

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations May /June 2018

Program: M.Sc. (Biochemistry)

Session: 2017-18

Semester: II

Max. Time: 3 Hours

Course Title: Proteins and Enzymes

Max. Marks: 70

Course Code: SIAL BC 1205 C 5005

Instructions:

1. Question no. 1 has seven sub parts and students need to answer any four. Each sub part carries three and half Marks.
2. Question no. 2 to 5 have three sub parts and students need to answer any two sub parts of each question. Each sub part carries seven marks.

Question No. 1. Answer briefly

(4X3.5=14)

- a) What are allosteric enzymes? Describe their main features.
- b) What are transition state analogues? What is their use in enzymology?
- c) Describe IUBMB classification of enzymes?
- d) Describe the basic chemistry of enzymes. How will you differentiate prosthetic groups from co-enzymes?
- e) What is catalytic efficiency? How can we determine it?
- f) Describe solid phase peptide synthesis.
- g) What is Eadie-Hofstee plot? What information can be derived from it?

Question No. 2.

(2X7=14)

- a) Describe peptide sequencing by Edman degradation method.
- b) Describe the biological importance of conjugated proteins and metallo-proteins.
- c) What is Mass Spectroscopy? Describe the functioning of a mass spectrometer with respect to protein structure elucidation.

Question No. 3.

(2X7=14)

- a) Describe various levels of protein structure, with labelled diagrams.
- b) Describe in detail the process of denaturation and renaturation in Ribonuclease A.
- c) Describe how nuclear magnetic resonance spectroscopy can be used to determine the 3-D structure of a protein.

Question No. 4.

(2X7=14)

- a) What do you understand by enzyme kinetics? Describe in detail various factors affecting enzyme kinetics.
- b) What is the significance of Michaelis-Menten equation? Drive Michaelis-Menten equation.
- c) Describe the activation energy and transition state theory of enzyme catalysis.

Question No. 5.

(2X7=14)

- a) With the help of labelled diagrams differentiate between competitive, uncompetitive, non-competitive enzyme inhibition.
- b) What is immobilized enzyme technology? Describe some of its uses.
- c) With the help of suitable examples, describe the role of enzymes in diagnostics.

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations May /June 2018

Programme: M.Sc (Biochemistry)

Session: 2017-18

Semester: II

Max. Time: 3 Hours

Course Title: Bioinformatics

Max. Marks: 70

Course Code: SIAL BC 0 1 2 02 GE 2103

Instructions:

1. Question no. 1 has seven sub parts and students need to answer any four. Each sub part carries three and half Marks.

2. Question no. 2 to 5 have three sub parts and students need to answer any two sub parts of each question. Each sub part carries seven marks.

Question No. 1:- Write the following.

(4X3.5=14)

- 4 programming languages.
- GenBank
- Write the full form of NCBI, DDBJ, EBI and PDB.
- Four protein databases.
- KEGG.
- One protein structure visualization tool. ✓
- CLUSTAL.

Question No. 2:- Discuss on the following questions/ statements in detail.

(2X7=14)

- Computer aided drug designing. ✓
- Significance of programming languages in bioinformatics ✓
- Application of bioinformatics in biological research ✓

Question No. 3.

(2X7=14)

- Write a detailed note on various types of sequence file formats.
- What is the E-value in BLAST? Explain it.
- Differentiate between PAM and BLOSSUM amino acid substitution matrices.

Question No. 4. Write a detailed note on the followings:-

(2X7=14)

- Needleman-Wunch algorithm.
- Local pairwise sequence alignment.
- Multiple sequence alignment.

Question No. 5. Explain in detail on the following questions:-

(2X7=14)

- Maximum parsimony method for phylogenetic analysis.
- Maximum likelihood method for phylogenetic analysis.
- Ramachandran plot.

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations May /June 2018

Programme: M. Sc. Biochemistry

Session: 2017-18

Semester: II

Max. Time: 3 Hours

Course Title: Biochemical correlation in Diseases

Max. Marks: 70

Course Code: SIAL BC 1 2 03 DCEC 4004

Instructions:

1. Question no. 1 has seven sub parts and students need to answer any four. Each sub part carries three and half Marks.

2. Question no. 2 to 5 have three subparts and students need to answer any two sub parts of each question. Each sub part carries seven marks.

Question No. 1. **Attempt any four out of seven questions briefly.** (4X3.5=14)

- Write short notes on Alkaptonuria.
- What causes hypercoagulable states?
- What is hemoglobin A1c?
- Write the various causes of precocious puberty.
- What are the risk factors associated with Hashimoto's thyroiditis?
- How does Huntington's disease pass through families?
- How do you get myasthenia Gravis?

Question No. 2. **Attempt any two out of three questions** (2X7=14)

- Write in details about copper transport and its defect in Wilson diseases.
- How von Gierke disease is caused. Explain.
- Patients with Phenylketonuria should avoid products containing the artificial sweetener aspartame, Why?

