v) Phagocytosis (5×3=15)