

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JANUARY-2022

BIOCHEMISTRY

PAPER - FIRST

SET - A

[Time allotted: Three hours]

[Max Marks: 100]

Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) (1 x 20 = 20)

1. Mitochondria are associated with all of the following **except**:
 - a. Oxidation of carbohydrates and lipids
 - b. Urea and heme synthesis
 - c. Hydrolysis of various macromolecules at low pH
 - d. Energy conservation
2. The amino acid containing guanidine group is:
 - a. Arginine
 - b. Histidine
 - c. Tyrosine
 - d. Tryptophan
3. All of the following are nucleotides **except**:
 - a. Adenosine triphosphate
 - b. Phosphoadenosine phospho sulphate
 - c. S-adenosyl methionine
 - d. Nicotinamide adenine dinucleotide
4. In the six major groups of enzymes, the fourth group has been assigned to:
 - a. Hydrolase
 - b. Lyases
 - c. Isomerases
 - d. Ligases
5. Which of the following is natural uncoupler?
 - a. Cortisol
 - b. Thyroxine
 - c. Prolactin
 - d. Biotin
6. The principal plasma protein responsible for exerting colloidal osmotic pressure is:
 - a. Haemoglobin
 - b. Globin
 - c. Albumin
 - d. Haptoglobin
7. An enzyme that catalyzes the conversion of an aldose to a ketose would be classified as:
 - a. Transferases
 - b. Isomerases
 - c. Oxidoreductases
 - d. Hydrolases
8. The enzyme "cytochrome P450 reductase", which catalyzes hydroxylation of drugs, requires the coenzyme:
 - a. NAD⁺
 - b. NADP⁺
 - c. NADH⁺H⁺
 - d. NADPH⁺H⁺
9. In oxidative phosphorylation the oxidation of one molecule of FADH₂ produces:
 - a. 1 ATP molecules
 - b. 2 ATP molecules
 - c. 3 ATP molecules
 - d. No ATP at all
10. Unusual nucleotide pseudouridylic acid is present in:
 - a. mRNA
 - b. tRNA
 - c. rRNA
 - d. hnRNA
11. Urine of a patient with acute intermittent porphyria is likely to contain:
 - a. Porphobilinogen
 - b. Uroporphyrinogen
 - c. Protoporphyrinogen
 - d. Bilirubin
12. The method employed in the analysis of products of polymerase chain reaction is:
 - a. Isoelectric focusing
 - b. Immunoelectrophoresis
 - c. Capillary electrophoresis
 - d. PAGE
13. The enzyme responsible for preventing super coiling of DNA, produced during unwinding of DNA in replication is:
 - a. Helicase
 - b. Primase
 - c. Topoisomerase
 - d. Ligase
14. Peptidyl transferase activity of 50S RNA is inhibited by:
 - a. Rifampicin
 - b. Cycloheximide
 - c. Chloramphenicol
 - d. Erythromycin
15. Hyperuricemia can result from defect in all of the following enzymes **except**:
 - a. Carbamoyl phosphate synthetase II
 - b. HGPRTase
 - c. PRPP synthase
 - d. Glucose-6-phosphatase
16. All of the following are important in determination of the primary structure of a protein **except**:
 - a. Determination of the α -helical structure of protein
 - b. Separation of different polypeptide chains.
 - c. Determination of the amino acid sequence in peptide fragments
 - d. Determination of the number of polypeptide chains
17. A competitive inhibitor of an enzyme:
 - a. Increases K_m without affecting V_{max}
 - b. Decreases K_m without affecting V_{max}
 - c. Increases V_{max} without affecting K_m
 - d. Decreases V_{max} without affecting K_m
18. Immunoglobulin classes are differentiated from each other on the basis of difference in their:
 - a. Electrophoretic mobility
 - b. Molecular weight
 - c. Light chains
 - d. Heavy chains
19. The beneficial effects of dietary fiber include all of the following **except**:
 - a. Increased motility of intestine
 - b. Helping in the digestion process
 - c. Decreased absorption of cholesterol
 - d. Increased glucose tolerance
20. Basal metabolic rate is increased by all of the following, **except**:
 - a. Fever
 - b. Thyroxine
 - c. Starvation
 - d. Cold climate

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

- Q. 2. Give reasons:** (2 x 5 = 10)
- FADH₂ generates only 1.5 ATP through ETC.
 - Pellagra like symptoms are seen in hartnup's disease.
 - Acute intermittent porphyria can be precipitated by drugs like barbiturates and phenytoin.
 - Why Ig A is called secretory antibody?
 - Intake of dietary fibers in diet leads to decrease serum cholesterol.
- Q. 3. Problem based question:** (2 x 5 = 10)
- A parent brings his child to the hospital with the complaint that his urine is normal coloured at time of voiding but after some time the urine turns dark in colour.
- What is the most probable diagnosis in this case?
 - Why does the urine turn dark in colour?
 - Which test would you advise in order to confirm your diagnosis?
 - How would you treat this patient?
 - What is Ochronosis?
- Q. 4. Write briefly on:** (6 x 4 = 24)
- Haemoglobinopathies
 - Define PCR and its applications
 - Electron transport chain
 - Professional qualities and role of a physician
- Q. 5. Structured questions:**
- (i) How is the enzyme activity regulated? Enumerate the factors affecting enzyme action. (5 + 5 = 10)
- (ii) Write the process of prokaryotic transcription. What are the post transcriptional modifications? (6 + 4 = 10)
- Q. 6. Answer as indicated:** (4 x 4 = 16)
- Causes of Immunodeficiency
 - Write a note on Hyperammonemia
 - Differentiate between Marasmus and Kwashiorkor
 - Types of RNA and draw the structure of tRNA

