

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, SEPTEMBER-2025**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) (20 x 01 = 20)**

1. A 3-year-old child presents with frequent bruising and prolonged bleeding following minor injuries. The mother reports the child has not received any injections since birth. Lab results show prolonged prothrombin time (PT). Which vitamin deficiency is most likely, and what is the reason for the condition?
 - a. Vitamin A deficiency; due to impaired epithelial integrity
 - b. Vitamin K deficiency; due to lack of neonatal prophylactic injection
 - c. Vitamin E deficiency; due to oxidative damage to RBCs
 - d. Vitamin D deficiency; due to impaired calcium absorption
2. All the following hormones affect the fluid and electrolyte balance, **EXCEPT**:
 - a. Cortisone
 - b. Anti diuretic hormone
 - c. Aldosterone
 - d. Thyroxin
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. A 60-year-old man on a strict vegan diet complains of fatigue and numbness in his feet. Lab reports show macrocytic anemia. Which vitamin deficiency is most likely responsible?
 - a. Folic acid
 - b. Vitamin B6
 - c. Vitamin B12
 - d. Iron
6. Which of the following hormones causes reabsorption of Na⁺ 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. Statin drugs are used to reduce blood cholesterol, which enzyme is inhibited by these drugs :
 - a. HMG CoA reductase
 - b. HMG CoA lyase
 - c. Mevalonate kinase
 - d. HMG CoA synthase
9. Hypokalemia is seen in:
 - a. Hemolysis
 - b. leukemia
 - c. Polycythemia
 - d. Alkalosis
10. A 20-year-old woman with type 1 diabetes presents with vomiting, abdominal pain, and deep rapid breathing (Kussmaul respiration). Her ABG shows: pH: 7.20, What is the most likely diagnosis?
 - a. Respiratory acidosis
 - b. Respiratory alkalosis
 - c. Metabolic acidosis
 - d. Mixed acidosis
11. Alpha chain of human chorionic gonadotropin (hCG) is shared with the following **EXCEPT**:
 - a. TSH
 - b. FSH
 - c. ACTH
 - d. LH
12. Chronic obstructive airway disease leads to
 - a. respiratory acidosis
 - b. Respiratory alkalosis
 - c. metabolic acidosis
 - d. metabolic alkalosis
13. Insulin favours:
 - a. Gluconeogenesis
 - b. Lipogenesis
 - c. Ketogenesis
 - d. Cholesterol synthesis
14. Which is true with regards to Thyroxine.
 - a. It inhibit Oxidative phosphorylation
 - b. It is an uncoupler
 - c. It inhibit translocase
 - d. It act as an Ionophore
15. Which of the lipoproteins carry dietary lipids from intestine to peripheral tissues
 - a. LDL
 - b. HDL
 - c. VLDL
 - d. Chylomicrons
16. A 30-year-old woman is diagnosed with osteomalacia. Lab results show hypocalcemia and low serum phosphate levels. Which vitamin is most likely deficient, and why is it considered a hormone?
 - a. Vitamin D; because it is activated via hydroxylation and regulates gene expression
 - b. Vitamin A; because it regulates epithelial growth
 - c. Vitamin K; due to its systemic coagulative action
 - d. Vitamin E; because of its widespread antioxidant role
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 key enzyme in synthesis of fatty acids is:
 - a. Enoyl reductase
 - b. Beta hydroxyacyl dehydratase
 - c. Acetyl- CoA carboxylase
 - d. acetyl transacylase
20. Pyruvate dehydrogenase complex requires all **EXCEPT**
 - a. NAD⁺
 - b. FAD⁺
 - c. TPP
 - d. Biotin

**BIOCHEMISTRY
PAPER- SECOND**

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

- Q. 2. Give reasons:** (5 x 2 = 10)
- TSH is low in hyperthyroidism.
 - In dehydration specific gravity is increased in urine
 - Folic acid is unable to act in deficiency of vitamin B12
 - Intramuscular Vitamin K injection is given to new born babies.
 - Methotrexate acts as an anti-cancer drug.
- Q. 3. Problem based question:**
- A patient presented to the OPD with difficulty in driving at night. On examination there are greyish white patches on the lateral conjunctiva of his eyes.
- What is the most probable diagnosis? (1)
 - Which is the reason for decreased vision in dark. (1)
 - Enumerate the biochemical functions of this vitamin (2)
 - Explain Wald's visual cycle (3)
 - Enumerate different fat soluble vitamins. Write deficiency features of vitamin D in children (3)
- Q. 4. Write in brief:** (4 x 6 =24)
- Qualities of a good clinician
 - Explain the clinical role of glycosaminoglycans and name some clinically important phospholipids
 - Also enumerate the liver function tests. Phase II detoxification in the liver.
 - How is iron absorption regulated at mucosal level? Explain with suitable diagram. How is serum calcium level maintained?
- Q. 5. Structured question:**
- (i) Enumerate the lipid profile tests. Describe the reverse transport of cholesterol with the help of diagram. What is atherogenesis and draw suitable diagram explaining atherogenesis. (2+4+4=10)
- (ii) Explain how blood glucose is regulated in the body. Write in brief the important steps of Gluconeogenesis. Explain von Gierke's disease. (4+3+3=10)
- Q. 6. Answer as indicated:** (4 x 4 =16)
- Enumerate tumour markers and write their clinical application
 - Tabulate role of vitamins as co-enzymes.
 - Write a note on Metabolic acidosis
 - Diagrammatically explain the different modes of hormone action
