

M.B.B.S. FIRST PROFESSIONAL EXAMINATION, FEBRUARY-2021

BIOCHEMISTRY

PAPER - FIRST

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. Cells communicate with each other through all of the following except:
 - a. Desmosomes
 - b. Gap junction
 - c. Channels
 - d. Tight junction
2. At isoelectric point amino acid exists as:
 - a. Anions
 - b. Cations
 - c. Zwitter ion
 - d. None of the above
3. Aqua porins are:
 - a. Sodium channels
 - b. Calcium channels
 - c. Potassium channels
 - d. Water channels
4. Structure of uric acid is:
 - a. 2, 6, 8 trioxypurine
 - b. 2, 6 dioxy purine
 - c. 6 - oxy purine
 - d. 6, 8 dioxy purine
5. The difference between nucleotide and nucleoside is the:
 - a. Absence of pentose in nucleoside
 - b. Absence of phosphate in nucleoside
 - c. Absence of base in nucleoside
 - d. Absence of phosphate in nucleotide
6. The following molecule is involved in the processing of hn RNA to m RNA:
 - a. sn RNA
 - b. small r-RNA
 - c. large r-RNA
 - d. t-RNA
7. The predominant form of DNA in the human biological system is:
 - a. A - DNA
 - b. B - DNA
 - c. Z - DNA
 - d. Q - DNA
8. In competitive inhibition of enzymes:
 - a. Km increased and v-max decreases
 - b. Km increases and v-max remains unchanged
 - c. V-max and km decreases
 - d. V-max decreases and km remains unchanged
9. Enzymes act by reducing the:
 - a. Activation energy
 - b. Binding energy
 - c. Heat energy
 - d. Interaction energy
10. A reversal of A/G ratio is observed in all except:
 - a. Cirrhosis of liver
 - b. Nephrotic syndrome
 - c. Multiple myeloma
 - d. Protein rich diet
11. Which one of the Immunoglobulins takes part in primary immune response?
 - a. IgG
 - b. IgM
 - c. IgA
 - d. IgE
12. The antibody that mediates the hypersensitive reaction and anaphylaxis is:
 - a. IgG
 - b. IgM
 - c. IgA
 - d. IgE
13. Administration of all of the following drugs further aggravates the conditions of porphyria except:
 - a. Barbiturates
 - b. Anticonvulsants
 - c. Ethanol
 - d. Cephalosporins
14. Binding of 2,3 BPG to haemoglobin increases in all of the following conditions except:
 - a. Life at high altitude
 - b. Obstructive pulmonary disease
 - c. Fetal circulation during pregnancy
 - d. Anemias
15. The P:O ratio for oxidation of NADH is:
 - a. 1.0
 - b. 1.5
 - c. 2.5
 - d. 2.0
16. All the following are enzymes of TCA cycle except:
 - a. Isocitrate dehydrogenase
 - b. α -ketoglutarate dehydrogenase
 - c. Citrate lyase
 - d. Alcohol dehydrogenase
17. One of the following blotting techniques is currently used as a diagnostic test to AIDS virus:
 - a. Southern blotting
 - b. Western blotting
 - c. Northern blotting
 - d. Dot blotting
18. The enzyme that links amino acid to the tRNA is:
 - a. Peptidyl transferase
 - b. Telomerase
 - c. Amino acyl - tRNA synthetase
 - d. Amino transferase
19. In eukaryotes the following promoter element determines the starting point of transcription:
 - a. Pribnow box
 - b. Caat box
 - c. Goldberg hogness box
 - d. All of the above
20. The ratio of the amount of nitrogen retained in the body and nitrogen absorbed is called:
 - a. Biological value
 - b. Net protein utilization
 - c. Protein efficiency ratio
 - d. Specific dynamic action.

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2020



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

- Q. 2. **Give reasons:** (2 x 5 = 10)
- Allopurinol is given in Gout.
 - A/G ratio is reversed in liver diseases.
 - Secondary response to antigen is more powerful than primary response.
 - Alcohol is given in treatment of methanol poisoning.
 - Ammonia is converted to urea in the body.
- Q. 3. **Problem based question:** (2 x 5 = 10)
- A person presents to surgical OPD with jaundice and intense itching and history of vomiting. He also gives history of passing clay coloured stools.
- What is the probable diagnosis?
 - Why is the patient passing clay coloured stools?
 - Which enzymes would be raised in this condition?
 - Name some bile salts.
 - What is the end product of haem catabolism?
- Q. 4. **Write briefly on:** (6 x 4 = 24)
- Why should a doctor maintain professional secrecy?
 - Isoenzymes
 - Fluid mosaic model of cell membrane
 - Vaccines
- Q. 5. **Structured questions:**
- (i) What is gene regulation? Describe lac operon in detail with the help of a diagram. (3+7= 10)
- (ii) Write about 'phenylketonuria'. Explaining why it is a metabolic disorder. (6+4= 10)
- Q. 6. **Answer as indicated:** (4 x 4 = 16)
- Explain DNA replication diagrammatically (labelled diagram)
 - Write the reaction which is carried out by enzyme which is deficient in Lesch Nyhan Syndrome.
 - Draw urea cycle
 - List the immunoglobulins mentioning the heavy and light chains in each.

