THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 0524] **MAY 2024** **Sub. Code: 4029**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER I – BIOMOLECULES, CELL BIOLOGY, BIOCHEMICAL TECHNIQUES, BIOSTATISCS AND RESEARCH METHODOLOGY, BASICS OF MEDICAL EDUCATION IN TEACHING AND ASSESSMENT OF BIOCHEMISTRY

Q.P. Code: 204029

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. Explain in detail about High pressure liquid chromatography and its applications.
2. What are second messengers? Describe the intracellular signaling mechanism of cAMP.

II. Write notes on: **(10 x 5 = 50)**

1. Delta check and its use in quality assurance.
2. Isotopic and Nonisotopic labels used in immunoassay
3. Reference material.
4. Microteaching.
5. Write two methods of correlation commonly used in research methodology.
6. Cholesterol structure and its function.
7. Chaperones.
8. Trans fats.
9. Limitations of microtechnology.
10. Aquaporins.

III. Reasoning out: **(4 X 5 = 20)**

1. Venom of viper snakes lead to hemolysis.
2. HbF is not a good transporter of oxygen to tissues.
3. In SDS-PAGE Protein movement does not depend on the protein charge.
4. Collagen maturation can be impaired in nutritional and genetic disorder.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 1224] **DECEMBER 2024** **Sub. Code: 4029**

(OCTOBER 2024 EXAM SESSION)

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER I – BIOMOLECULES, CELL BIOLOGY, BIOCHEMICAL TECHNIQUES, BIOSTATISTICS AND RESEARCH METHODOLOGY, BASICS OF MEDICAL EDUCATION IN TEACHING AND ASSESSMENT OF BIOCHEMISTRY

Q.P. Code: 204029

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

(4+8+3)

1. a) How will you separate and confirm the protein of interest from the cell.
   b) Discuss in detail about various methods available to purify the protein.
   c) Add a note on basic physical principles underlying X-ray crystallography.

(5+7+3)

2. a) Compare the different three-dimensional forms of DNA.
   b) Describe in detail about the different levels of hierarchical structure of chromosome.
   c) What are the different types of structural variation found in chromosome.

II. Write notes on: **(10 x 5 = 50)**

1. Material safety Data Sheet.
2. Blooms Taxonomy.
3. Lipidomics.
4. Discuss about different types of small RNAs.
5. Immunoelectrophoresis.
6. Laboratory data management.
7. Enzyme based Bio sensors.
8. Biochemical events during muscle contraction.
9. Discuss about clinical importance of Phospholipids.
10. Formation and nomenclature of cyclic structure of monosaccharides.

III. Reasoning out: **(4 X 5 = 20)**

1. The structure of myoglobin prevents release of reactive oxygen species.
2. Fluidic nature of biological membrane.
3. Serine tends to disrupt alpha helix.
4. Sucrose intake is associated with dental caries.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 0525] **MAY 2025** **Sub. Code: 4029**

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER I – BIOMOLECULES, CELL BIOLOGY, BIOCHEMICAL TECHNIQUES, BIOSTATISTICS AND RESEARCH METHODOLOGY, BASICS OF MEDICAL EDUCATION IN TEACHING AND ASSESSMENT OF BIOCHEMISTRY

Q.P. Code: 204029

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. Explain in detail the principle, types, applications of electrophoresis.
2. a) Explain the various level of structural organisation of proteins. (10)
   b) How to determine primary structure of protein? (5)

II. Write notes on: **(10 x 5 = 50)**

1. Brief the properties and mechanism of action of Ion channels.
2. Brief the principal proteins found in bone and the metabolic and genetic disorders affecting bone.
3. West guard rules and its significance.
4. Cell signalling.
5. Brief about the various small and large non coding RNA's and its significance with suitable examples.
6. Brief the definition, process and skills for implementation of SDL (Self-Directed Learning).
7. Ion selective electrodes
8. Significance of glycerophospholipids.
9. Chi square test.
10. Cross sectional study.

III. Reasoning out: **(4 X 5 = 20)**

1. 30% of Human Genome consist of repetitive sequences – Justify.
2. Freshly prepared glucose solution is not preferred in a clinical chemistry lab.
3. Significance of 2,3 BPG in stored blood.
4. Glycoproteins are important in Fertilization.

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THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

[MD 1025] **OCTOBER 2025** **Sub. Code: 4029**

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER I – BIOMOLECULES, CELL BIOLOGY, BIOCHEMICAL TECHNIQUES, BIOSTATISTICS AND RESEARCH METHODOLOGY, BASICS OF MEDICAL EDUCATION IN TEACHING AND ASSESSMENT OF BIOCHEMISTRY

Q.P. Code: 204029

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. Describe the structural and functional relationship of adult hemoglobin. Add a note on effect of lowering PO_2 on structure of HbS.

2. Write an essay on principle, applications, advantages and limitations of Ion selective electrode.

II. Write notes on: **(10 x 5 = 50)**

1. POCT (point of care testing).
2. Principle and types of ANOVA (analysis of variance).
3. Statistical methods of validation of diagnostic tests.
4. Ion channels and its clinical application.
5. Internal quality control program in lab.
6. Renal regulation of P_H.
7. Competency based assessment.
8. Sphingolipids.
9. Anticancer and Antiviral drugs action on nucleosides.
10. Cellular functions of cytoskeleton.

III. Reasoning out: **(4 x 5 = 20)**

1. 2D electrophoresis an important tool in proteomics.
2. Osmometer based on freezing point depression.
3. Proteoglycans associated with major diseases and aging.
4. Prion diseases are protein conformation diseases.

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THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

[MD 0526] **MAY 2026** **Sub. Code: 4029**

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER I – BIOMOLECULES, CELL BIOLOGY, BIOCHEMICAL TECHNIQUES, BIOSTATISTICS AND RESEARCH METHODOLOGY, BASICS OF MEDICAL EDUCATION IN TEACHING AND ASSESSMENT OF BIOCHEMISTRY

Q.P. Code: 204029

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. a) Describe in detail about the different levels of protein hierarchical structure present in hemoglobin. (8)
   b) Explain how oxygen binding changes the quaternary structure of Hemoglobin. (4)
   c) Add a note on spectral pattern and their significance of Modified Hemoglobins. (3)

2. a) Write the procedure to extract lipid from the tissues. (4)
   b) Discuss the separation of polar and volatile lipids from solution. (6)
   c) Add a note on liposomes and its clinical significance. (5)

II. Write notes on: **(10 x 5 = 50)**

1. Critical Value Alert.
2. Competency Based Medical Education.
3. Glycomics.
4. Measurement of Scattered Light.
5. Reagent Grade Water.
6. Brief about Synthetic Nucleotide Analogues.
7. Dehydration reactions to differentiate various monosaccharides.
8. Peripheral membrane proteins of R.B.C. and their abnormality.
9. Explain how water is an ideal Biologic solvent.
10. Discuss the types of endocytosis with examples.

III. Reasoning out: **(4 x 5 = 20)**

1. Amino acids are distributed inside out patterns in porins.
2. In cell cycle DNA synthesis takes place at final stage.
3. Arginine tends to disrupt alpha helix.
4. In Haworth projection of sucrose, the glycosidic bond is reversed.

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