

**M.B.B.S. FIRST PROFESSIONAL EXAMINATION, FEBRUARY-2023****BIOCHEMISTRY  
PAPER – SECOND****[Time allotted: Three hours]****SET - A****[Max Marks: 100]****Q. 1. Multiple choice questions (Darken the single best response in OMR sheet. Time allotted 20 minutes) (1 x 20 = 20)**

1. Concentration of potassium is more:
  - a. In plasma
  - b. In serum
  - c. In cells
  - d. In intercellular fluid
2. The following mineral is used to treat psychotic depression:
  - a. Molybdenum
  - b. Lithium
  - c. Sodium
  - d. Magnesium
3. All of the following hormones have membrane receptors **except**:
  - a. Insulin
  - b. glucagon
  - c. Epinephrine
  - d. Thyroxin
4. Blue light phototherapy is effective in neonatal jaundice because:
  - a. It increases resorption of bilirubin from skin
  - b. It increases vitamin D in skin
  - c. It increases excretion of bilirubin metabolite in bile
  - d. It reduces the formation
5. Which of the following enzymes exerts regulatory control over heme synthesis?
  - a. ALA synthase
  - b. PBG synthase
  - c. Uroporphyrinogen III synthase
  - d. Ferrochelatase
6. Which of the following hormones causes reabsorption of Na<sup>+</sup> in the renal tubules?
  - a. Cortisol
  - b. Aldosterone
  - c. Antidiuretic hormone
  - d. progesterone
7. Which of the following is an example of phase II detoxification?
  - a. Hydrolysis
  - b. Conjugation
  - c. Dealkylation
  - d. Deconjugation
8. All are formed from cholesterol **except**:
  - a. steroid hormones
  - b. Melanin
  - c. Bile acids
  - d. Vitamin D3
9. Dehydration could be seen in all of the following **except**:
  - a. Congestive cardiac failure
  - b. Diarrhoea + vomiting
  - c. Nephrogenic diabetes insipidus
  - d. Burns
10. The normal pH of blood has a range of:
  - a. 7.15 - 7.25
  - b. 7.25 - 7.35
  - c. 7.35 - 7.45
  - d. 7.45 - 7.55
11. The following fatty acids reduce the risk of coronary artery disease:
  - a. ω - 6 fatty acids
  - b. ω - 3 fatty acids
  - c. SFA
  - d. ω - 9 fatty acids
12. Chronic obstructive airway disease leads to:
  - a. respiratory acidosis
  - b. Respiratory alkalosis
  - c. metabolic acidosis
  - d. metabolic alkalosis
13. Which one of the following is a tumour suppressor gene?
  - a. Ras
  - b. P53
  - c. erb-B
  - d. Abl
14. The presence of CEA in serum is detected in:
  - a. Hepatoma
  - b. Chorio carcinoma
  - c. Multiple myeloma
  - d. Colo rectal carcinoma
15. Which of the lipoproteins carry dietary lipids from intestine to peripheral tissues?
  - a. LDL
  - b. HDL
  - c. VLDL
  - d. Chylomicrons
16. The precursor of Ketone body formation is:
  - a. Acetyl CoA
  - b. Malonyl CoA
  - c. Propionyl CoA
  - d. Malate
17. Tumour markers for ovarian cancer are:
  - a. Beta - hcG
  - b. CA 125
  - c. CEA
  - d. TPP
18. The defect in muscle glycogen phosphorylase causes:
  - a. Cori's disease
  - b. Mc Ardle's disease
  - c. TB
  - d. Pompe's disease
19. The de novo synthesis of fatty acids occurs in:
  - a. Mitochondria
  - b. Plasma membrane
  - c. Cytosol
  - d. nucleus
20. Pyruvate dehydrogenase complex requires all **except**:
  - a. NAD<sup>+</sup>
  - b. FAD<sup>+</sup>
  - c. TPP
  - d. Biotin