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, JANUARY-2022

BIOCHEMISTRY

PAPER - SECOND

SET - A

[Max Marks: 100]

[Time allotted: Three hours]

Q. 1. Multiple choice questions (attempt all MCQs in the allotted first 20 minutes in the OMR sheet) (1 x 20 = 20)

1. Anti-egg injury factor refers to which vitamin?
 - a. Biotin
 - b. Inositol
 - c. Choline
 - d. Folic acid
2. Vitamin E is all **except**:
 - a. Immunopromoter
 - b. Anti-carcinogenic agent
 - c. Antioxidant
 - d. One carbon transfer moiety
3. Keshan's disease is associated with deficiency of:
 - a. Molybdenum
 - b. Manganese
 - c. Selenium
 - d. Sulphur
4. Which of the following reactions is catalysed by enzyme adenylate cyclase?
 - a. cGMP to GMP
 - b. cAMP to AMP
 - c. ATP to cGMP
 - d. ATP to cAMP
5. Quabain is an inhibitor of:
 - a. Pyruvate kinase
 - b. Electron transport chain
 - c. Na⁺ K⁺ ATPase
 - d. Ca²⁺ calmodulin system
6. Hypoglycemia stimulates the release of all of the following hormones **except**:
 - a. Insulin
 - b. Glucagon
 - c. Adrenaline
 - d. Growth hormone
7. Chylomicrons:
 - a. Principally carry cholesterol
 - b. Are synthesised in small intestine
 - c. Are apolipoproteins
 - d. Are the smallest of lipoproteins
8. During fasting all of the following events occur **except**:
 - a. TAG mobilised from adipose tissue
 - b. Hormone sensitive lipase is activated
 - c. Glucose uptake by adipose tissue is increased
 - d. Plasma non-esterified fatty acids (NEFAs) are increased
9. All are correct **except**:
 - a. Ketone bodies may be synthesised during starvation
 - b. Ketone bodies are utilised by the liver during long term starvation
 - c. They may be synthesised in uncontrolled diabetes mellitus
 - d. They are utilised in cardiac muscles
10. Cholesterol synthesis takes place in all of the following **except**:
 - a. Adrenal Cortex
 - b. Liver
 - c. Adult brain
 - d. Small intestine
11. The bicarbonate ion moves from RBC to plasma in exchange for:
 - a. CO₂
 - b. Ca²⁺
 - c. Na⁺
 - d. Cl⁻
12. Which of the following diseases cause proteinuria (albuminuria) **except**?
 - a. Glomerulonephritis
 - b. Nephrotic syndrome
 - c. Diabetic nephropathy
 - d. None of the above
13. The level of following enzymes is increased in acute pancreatitis:
 - a. ALT and AST
 - b. Serum amylase and lipase
 - c. CK and LDH
 - d. Carbonic anhydrase
14. Tumor-makers for ovarian cancers are:
 - a. B-hcG
 - b. AFP
 - c. CA-125
 - d. CEA
15. The de Novo synthesis of fatty acids accords in:
 - a. Mitochondria
 - b. Cytosol
 - c. Nucleus
 - d. Plasma membrane
16. Gall stones are formed when:
 - a. Bile is supersaturated with bile salts
 - b. Bile is undersaturated with bile salts
 - c. Bile is supersaturated with cholesterol
 - d. None of the above
17. Accumulation of the following metabolite of galactose metabolism is linked with cataract formation:
 - a. Sorbitol
 - b. Lactose
 - c. Galactitol
 - d. GAGs
18. Somatostatin is secreted from:
 - a. Alpha cells of pancreas
 - b. Beta cells of pancreas
 - c. Delta cells of pancreas
 - d. Gamma cells of pancreas
19. Phase I reactions are concerned with which of the following?
 - a. Conjugation with UDP glucuronic acid
 - b. Excretion of different conjugates
 - c. Mono oxygenation
 - d. Hippuric acid formation
20. P₃₂ has been used for all **except**:
 - a. DNA finger printing
 - b. Treatment of poly cythemia vera
 - c. SPECT imaging
 - d. Metabolic studies

**BIOCHEMISTRY
PAPER- SECOND**

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

- Q. 2. Give reasons:** (2 x 5 = 10)
- Cataract is seen in galactosemia
 - Ketone bodies are formed in starvation
 - There is bleeding gums in deficiency of vitamin C
 - Insulin is known as 'one man army'
 - Hyperventilation develop respiratory alkalosis
- Q. 3. Problem based question:** (2 x 5 = 10)
- A patient presented to emergency with acute pain upper abdomen after having alcohol. The pain is intense and radiates to back.
- What is the most probable diagnosis?
 - Which investigations would be recommended to confirm diagnosis?
 - Which investigations would rule out myocardial infarction?
 - Which enzyme is specific for pancreatic infections and injuries?
 - Define isoenzymes. Name the Isoenzymes of LDH.
- Q. 4. Write briefly on:** (6 x 4 = 24)
- Explain the importance of consent in doctor patient relationship.
 - Fatty liver
 - Reverse cholesterol transport
 - Oncogenes and name some oncogenic viruses
- Q. 5. Structured questions:**
- (i) Explain gluconeogenesis in detail. Write its importance. (7 + 3 = 10)
- (ii) Explain the role of various factors in maintaining the serum calcium levels in the body. (10)
- Q. 6. Answer as indicated:** (4 x 4 = 16)
- Explain phase II of detoxification
 - Diagrammatically explain mechanism of action of second messenger based hormones.
 - Steps of beta oxidation of fatty acids
 - Clinical application(uses) of Hetero polysaccharides