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

1. Pyruvate is converted to acetyl-CoA by:
 - a. Pyruvate dehydrogenase
 - b. Pyruvate carboxylase
 - c. Pyruvate kinase
 - d. Lactate dehydrogenase
2. Malate shuttle is necessary for:
 - a. Gluconeogenesis
 - b. Providing NADPH
 - c. ATP generation
 - d. Glycogenolysis
3. The coenzyme required for propionyl-CoA carboxylase is:
 - a. Thiamine pyrophosphate
 - b. NADPH
 - c. Biotin
 - d. Pyridoxal phosphate
4. Name the defective enzyme in methylmalonyl aciduria:
 - a. Propionyl-CoA carboxylase
 - b. Methylmalonyl-CoA mutase
 - c. Tyrosinase
 - d. Cystathionine synthase
5. Oncogenes are:
 - a. Bacteria capable of causing cancer
 - b. Viruses capable of causing cancer
 - c. Proteins capable of causing cancer
 - d. Genes capable of causing cancer
6. The most common second messenger in hormonal action is:
 - a. 3'5' cyclic AMP
 - b. SAM
 - c. AMP
 - d. CTP
7. Which of the following does not increase blood glucose level?
 - a. Glucagon
 - b. Thyroxine
 - c. Epinephrine
 - d. Insulin
8. One of the tests for pancreatic function is the estimation of serum:
 - a. Alkaline phosphatase
 - b. CK - MB
 - c. Amylase
 - d. SGPT
9. Kernicterus is caused by serum bilirubin levels greater than:
 - a. 0.2 mg/dl
 - b. 2 mg/dl
 - c. 12 mg/dl
 - d. 20 mg/dl
10. R.S.T. is lowered in:
 - a. Renal glycosuria
 - b. Adrenal glycosuria
 - c. Hepatic glycosuria
 - d. Diabetes mellitus
11. All water soluble vitamins are excreted through urine and not stored in the body except:
 - a. Vitamin B₁₂
 - b. Vitamin B₆
 - c. Vitamin-C
 - d. Niacin
12. The metabolism of sodium is regulated by the following hormone:
 - a. PTH
 - b. Glucagon
 - c. Aldosterone
 - d. Insulin
13. Following are the examples of radioisotopes except:
 - a. N¹⁴
 - b. Iodine¹³¹
 - c. Co⁵¹
 - d. Cobalt⁶⁰
14. Substance such as sulphanilamide is removed by the body by:
 - a. Glucuronidation
 - b. Sulfonation
 - c. Acetylation
 - d. Methylation
15. Primary event in respiratory alkalosis is:
 - a. Increase in pH
 - b. Decrease in bicarbonate
 - c. Increase in plasma bicarbonate
 - d. Decrease in PCO₂
16. Humans cannot synthesize vitamin C due to the deficiency of the following enzyme:
 - a. UDP-glucose dehydrogenase
 - b. Glucuronidase
 - c. L- Gulonolactone Oxidase
 - d. Xylitol dehydrogenase
17. Which vitamin is required for oxidative decarboxylation?
 - a. Pyridoxal phosphate
 - b. Thiamine
 - c. Biotin
 - d. Riboflavin
18. Deficiency of pantothenic acid leads to:
 - a. Night blindness
 - b. Rickets
 - c. Macrocytic anemia
 - d. Burning of foot syndrome
19. Function of HDL is the transport of:
 - a. Triglycerides from intestine to adipose tissue
 - b. Cholesterol from liver to peripheral tissues
 - c. Cholesterol from peripheral tissues to liver
 - d. Free fatty acids (NEFA) from adipose tissue
20. β -oxidation of odd chain fatty acids produces:
 - a. Acetyl CoA + Malonyl CoA
 - b. Acetyl CoA + Propionyl CoA
 - c. Propionyl CoA + Malonyl CoA
 - d. Succinyl CoA + Acetyl CoA

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

- Q. 2. Give reasons:** (2 x 5 = 10)
- Patients with diabetic ketoacidosis have Kussmaul breathing.
 - Methotrexate is used as anticancer drug.
 - Deficiency of vitamin B₁₂ causes folate trap.
 - Essential fatty acids help in the prevention of fatty liver.
 - Liver cirrhosis can cause ascites.
- Q. 3. Problem based question:** (2 x 5 = 10)
- A 13 year old child who was residing in a boarding school for the last 3 years was admitted to the hospital. On taking his history he was found to have a poor appetite. His gums were swollen and tender. He was anemic and had complaints of fatigue, restlessness, muscular weakness and joint pain. Thorough examination of the patient revealed that he bruised easily and had edema & some subcutaneous hemorrhages on his limbs.
- What is the probable diagnosis and the cause of the disorder?
 - Explain biochemically the reason for easy bruising, muscular weakness and joint pain in this patient.
 - Name all the vitamins whose deficiency can cause anemia.
 - List the antioxidant vitamins.
 - Write the coenzyme forms of pantothenic acid and folic acid
- Q. 4. Write briefly on:** (6 x 4 = 24)
- Metabolic functions of liver
 - Tumor suppressor genes
 - Importance of history taking while assessing a patient
 - Absorption and metabolism of Iron
- Q. 5. Structured questions:**
- (i) What are lipoproteins? Describe the separation methods of various lipoproteins and their fractions.
Describe the metabolism of HDL. (2+4+4= 10)
- (ii) Describe the process of glycogenesis. Write in detail any two glycogen storage diseases. (6+4= 10)
- Q. 6. Answer as indicated:** (4 x 4 = 16)
- Write therapeutic uses of radioisotopes.
 - Illustrate role of Renin in electrolyte imbalance.
 - Draw a labelled diagram for mechanism of action of steroid hormones.
 - Write a short note on Ketosis.