



## Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)

Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC

Coimbatore - 641 043, Tamil Nadu, India

### Master's Degree Examination – May 2025

#### II Semester

Class : I P.G.  
Major : Zoology

Time: 3 Hours  
Max. Marks: 100

#### 23MZOC07 Biochemistry

##### Course Outcomes:

- CO1: Impart knowledge on the biochemical concepts of bioenergetics  
CO2: Gain perception on the basic structure and functions of biomolecules  
CO3: Ability to grasp insight on metabolic pathway and able to relate with well being  
CO4: Understand fundamental concepts on enzymes and their importance in biological reactions  
CO5: Acquire information on the principles and practical experience of a wide range of biochemical techniques.

##### Part A

10 x 1 = 10

##### Choose the Correct Answer

- The tendency of a molecule to gain or lose electrons is called  
a. Enthalpy      b. Entropy      c. Redox Potential      d. Free energy      CO1K1
- Coenzyme Q (ubiquinone) serves as a  
a. Proton pump      b. Mobile electron carrier      c. ATP Synthase      d. Dehydrogenase      CO1K1
- Cellulose is an example of a  
a. Homopolysaccharide      b. Heteropolysaccharide  
c. Disaccharide      d. Monosaccharide      CO2K1
- Fatty acids with no double bonds are called as  
a. Unsaturated      b. Saturated      c. Polysaturated      d. Trans- fatty acids      CO2K1
- An example of an inborn error of amino acid metabolism is  
a. Sickle cell anaemia      b. Haemophilia      c. Turners syndrome      d. Phenylketonuria      CO3K1
- The primary structure of protein is held together by  
a. Hydrogen bonds      b. Ionic bonds      c. Peptide bonds      d. Disulfide bonds      CO3K1
- Which among the following buffer systems is most important in regulating the pH of blood?  
a. Phosphate buffer      b. Bicarbonate buffer      c. Protein buffer      d. Ammonia buffer      CO4K1
- The principle of centrifugation is based on the difference in the  
a. Solubility of substances      b. Density of particles  
c. pH of substances      d. Temperature of samples      CO4K1
- The molecule absorbs light at one wavelength and then re-emits it at a longer wavelength is called  
a. Fluorescence      b. Absorbance      c. Emission      d. Microarray      CO5K1
- Electrophoresis separates molecules based on  
a. Mass      b. Shape      c. Energy      d. Charge      CO5K1

##### Part B

5 x 6 = 30

##### Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. Explain the concept of free energy and differentiate between endergonic and exergonic reactions.      CO1K2  
(or)
- 11.b. Discuss the components and functions of the electron transport chain (ETC).      CO1K2

- 12.a. Classify the types of carbohydrates with examples. CO2K3  
(or)
- 12.b. Illustrate the structure and functions of fatty acids. CO2K3
- 13.a. Outline the steps of urea cycle and its role in nitrogen metabolism. CO3K4  
(or)
- 13.b. Discuss the factors affecting enzyme activity. CO3K4
- 14.a. Describe the principle and working mechanism of a hydrogen electrode for pH determination. CO4K3  
(or)
- 14.b. Explain the process and application of thin-layer chromatography. CO4K4
- 15.a. Explain Beer-Lambert's Law and its significance in spectrophotometry. CO5K2  
(or)
- 15.b. Describe the principle of UV-Visible spectroscopy and its instrumentation. CO5K3

**Part C**

**5 x 12 = 60**

**Answer ALL questions**

**Each answer should not exceed 800 words or four pages**

- 16.a. Explain the laws of thermodynamics and their application in biological systems. CO1K3  
(or)
- 16.b. Analyze the effects of uncoupling oxidative phosphorylation and provide examples of uncoupling agents. CO1K5
- 17.a. Discuss the TCA cycle, including its steps, enzymes and role in energy production. CO2K2  
(or)
- 17.b. Elaborate the  $\beta$  - oxidation of fatty acids and its significance. CO2K5
- 18.a. Discuss the Ramachandran plot, motifs, domains and folds in protein structure and function. CO3K2  
(or)
- 18.b. Describe the structure, classification and mechanism of enzyme action. CO3K3
- 19.a. Discuss the types of centrifuges and highlight the differences between analytical and preparative ultracentrifuges. CO4K2  
(or)
- 19.b. Explain the working principle, methodology and applications of gas-liquid chromatography. CO4K3
- 20.a. Highlight the principles, instrumentation and applications of Atomic Absorption Spectroscopy (AAS). CO5K5  
(or)
- 20.b. Elaborate on the principles and working of polyacrylamide gel electrophoresis (PAGE) and its use in DNA analysis and size determination. CO5K4

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