M- 005M

MBBS FIRST PROFESSIONAL EXAMINATION, 2021

BIOCHEMISTRY

Paper I

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

Note:- Attempt all questions. All part of a question should be answered together. Figures in parenthesis indicate marks allotted to a question.

Section-A

Q1. Write in detail about inter-relationship between various metabolic pathways. **(20)**

Q2. Write briefly on: **(2x10)**

(a) HMP Shunt pathway

(b) Detoxification of ammonia from brain

Q3. Multiple Choice Questions: **(10x1)**

1. **Hydroxylation of phenylalanine requires all of the following EXCEPT**
   a. Molecular oxygen
   b. Phenylalanine hydroxylase
   c. Tetrahydrobiopterin
   d. FADH2
2. **The diet of a child suffering from Maple Syrup Urine Disease should be low in which of the following amino-acid content?**
   a. Tryptophan
   b. Methionine
   c. Phenylalanine
   d. Branched chain amino-acids
3. **The deficiency of which of the following enzyme of pentose phosphate pathway causes haemolytic anaemia?**
   a. Transketolase
   b. Transaldolase
   c. Glucose-6-phosphate dehydrogenase
   d. Phosphohexose isomerase
4. **Disease associated with deficiency of Glucose-6-phosphatase in liver:**
   a. von Gierke's Disease
   b. Pompe's Disease
   c. McArdle Disease
   d. Cori's Disease
5. **Insulin stimulates:**
   a. Hepatic glycogenesis
   b. Hepatic glycogenolysis
   c. Gluconeogenesis
   d. Lipolysis

6. **Which one of the following enzyme acts as biomarker in the diagnosis of prostate cancer?**
   a. Acid phosphatase
   b. Alkaline phosphatase
   c. Amylase
   d. Acetylase
7. **Refsum's Disease is due to defect in:**
   a. β-oxidation
   b. α-oxidation
   c. ω-oxidation
   d. Peroxisomes
8. **Antimycin A, an inhibitor of Electron Transport Chain inhibits the flow of electrons from:**
   a. Complex I
   b. Complex II
   c. Complex III
   d. Complex IV
9. **Pumping of the hydrogen ions between two membranes of mitochondria from the matrix is best explained by which of the following:**
   a. Oxidative phosphorylation
   b. Loop mechanism
   c. Uncouplers
   d. Ionophores
10. **Activation of fatty acids requires all the following except:**
    a. ATP
    b. Coenzyme A
    c. Thiokinase
    d. Carnitine

Section-B

Q1. Write in detail about important role of biochemistry in medicine. Add a note on role of calcium in human body. **(20)**

Q2. Write short notes on: **(2x10)**

(a) Structure and functions proteins.

(b) Km, Vmax and regulation of enzyme activities.

Q3. Multiple Choice Questions: **(10x1)**

1. **The amino acid which contains an indole group is:**
   a. Histidine
   b. Arginine
   c. Cystine
   d. Tryptophan
2. **Cyclic AMP is formed from ATP by the enzyme adenylate cyclase which is activated by the hormone:**
   a. Insulin
   b. Epinephrine
   c. Testosterone
   d. Progesterone

3. **The synthesis of mRNA in human is catalyzed by:**
   (a) RNA polymerase I
   (b) RNA polymerase II
   (c) RNA polymerase III
   (d) RNA polymerase IV
4. **Which of the following is known to be involved in the initial presentation of antigen to T- lymphocytes?**
   (a) Dendritic cells
   (b) Plasma cells
   (c) Platelets
   (d) Erythrocytes
5. **Perforin is a protein secreted by:**
   (a) Helper T cell
   (b) Cytotoxic T cell
   (c) Natural killer cell
   (d) Suppressor T cell
6. **Memory cells are formed from:**
   (a) Erythropoietic stem cells
   (b) Monocytes
   (c) T- lymphocytes
   (d) B- lymphocytes
7. **For measurement of HbA1c sample blood specimen is collected in a tube containing anticoagulant:**
   (a) Sodium fluoride
   (b) Sodium citrate
   (c) Heparin
   (d) EDTA
8. **Which fraction of bilirubin can cross blood brain barrier and enter the neurons of basal ganglia, hippocampus and cerebellum causing necrosis of nerve cells leading to the development of bilirubin encephalopathy?**
   (a) Delta bilirubin
   (b) Unconjugated bilirubin
   (c) Bilirubin mono-glucuronide
   (d) Bilirubin di-glucuronide
9. **Which one is the most common cause of raised unconjugated bilirubin in a case of Physiological Jaundice of Newborn?**
   (a) Reduced activity of UDP-glucuronosyl-transferase enzyme
   (b) Cholestasis
   (c) Blood group incompatibility
   (d) G6PD deficiency
10. **Elevated homocysteine levels are associated with:**
    (a) Coronary artery disease
    (b) Bronchitis
    (c) Common cold
    (d) Diarrhoea

Section-B

Q1. Vitamin D3 is a prohormone and calcitriol is a hormone – Justify the statement. Describe the synthesis, biochemical functions and deficiency disorders of Vitamin D **(20)**

Q2. Write short notes on: **(2x10)**

a) What are chemical carcinogens? Write briefly about the biochemical basis of cancer chemotherapy.

b) Describe the mode of action for group I hormones with the help of a well labelled diagram.

Q3. Multiple Choice Questions: (10x1)

1. **A tumor suppressor gene is:**
   (a) Inactivated by mutation
   (b) Activated by mutation
   (c) Functional during tumor formation
   (d) Metastasis promoting gene
2. **Retrovirus can induce cancer by:**
   (a) Injecting oncogenes into the cells
   (b) Converting proto-oncogenes into oncogenes
   (c) Causing mutations in G proteins
   (d) Suppressing p53
3. **Which of the following enzyme is deficient in Gaucher's disease?**
   (a) Glucosidase (glucocerebrosidase)
   (b) Glucoceramide
   (c) Sphingomyelinase
   (d) Galactosidase
4. **Thyroid hormones are transported in blood bound to:**
   (a) Thyroxine binding prealbumin
   (b) Transcortin
   (c) Sex hormone binding globulin
   (d) Thyroglobulin
5. **The temporary storage form of iron in intestinal mucosal cell is:**
   (a) Hemosiderin
   (b) Transferrin
   (c) Ferritin
   (d) Haemoglobin
6. **Neural tube defect is associated with the deficiency of:**
   (a) Pyridoxine
   (b) Thiamine
   (c) Folate
   (d) Cobalamine
7. **The vitamin deficient in maize is:**
   (a) Thiamine
   (b) Riboflavin
   (c) Niacin
   (d) Pyridoxine
8. **Thiamine level is best monitored by:**
   (a) Transketolase level in blood
   (b) Thiamine level in blood
   (c) Glucose - 6 - phosphate dehydrogenase activity
   (d) Reticulocytosis
9. **Binding of the following hormones to receptor activate adenyl cyclase except:**
   (a) Vasopressin
   (b) Glucagon
   (c) Thyroxine
   (d) Epinephrine
10. **Carotenes are transported through:**
    (a) Proteins
    (b) Lipids
    (c) Minerals
    (d) Lipoproteins

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