

**Karnataka State Open University**  
**I Semester, M.Sc. Biochemistry, Examination January/February 2021**  
**BUILDING BLOCKS OF BIOMOLECULES**

Open Book Exam.

Max. Marks: 80

**Section-A**Answer **Any FOUR** of the following:

(4 x 5 = 20)

1. Write a note on gangliosides.
2. How are amino acids classified based on properties of R groups?
3. Explain Chargaff's rule.
4. Discuss the properties of lipids.
5. Explain the chirality of amino acids.
6. What are polyphenols? Give the significance of polyphenols.

**Section-B**Answer **Any THREE** of the following:

(3 x 10 = 30)

7. A) Briefly explain the steps involved in structural elucidation of carbohydrates. 5  
 B) Describe blood group polysaccharides. 5
8. A) Write a note on intrinsic fluorescence properties of aromatic amino acids. 5  
 B) Explain peptide bond. Describe importance of endorphins. 5
9. A) Write a note on cot curve and its applications. 5  
 B) Explain the colorimeter estimation of nucleic acids. 5
10. A) Describe the composition and functions of lipid bilayer. 5  
 B) Write the structure and biological importance of Lecithin. 5
11. A) What are heterocyclic compounds? Give their classification. 5  
 B) Describe the hyperchromicity of DNA. 5

**Section-C**Answer **Any TWO** of the following:

(2 x 15 = 30)

12. A) Write a note on Acetolysis. 5  
 B) Describe the structure and biological importance of prostacyclins. 5  
 C) Give the application of synthetic peptides. 5
  13. A) Explain the cyclic structure and Haworth projection formula of carbohydrates. 5  
 B) Write a note on zwitter ions. 5  
 C) Explain UV absorption by amino acids. 5
  14. Write a note on the following:
    - A) Cholesterol 5
    - B) Indole 5
    - C) Hyaluronic acid 5
  15. A) Explain solid phase synthesis of peptides. 10  
 B) Write a note on non-protein amino acids. 5
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**BIOCHEMICAL TECHNIQUES**

**Open Book Exam.**

**Max. Marks: 80**

*Instruction: Answer all the sections.*

**Section-A**

Answer **Any FOUR** of the following:

**(4 x 5 = 20)**

1. Discuss the uses of animal models in scientific research.
2. Describe the types of paper chromatography.
3. Explain the detection of mutations in microorganisms.
4. Describe Beer-Lambert's law.
5. Write the applications of radioisotopes.
6. Explain the principle involved in SDS-PAGE.

**Section-B**

Answer **Any THREE** of the following:

**(3 x 10 = 30)**

7. Write a note on;
  - A. Zymogram. **5**
  - B. Cell culture. **5**
8. Describe ion exchange chromatography in detail.
9. Compare between natural and artificial radioactivity.
10. With the help of diagrams describe density gradient centrifugation.
11. Explain different types of spectrophotometry.

**Section-C**

Answer **Any TWO** of the following:

**(2 x 15 = 30)**

12. A. Describe the principle and instrumentation of HPLC. **10**
    - B. Explain the working model of capillary electrophoresis. **5**
  13. A. Explain gel filtration chromatography. **10**
    - B. Write a short note on TLC. **5**
  14. A. Explain the principle and working of various types of scintillation counters. **10**
    - B. Mention the safety measures in radiobiology laboratory. **5**
  15. Describe the methods used for the visualization of electrophoretically separated protein molecules.
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**PHYSIOLOGY AND NUTRITION**

**Open Book Exam.**

**Max. Marks: 80**

*Instruction: Answer all the sections.*

**Section-A**

Answer **Any FOUR** of the following.

**(4 x 5 = 20)**

1. Explain the characteristics of life.
2. Give the composition of extracellular and intracellular fluids.
3. Explain proximate analysis of food.
4. Write a note on detoxification function of liver.
5. Discuss the factors that affect BMR?
6. Write the structure of Vitamin A and explain its role in visual cycle.

**Section-B**

Answer **Any THREE** of the following.

**(3 x 10 = 30)**

7. A) Explain specific dynamic action of food. 5  
 B) What are anticoagulants? Write a note on natural anticoagulants. 5
8. A) Discuss the effect of hormones on the water metabolism. 5  
 B) Give the functions of thyroid and parathyroid hormones. 5
9. A) What are vitamin like compounds? Give the functions of Lipoic acid. 5  
 B) Explain the resting membrane potential and action potential. 5
10. A) What is blood pressure? How is blood pressure regulated? 5  
 B) What is reflex arc? Write the schematic diagram of simple reflex arc. 5
11. A) Explain the excretory role of skin and lungs. 5  
 B) Explain the emulsification of lipids in the small intestine. 5

**Section-C**

Answer **Any TWO** of the following.

