Question Paper

Exam Date & Time: 21-May-2024 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Biochemistry [PBT-BP203T-S1]

Marks: 75 **Duration: 180 mins.**

I Multiple Choice Questions (MCQs)

Answer all the questions. Section Duration: 30 mins

1) A reaction with a negative ΔG is classified as: (1)

- Endergonic and Spontaneous
- Exergonic and Spontaneous
- Endergonic and non-spontaneous
- Exergonic and non-spontaneous

2) The disorder of a system is measured by its --- (1)

- Activation energy
- Heat of reaction
- Enthalpy
- Entropy

3) Which among the following is **NOT** a high energy compound? (1)

- Phosphoenolpyruvate
- Carbamoyl phosphate
- Creatinine phosphate
- Glucose-1-phosphate

4) Which of the following molecules is **NOT** produced during the Krebs cycle? (1)

- NADH
- FADH2
- ATP
- Pyruvate

5) What is the fate of glucose-6-phosphate generated from glycogen breakdown in Muscle? (1)

- Conversion to pyruvate
- Entry into glycolysis
- Reconversion to glucose
- Entry into the pentose phosphate pathway

6) The most predominant lipid component of chylomicrons _____. (1)

- Triglycerides
- Phospholipids
- Cholesterols
- Sphingolipids

7) Cholesterol synthesis is controlled by feedback inhibition of the enzyme _____. (1)

- Thiolase
- HMG CoA reductase
- Cholesterol oxidase
- Cholesterol esterase

8) The reducing equivalents for fatty acid synthesis are provided by ------ (1)

- Glycolysis
- TCA cycle
- Ketolysis
- HMG Shunt

9) The amino acid that does not participate in transamination (1)

- Lysine
- Glutamate
- Alanine
- Tryptophan.

10) What is the role of the promoter in the regulation of gene expression? (1)

- Recruit DNA polymerase and transcription factors to DNA
- Recruit RNA polymerase and transcription factors to DNA
- Recruit Ribosomes and translation factors to DNA
- Recruit Ribosomes and translation factors to RNA

11) RNA is involved in a wide range of cellular processes, identify the type of RNA involved in pre-mRNA splicing. (1)

- miRNA
- siRNA
- snRNA
- snoRNA

12) Which of the following statement related to DNA polymerase is **NOT** true? (1)

- Initiates DNA synthesis de novo
- Add nucleotides in the 5′ → 3′ direction
- Requires a primer for DNA synthesis
- Catalyse the formation of a phosphodiester bond

13) What differentiates origin of replication (oriC) from other regions of the DNA molecule? (1)

- Presence of specific termination sequences
- Presence of promoter region
- Presence of guanine-cytosine base pairs
- Presence of specific sequences recognized by replication initiation proteins

14) What is the role of the RNA polymerase σ sigma factor subunit in DNA transcription process? (1)

- Promotes the nonspecific binding of RNA polymerase
- Initiates primer binding
- Promotes RNA elongation
- Recognition of gene promoters

15) Which of the following statement related to Translation process is **NOT** true? (1)

- Genetic code is degenerate
- Codon and anti-codon pairing
- Wobble base pairing
- Triplet, overlapping code

16) Which codon serves as the start codon for protein translation? (1)

- AUG
- UAA
- UAG
- UGA

17) Allosteric enzymes have --- (1)

- Single subunit
- Obey Michaelis Menten Kinetics
- Catalytic and regulatory sites
- Affinity towards inhibitors only

18) The Factor that **DOES NOT** affect the enzyme activity is --- (1)

- pH
- Temperature
- Isoenzyme concentration
- Substrate concentration

19) Pepsin is an example for the class of enzymes namely ---- (1)

- Oxidoreductases
- Transferases
- Hydrolases
- Ligases.

20) In the feedback regulation, the end product binds at ----------. (1)

- Active site
- Allosteric site
- E-S complex
- Promoter region

II Long Answers

Answer all the questions.

1) Citing Palmitic acid as an example, describe the beta oxidation of saturated fatty acids. Write a note on its energetics. (10)

2) Describe the gluconeogenesis from pyruvate as a primary source. (10)

III Short Answers

Answer all the questions.

1) Write a note on classification of carbohydrates and explain the functions of carbohydrates. (5)

2) Write a note on the significance of pentose phosphate pathway. (5)

3) Outline the detoxification process of ammonia in our body. (5)

4) Write about the mechanism of transcription in prokaryotes. (5)

5) Write a brief note on following terms related to protein translation. (5)

a. Crick's adapter hypothesis. (1.5 M)
b. Nonoverlapping vs Overlapping code. (2 M)
c. Reading frame. (1.5 M)

6) What is Line Weaver Burke plot? How distinct types of enzyme inhibitions can be recognised using the double reciprocal plot? (5)

7) Explain IUB classification of enzymes. (5)

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