

QUESTION BANK

PHARM D I YEAR-MEDICINAL BIOCHEMISTRY

LONG ESSAY (10 MARKS)

ENZYMES

- 1) Define an enzyme? Outline the IUB classification of enzymes with examples. Explain the mechanism of enzyme action.
- 2) Explain the factors affecting enzyme activity. Add a note on the properties of enzymes.
- 3) Define enzyme inhibition and discuss the different types of enzyme inhibitions.

CARBOHYDRATE METABOLISM:

- 1) Define glycolysis? Describe the biochemical pathway for the breakdown of glucose to pyruvate and lactate. Write about the energetics.
- 2) Explain the reactions sequence, significance and energetics of TCA cycle.
- 3) Define Gluconeogenesis and explain the reactions involved in it with its significance.
- 4) Explain glycogenesis and glycogenolysis.
- 5) Describe the steps involved in the complete oxidation of glucose to pyruvate under aerobic condition with its energetic.

LIPID METABOLISM

- 1) Describe the biosynthesis of cholesterol. Add a note on the role of cholesterol in the body.

NUCLEIC ACID METABOLISM

- 1) Describe the de novo synthesis of purine nucleotides.
- 2) Explain the metabolic pathway for the biosynthesis of the pyrimidine nucleotides.
- 3) Explain in detail the semiconservative mode of DNA replication.
- 4) Explain in detail about biosynthesis of proteins.

SHORT ESSAY (5 Marks)

Enzymes:

- 1) What are isoenzymes? Describe their diagnostic applications.
- 2) What are coenzymes? Explain the biochemical role and deficiency symptoms of niacin.
- 3) Discuss the biochemical role and deficiency symptoms of vitamin B₂ and B₆.
- 4) Discuss the biochemical role of coenzyme forms of vitamin B₁ and folic acid.
- 5) Discuss the biochemical role and deficiency symptoms of vitamin B₁₂.

CARBOHYDRATE METABOLISM:

- 1) Discuss the glucose tolerance test with its significance.
- 2) Outline the various biochemical reactions involved in HMP shunt pathway and write its significance.
- 3) Discuss the glycogen storage diseases.
- 4) Explain the hormonal regulation of blood glucose level in the body.

Lipid metabolism:

- 1) Explain the β -oxidation of saturated fatty acids. Calculate the ATP generated on complete oxidation of palmitic acid.
- 2) Explain the reactions of palmitate synthesis, starting from acetyl CoA.
- 3) What are ketone bodies? Explain the formation and importance of ketone bodies.
- 4) Describe briefly the synthesis of bile acids. Add a note on enterohepatic circulation of bile salts.

Biological oxidation

- 1) Describe the components of ETC
- 2) What is oxidative phosphorylation? How does it differ from substrate level phosphorylation?
- 3) Explain the chemiosmotic theory of oxidative phosphorylation.

Protein and amino acid metabolism

- 1) Explain the transamination reactions involved in the catabolism of amino acids.
- 2) Explain the deamination reactions involved in the catabolism of amino acids.
- 3) Describe the reactions of urea cycle.
- 4) Explain phenylketonuria and alkaptonuria.
- 5) What are porphoria? Explain the types and clinical manifestations of porphoria.
- 6) Explain the production of bile pigments.
- 7) What is jaundice and explain the different types of jaundice.

NUCLEIC AID METABOLISM

- 1) Define mutation. Explain various types of the same.
- 2) Describe the different DNA repair mechanisms.
- 3) Define genetic code and describe its characteristic features.

KIDNEY FUNCTION TESTS

- 1) List out different kidney function tests Explain any two of them.
- 2) Enlist the tests to assess the renal function? Explain the clearance tests for creatinine and urea.
- 3) Mention the different kidney function tests. Explain in detail any two.
- 4) Write a note on urinary tract calculi.
- 5) Discuss the tests for NPN constituents.
- 6) Add a note on role of kidneys.

LIVER FUNCTION TESTS:

- 1) Discuss the test to assess the metabolic and detoxification capacity of liver.
- 2) Explain any two liver function tests.
- 3) Enlist the different liver function tests. Explain the dye test for excretory function of liver.
- 4) Explain the tests for hepatic dysfunction.
- 5) Write the principle and significance of SGPT and SGOT determination.