**BIOCHEMISTRY  
PAPER- SECOND**

**Note:** Attempt all questions.  
Draw suitable diagrams (wherever necessary)

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- Q. 2. Give reasons:** (2 x 5 = 10)
- Anemia is seen in cases of renal failure.
  - Dicoumarol is used as anticoagulant.
  - Deficiency of certain vitamins causes decrease fatty acid synthesis.
  - Liver produces ketone bodies but does not utilize them
  - Vitamin C overdose does not lead to toxicity
- Q. 3. Problem based question:** (1+1+3+3+2 = 10)
- A patient presented to the emergency with sudden unbearable pain in chest. He also has difficulty in breathing. ECG shows ST segment elevation.  
Serum AST = 89 IU /L
- What is the most probable diagnosis?
  - Which is the first marker to be raised in this condition.
  - Name the enzyme last to appear in this state. Tabulate all markers and enzymes raised in this condition in reference to onset, peak and duration.
  - Enumerate some modifiable risk factors for cardiac diseases.
  - Name the Lipoprotein that reduces the risk of cardiac disease. Explain it's mechanism.
- Q. 4. Write briefly on:** (6 x 4 = 24)
- Role of different hormones in calcium homeostasis. Write steps of vitamin D activation in the body.
  - Explain haemosiderosis. Write about mucosal block theory of iron absorption.
  - Role of a doctor as a good communicator
  - Metabolic acidosis.
- Q. 5. Structured questions:**
- (i) Describe glycogenolysis. Explain regulation of glycogen metabolism. Add a note on von Gierke's disease. (3+4+3=10)
- (ii) Explain how blood glucose is regulated in the body. What is the fate of acetyl CoA during starvation? Write briefly about Fatty Liver. (3+3+4= 10)
- Q. 6. Answer as indicated:** (4 x 4 = 16)
- Diagrammatically explain carnitine shuttle.
  - Tumour markers and their clinical application.
  - Diagrammatic representation of digestion and absorption of lipids
  - Clinical applications of radioisotopes.

## M.B.B.S. FIRST PROFESSIONAL EXAMINATION, FEBRUARY-2023

## BIOCHEMISTRY

## PAPER - FIRST

[Time allotted: Three hours]

SET - A

[Max Marks: 100]

Q. 1. Multiple choice questions (Darken the single best response in OMR sheet. Time allotted 20 minutes) (1 x 20 = 20)

1. Identify the false statement- In the cell membrane:
  - a. More unsaturated fatty acids increases the fluidity
  - b. Cholesterol content of the membrane does not alter the fluidity
  - c. Nucleolus Polar head of phospholipids are towards the extracellular side
  - d. Transmembrane proteins can serve as receptors
2. Most common amino acid to undergo oxidative deamination:
  - a. Lysine
  - b. Glutamic acid
  - c. Methionine
  - d. Threonine
3. Maple Syrup urine disease is due to defect in which amino acid metabolism:
  - a. Valine
  - b. Lysine
  - c. Histidine
  - d. Glutamine
4. A prosthetic co-factor is:
  - a. FMN
  - b. Biotin
  - c. Folic acid
  - d. Niacin
5. Fumerase belongs to which class of enzyme:
  - a. Ligase
  - b. Isomerase
  - c. Z Hydrolase
  - d. Lyase
6. Orotic aciduria is due to deficiency of:
  - a. Carbamoyl phosphate synthetase II
  - b. Aspartyl trans-carbamoylase
  - c. Dihydro-orotate dehydrogenase
  - d. Orotidine monophosphate decarboxylase
7. Self mutilation is a symptom of:
  - a. Gout
  - b. Lesch-Nyhan Syndrome
  - c. Orotic aciduria
  - d. ADA deficiency
8. Which enzyme is required for unwinding of DNA?
  - a. Primase
  - b. Helicase
  - c. Topoisomerase
  - d. DNA Ligase
9. Histone protein that is not the part of histone octamer:
  - a. H1
  - b. H3
  - c. H2
  - d. H4
10. Lac -Operon is an example of regulation of gene expression at the level of:
  - a. Transcription
  - b. Replication
  - c. Translation
  - d. Post translation modification
11. Peptide bond formation takes place at:
  - a. Aminoacyl site
  - b. Peptidyl site
  - c. 30 s ribosomal sub unit
  - d. 50 s ribosomal sub unit
12. All are examples of passive transport **except**:
  - a. Calcium channels
  - b. GLUT
  - c. Aquaporins
  - d. Calcium pump
13. Northern blot technique is used for:
  - a. Identification of DNA
  - b. Identification of RNA
  - c. Identification of Protein
  - d. Identification of Lipids
14. Rate of migration during electrophoresis will depend upon all **except**:
  - a. Net charge on the particle
  - b. Mass of the particle
  - c. Concentration of the particle
  - d. pH of the medium
15. All are required for Met-Hb reductase activity **except**:
  - a. NADH + H<sup>+</sup>
  - b. NADPH+ H<sup>+</sup>
  - c. Glutathione
  - d. FADH<sub>2</sub>
16. Substrate level phosphorylation in TCA is done by:
  - a. Isocitrate dehydrogenase
  - b. Fumarase
  - c. Succinate thiokinase
  - d. Aconitase
17. How many protons are pumped out in inter mitochondrial space from complex IV:
  - a. Two
  - b. Four
  - c. Zero
  - d. Three
18. Limiting amino acid in wheat is:
  - a. Lysine
  - b. Methionine
  - c. Cysteine
  - d. Glycine
19. Fetal Haemoglobin binds with oxygen:
  - a. With same affinity as Hb A
  - b. With higher affinity than Hb A
  - c. With less affinity than Hb A
  - d. None of the above
20. Secretory immunoglobulin is:
  - a. IgG
  - b. IgA
  - c. IgD
  - d. IgM

