2406000101030701-A
EXAMINATION OCTOBER 2024 (Supplementary Exam)
FIRST MBBS
BIO-CHEMISTRY (PAPER - I) (NEW) - LEVEL 3

[Time: As Per Schedule] **[Max. Marks: 100]**

Instructions:
1. **Fill up strictly the following details on your answer book**
   a. Name of the Examination: **BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (FIRST)**
   b. Name of the Subject: **BIO-CHEMISTRY (PAPER - I) –Level-3**
   c. Subject Code No: **2406000101030701-A**
2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.

Seat No:

Student's Signature

SECTION-A

Q.1 Multiple choice questions (20 out of 20) **20**

1. Which of the following enzymes, does not play a role by eliminating the free radicals from the biological sssystem?
   a) Synthase b) Superoxide dismutase
   c) Catalase d) Glutathione peroxidase

2. The oxidation of NADH & $FADH_2$ Through ETC yields about
   a) 2.5 and 1.5 ATP respectively b) 3 and 2 ATP respectively
   c) 1.5 and 2.5 ATP respectively d) 2 and 3 ATP respectively

3. Which one of the following molecules acts as a methyl donor in detoxification by Conjugation
   a) SAM b) GSH
   c) PAPS d) All the above

4. End product of glycolysis in aerobic and anaerobic respectively
   a) Pyruvate, Lactate
   b) Lactate, Pyruvate
   c) Fumarate, Ketoglutarate
   d) Ketoglutarate, Fumarate

5. Von-gieake Disease is due to which enzyme defied
   a) Glycogen Synthase
   b) Transketolase
   c) Pyruvate kinase
   d) Glucose-6-phosphatase

6. The number of cycles required to synthesize palmitate is
   a) 5
   b) 6
   c) 7
   d) 9

7. Which of the following enzymes were used as markers of Hepatocellular injury
   a) ALP & GGT
   b) ALT & AST
   c) LDH & CPK
   d) None of above

8. Which of the following is not the disease associated with the abnormalities of membrane proteins?
   a) Wilson disease
   b) Familial hypercholesterolemia
   c) Diabetes mellitus
   d) Cystic fibrosis

9. Which of the following is not an example of factors promoting Calcium absorption?
   a) Vitamin D
   b) Oxalates
   c) Parathyroid Hormone
   d) Lactose

10. Which of the following vitamins does not play a beneficial role in protecting the biological membranes from lipid peroxidation.
    a) Vitamin E
    b) Vitamin C
    c) Vitamin-B12
    d) Vitamin A

11. Proteins take part in ETC & Oxidative Phosphorylation are coded by _____
    a) Nuclear DNA
    b) Mitochndrial DNA
    c) RNA
    d) A & B Both

12. Which of the following substance cannot pass through the normal glomerular membrane?
    a) Creatinine
    b) Albumin
    c) Myoglobin
    d) Uric acid

13. Which of the following metabolic pathway is amphibolic in nature?
    a) Glycolysis b) Glycogenolysis
    c) De-novo synthesis d) TCA cycle

14. Following is the major organ involve in metabolism of Xenobiotics
    a) Brain b) Liver
    c) Muscles d) Kidney

15. Key enzymes of gluconeogenesis except all are
    a) Pyruvate carboxylase b) PEP-CK
    c) Fructose 1-6-bisphosphatase d) Transketolase

16. Bronze diabetes is associated with
    a) Wilson's disease b) Hemosiderosis
    c) Hemochromatosis d) Iron deficiency anemia

17. The following is used in measuring GFR
    a) Cellulose b) Inulin
    c) Starch d) Glycogen

18. Most of glycogen stores are present in
    a) Liver b) Skeletal Muscle
    c) Brain d) Adipose Tissue

19. Molecule that acts as a local Hormone
    a) Phospholipids b) Cholesterol
    c) Prostaglandins d) Acetylcholine

20. Dipalmitoyl lecithin acts as:
    a) Platelet activating factor
    b) Second messenger for hormones
    c) Lung surfactant
    d) Anti-ketogenic compound

SECTION-B

Q.2 Long Answer Questions (2 out of 3) 20

1. Enumerate the beta-oxidation of palmitic acid with energetics. Describe the regulation of beta oxidation.(2+5+3=10 marks)

2. Describe the sources, daily requirement, biological functions and disorders of iron metabolism. Describe the absorption of iron with enhancing and hindering factors.(1+2+2+2+3=10 marks)
3. Describe the synthesis and breakdown of glycogen. Describe its regulation and add a note on glycogen storage disorders.(4+2+4=10marks)

Q.3 Short Answer Questions (10 out of 11) **20**

1. Give any four examples of phase 1 detoxification reactions.
2. Why is sample for blood glucose collected in fluoride bulb?
3. Why is hypocalcemia seen in Vit D deficiency?
4. Why mitochondria are called powerhouses of the cell?
5. Difference between primary and secondary hypothyroidism on lab testing.
6. Biological role of prostacyclins and thromboxane.
7. How do statins help in lowering cholesterol levels?
8. Name essential fatty acids and describe deficiency symptoms.
9. Significance of HMP shunt.
10. Products formed from cholesterol in the body.
11. Factors causing methaemoglobinemia and its treatment.

SECTION-C

Q.4 Short Answer Questions (4 out of 5) **20**

1. Inhibitors of electron transport chain.
2. Write the role of doctor in healthcare system.
3. Describe transport across cell membrane.
4. Renal function tests.
5. Amphibolic role of TCA Cycle

Q.5 Clinical Cases (2 out of 2) **20**

Case-1:

A 4-year child was brought to pediatric OPD with edema over legs and face. She also had discoloration of hair, skin and retarded growth, on enquiring by doctor, mother told to the doctor that child was on breast milk only for one and half year of the age and for the last two years she was being given rice. The child was admitted in pediatric ward and diagnosed as Protein Energy Malnutrition (PEM).

The laboratory data of child showed hypoalbuminemia and abdominal sonography showed enlarged liver (fatty liver).

1. What are the different types of Protein Energy Malnutrition (PEM)? What is the type of PEM in this case?
2. What are the clinical features of different type of PEM?
3. What is the cause of edema in this case?
4. What dietary advice will you suggest for this patient?
5. Why there is fatty liver in PEM?

Case-2:

A 54-year-old obese person presented in emergency with altered consciousness level and shortness of breath for last 4 hours. He is having history of uncontrolled diabetes mellitus for 15 years, as he was not following any medical advice from physician. Patient's relative told that was also having complained of fever, nausea & vomiting. On examination physician noted dryness of mouth, pale & dry conjunctive, sunken eye ball, feeble pulse, tachypnoea, tachycardia, very low blood pressure (70/40 mm Hg).
Lab investigations:
Random Blood glucose: 480 mg/dl (70-140 mg/dl)
Blood pH: 7.20 (7.35 – 7.45)
Serum creatinine: 2.5 mg/dl (0.4-1.4 mg/dl)
Urine glucose: Positive (++++),
Serum Na+ 120mmol/L (135-145 mmol/L)
Urine Ketones: Positive
Serum K+: 6.0 mmol/l (3.5-5.0 mmol/L)

The patient was diagnosed as a case of Diabetic ketoacidosis with acute renal failure.
Questions:

1. Write biochemical basis for shortness of breath and dehydration in this patient.
2. Ketogenesis occurs only in liver but hepatocytes cannot utilize ketone bodies. Justify.
3. Write four causes for positive benedict test in urine other than reducing sugar.
4. Which other investigation are required for evaluation of renal function & to differentiate acute & chronic renal failure?
5. Why serum K+ levels have to be monitored while giving the treatment to this patient?

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