Question No. 3. **Attempt any two out of three questions** (2X7=14)

- What is Atherosclerosis? Discuss in details the pathogenesis and treatment of Atherosclerosis.
- What are the important differences between type 1 and type 2 diabetes mellitus?
- Hypothyroidism caused by Hashimoto's thyroiditis is much more common in women than in men. Why?

Question No. 4. **Attempt any two out of three questions** (2X7=14)

- How sickle hemoglobin protects against malaria. Explain.
- How cells discriminate against self and non-self antigen? What is meant by autoimmune disease?
- Malfunctioning of Prion proteins leads to Mad-cow diseases. Discuss.

Question No. 5. **Attempt any two out of three questions** (2X7=14)

- Enlist the strategies in designing and developing Vaccines against a disease.
- Write the mechanisms of action of tetanus toxin proteins in cells.
- How HIV protein integrase mediates incorporation of HIV genomes into the human genome?

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations, May/June 2018

Programme: M.Sc (Biochemistry)

Session: 2017-18

Semester: II

Max. Time: 3 Hrs.

Course Title: Bioenergetics and Metabolism

Max. Marks: 70

Course Code: SIAL BC 0 1 2 06 C 5005

Instructions:

1. Question no. 1 has seven sub parts and students need to answer any four.
2. Question no. 2 to 5 have three sub parts and students need to answer any two sub parts of each question.

Question No. 1. Answer the following briefly

(4X3.5=14)

- a) Biological electron carriers
- b) Substrate level phosphorylation
- c) Anaplerotic reactions
- d) Mitochondrial genome
- e) Maple syrup disease
- f) UDP-sugars
- g) ATP-synthase

Question No. 2.

(2X7=14)

- a) Explain the hormonal regulation of glycogen phosphorylase in liver. Illustrate the allosteric regulation of liver and muscle glycogen phosphorylase.
- b) Discuss the various feeder pathways for glycolysis.
- c) Explain the regulation of Glycolysis at various levels.

Question No. 3.

(2X7=14)

- a) Explain that TCA cycle and Glyoxylate pathways are coordinately regulated.
- b) Describe the Beta- oxidation of mono-unsaturated fatty acids.
- c) During gluconeogenesis, the conversion of pyruvate in phosphoenolpyruvate (PEP) requires a bypass, why? Illustrate the procedure.

Question No. 4.

(2X7=14)

- a) Describe the procedure of fatty acid synthesis.
- b) Describe the various modes of entry of electrons in ETC in mitochondria.
- c) Discuss the integration between carbohydrate and lipids metabolic pathways.

Question No. 5.

(2X7=14)

- a) How the dietary proteins are digested in the body. Explain the procedure.
- b) Illustrate the Krebs bicycle and its significance.
- c) Discuss the catabolism of purine nucleotides with diseases associated with the defects in this pathway.

CENTRAL UNIVERSITY OF HARYANA

Term End Examinations, May/June 2018

Programme: MSc Biochemistry **Session:** 2017-18
Semester: IIIrd **Max. Time:** 3 Hrs
Course Title: Molecular Biology (Theory) (Re-appear) **Max. Marks:** 70
Course Code: SIAL BC 1 3 09 C 5005

Instructions:

1. Question no. 1 has seven sub parts and students need to answer any four.
2. Question no. 2 to 5 have three sub parts and students need to answer any two sub parts of each question.

Question No. 1.

(4X3.5=14)

- a) COT curve
- b) RNA species and their biological roles
- c) Okazaki fragments
- d) Transposons
- e) Catabolic repressors
- f) Site directed mutagenesis
- g) Ames test

Question No. 2.

(2X7=14)

- a) What is DNA supercoiling? Describe positive and negative supercoiling and its biological significance.
- b) Describe atleast two historical experiments demonstrating that DNA is the genetic material.
- c) What is gene? Draw the structure of prokaryotic and eukaryotic gene. Compare their features.

Question No. 3.

(2X7=14)

- a) What is DNA replication? Discuss the similarities and differences between prokaryotic and eukaryotic DNA replication.
- b) What is RNA splicing? Describe the RNA splicing procedure.
- c) Discuss the post transcriptional processing of RNA in eukaryotes.

Question No. 4.

(2X7=14)

- a) Draw the structure of tRNA and describe its role in translation.
- b) What is Lac operon? Discuss the cis- and trans- regulation of lac operon.
- c) Illustrate the various modes of DNA replication in prokaryotes.

Question No. 5.

(2X7=14)

- a) What are post-translational modifications? Discuss various kind of post-translational modifications in eukaryotes
- b) Discuss at least two modes of DNA repair in eukaryotes.
- c) Explain various kinds of mutagens.