**BIOCHEMISTRY**  
**PAPER- FIRST**

**Note:** Attempt all questions.  
Draw suitable diagrams (wherever necessary)

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- Q. 2. Give reasons:** (2 x 5 = 10)
- a. Enzymes show maximum activity at optimum pH.
  - b. Photosensitivity in porphyria cutanea tarda.
  - c. Inflammation and arthritis in Gout.
  - d. Blackening of urine on standing in Alkaptonuria.
  - e. One molecule of NADH +H<sup>+</sup> generates 2.5 ATPs while one molecule of FADH<sub>2</sub> Gives rises 1.5 ATPs through Electron transport chain.
- Q. 3. Problem based question:** (2 x 5 = 10)
- A 2-day-old term male infant develops vomiting, unresponsiveness, seizures, and tachypnea. His mother had a previous male child who had died suddenly 3 days after birth presumably from sepsis; no autopsy or additional studies had been performed. The infant's three sisters are healthy. He has been evaluated for sepsis and meningitis, with cultures, white blood cell counts, and chemistries of the cerebrospinal fluid being normal. Computed tomography of the brain demonstrates cerebral edema. Laboratory studies are as follows: pH 7.48, Serum urea nitrogen- 2 mg/dL, Serum Ammonia- - 1,175 µg/dL, Serum Citrulline -Trace Orotic acid in urine- 14.6 mg/g with referance range of (1.9-7.3) mg/g
- a. Write the probable diagnosis. Which enzyme is deficient and what is the inheritance pattern of the disease?
  - b. What are normal levels for blood urea and blood ammonia?
  - c. Explain the biochemical basis for the symptoms.
  - d. Write two non-protein amino acids.
  - e. Why Orotic acid level increases in urine?
- Q. 4. Write Briefly on:** (6 x 4 = 24)
- a. TCA as amphibolic pathway.
  - b. Cell mediated immunity.
  - c. Gout
  - d. Importance of trust and vulnerability in doctor-patient relationship
- Q. 5. Structured questions:**
- (i) Explain IUB classification of enzymes with one example of each class. Write a note on Co-factor. (6 + 4 = 10)
- (ii) Describe the process of Translation in prokaryotes and explain post translational modifications. (6 + 4 = 10)
- Q. 6. Answer as indicated:** (4 x 4 = 16)
- a. Comparison between the salient features of Kwashiorkor and Marasmus
  - b. Steps and clinical applications of PCR
  - c. Illustrate Bilirubin metabolism
  - d. Labelled diagram of replication fork