**(2 x 15 = 30)**

12. A) Discuss the digestion and absorption of carbohydrates. 10  
 B) How calorific value of foods determined using bomb calorimeter. 5
  13. A) Explain the mechanism of extrinsic pathway of blood clotting. 10  
 B) How are dietary fibres classified? Explain the biological role of fibre. 5
  14. A) Explain the feed-back regulation of hormone secretion. 5  
 B) Write a note on gastrointestinal hormones. 5  
 C) Write the composition and functions of Pancreatic juice. 5
  15. Write a note on the following.
    - A) Composition of blood 5
    - B) Hyponatremia 5
    - C) Lymph 5
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CELL BIOLOGY

Open Book Exam.

Max. Marks: 80

*Instruction: Answer all the sections.*

**Section-A**

Answer **Any FOUR** of the following:

(4 x 5 = 20)

1. Write a note on thylakoids.
2. Describe the layers of plant cell wall.
3. Explain the steps of chromatin remodelling.
4. Differentiate between C3 and C4 plants.
5. Write a note on tight junctions.
6. Enlist the functions of cytoskeleton.

**Section-B**

Answer **Any THREE** of the following:

(3 x 10 = 30)

7. Write a note on;
  - A. Desmosomes 5
  - B. PDGF. 5
8. Describe the functions of Cyclin dependent kinases.
9. Explain the Fluid mosaic model of plasma membrane. Give the functions of chloroplast.
10. Describe the molecular mechanism of muscle contraction.
11. Differentiate between a prokaryotic ribosome and a eukaryotic ribosome.

**Section-C**

Answer **Any TWO** of the following:

(2 x 15 = 30)

12. A. Explain the main stages of meiosis with the help of a diagram. 12  
B. Enlist the functions of Golgi apparatus. 3
  13. A. Write a note on G-protein coupled receptors. 6  
B. Describe the ultra-structure of mitochondria with a neat labelled diagram. 9
  14. A. Describe in detail the structural organization of an animal cell. 10  
B. Explain the functions of Endoplasmic reticulum. 5
  15. A. Explain in detail the stages of Electron transport chain (ETC). 12  
B. Write a note on Lysosome. 3
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**GENERAL CHEMISTRY**

**Open Book Exam.**

**Max. Marks: 80**

*Instruction: Answer all the sections.*

**Section-A**

Answer **Any FOUR** from the following: (4 x 5 = 20)

1. Explain Donnan membrane equilibrium.
2. Give the mechanism of nitrogen fixation in legumes.
3. Outline the molecular orbital theory of benzene.
4. Give the mechanism of S<sub>N</sub>2 reaction with an example.
5. Distinguish Bayer's strain theory and Sachse-Mohr theory on stability of cycloalkanes.
6. Give the importance of Selenium compounds in biological system.

**Section - B**

Answer **Any THREE** from the following: (3 x 10 = 30)

7. A) Describe nitrogen cycle in detail. 6  
 B) Explain i) Carbanion, ii) Carbocations. 4
8. A) Give the orienting influence of substituents in electrophilic substitution of Toluene.  
 B) Outline the role of ozone in maintenance of life on earth. 6 + 4
9. Write briefly on the following:
  - A) Avogadro's number. 3
  - B) Freundlich and Langmuir adsorption isotherm. 4
  - C) Structure & biological importance of Cytochromes. 3
10. A) Write short notes on i) Elevation of boiling point, ii) Depression in freezing point.  
 B) Describe the effect of substitution on acidity of phenols. 6 + 4
11. A) How do you determine the viscosity of glycoprotein by Ostwald's viscometer. 6  
 B) Give the classification of alcohols with examples. 4

**Section - C**

Answer **Any TWO** from the following: (2 x 15 = 30)

12. A) Discuss heterogenous and homogenous hydrogenation of oils. 5  
 B) Give definition for the following: i) Molarity, ii) Equivalent weight, iii) Normality. 5  
 C) Describe Phosphorous cycle. Give biological importance of phosphorous compounds. 5
13. A) With suitable examples discuss the mechanism and the stereochemical factors that affect the rate of S<sub>N</sub>1 reactions. 10  
 B) Discuss the mechanism of Nitration and Friedel-Crafts reaction. 5
14. A) Give postulate of Werner's theory. 5  
 B) How are ligands classified? Explain coordination number? 5  
 C) With examples explain the classification of organic reactions. 5
15. A) Describe porphyrin nucleus & their classification. Discuss the importance of metallo-porphyrins occurring in nature. 10  
 B) Discuss distribution law and its limitations. 5

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