LIPID PROFILE TESTS:

- 1) Describe lipid profile tests.
- 2) Name the importance of phospholipids and give their physiological role.
- 3) How will you determine the total cholesterol in serum?
- 4) Add a note on HDL and LDL.
- 5) Write the composition and functions of lipoproteins.

IMMUNOLOGICAL TECHNIQUES

- 1) What is radioimmuno assay? Give its principle and applications.
- 2) What is ELISA? Give its principle and applications.

MEDICINAL BIOCHEMISTRY QUISTION BANK

Short Answers (2marks)

Introduction to Biochemistry

- 1) Write the structure and significance of cyclic AMP
- 2) What are high energy compounds? Give two examples.
- 3) Write the structure and significance of ATP.

ENZYMES

- 1) What are allosteric enzymes? Give two examples.
- 2) Give Michaelis-Menten equation with notations used.
- 3) Give therapeutic uses of any two enzymes.
- 4) What is Line-Weaver Burk plot? Give its significance.
- 5) Define V_{max} and write its significance.
- 6) Define K_m and write its significance.
- 7) What are the two models to explain the active site of enzymes?
- 8) Define enzyme specificity. Give example.
- 9) Define holoenzyme and apoenzyme.

CARBOHYDRATE METABOLISM:

- 1) What is Diabetes mellitus? Mention its types.
- 2) What is the use of malate-aspartate shuttle?
- 3) What is the amphibolic role of TCA cycle?
- 4) What are anaplerotic reactions?
- 5) How many moles of ATPs are formed in glycolysis when the end product is a) Pyruvic acid and b) lactic acid.
- 6) What is galactose tolerance test? Write its significance.
- 7) Name the enzymes and coenzymes present in pyruvate dehydrogenase (PDH) complex.
- 8) Give the significance of HMP shunt.

LIPID METABOLISM

- 1) What is the role carnitine in fatty acid oxidation?
- 2) What is the role of citrate in fatty acid synthesis?
- 3) What is ketosis? Name the two conditions which lead to ketosis.
- 4) What is ketolysis? Give its significance.
- 5) What is the functional significance of fatty acid synthase complex?
- 6) Name three unsaturated fatty acids. Write the structure of one of them.
- 7) Enumerate the functions of unsaturated fatty acids.
- 8) Write the structure of cholesterol. What is the role of cholesterol in our body?

- 9) What are bile salts? Give their importance.
- 10) Name three biologically important compounds derived from the catabolism of cholesterol.
- 11) What is hypercholesterolemia? Name two disorders that result in hypercholesterolemia.
- 12) What are the two measures that can be used to control hypercholesterolemia?
- 13) What is fatty liver? Name the two causes responsible for fatty liver?
- 14) What is atherosclerosis?

BIOLOGICAL OXIDATION

- 1) Enumerate uncouplers of oxidative phosphorylation, write their mechanism of action.
- 2) Name two inhibitors of ETC and their sites of action.
- 3) What is substrate level phosphorylation and oxidative phosphorylation.

PROTEIN AND AMINO ACID METABOLISM

- 1) What are transaminases? Write the diagnostic importance of two transaminases.
- 2) What is the normal blood urea level? Name two conditions in which blood urea level is elevated.
- 3) Name four metabolic disorders of urea cycle with enzyme defect.
- 4) What is maple syrup urine disease? What are its characteristics?
- 5) What is albinism? What are its characteristics?
- 6) What is homocystinuria? What are its characteristics?
- 7) What is jaundice?
- 8) What are bile pigments, name the disease associated with their metabolism.
- 9) What are porphoria?
- 10) Define nitrogen balance and protein turnover.

NUCLEIC ACID METABOLISM

- 1) What are Okazaki fragments?
- 2) What is Gout?
- 3) What are leading and lagging strands?
- 4) What are nucleotides? Name four nucleotides.
- 5) Enumerate the purine and pyrimidine bases present in DNA and RNA.
- 6) What is onion peel model of DNA replication?
- 7) Name two inhibitors of protein synthesis and their site of action.

KIDNEY FUNCTION TESTS:

- 1) What is semi quantitative urine analysis?
- 2) What is urine concentration test? Give its significance.
- 3) What is creatinine clearance test? Give its significance
- 4) What are urinary tract calculi?
- 5) What is urea clearance test? Give its significance.
- 6) Name any four abnormal urine constituents.

LIVER FUNCTION TESTS:

- 1) Give the dye test for excretory function of liver.
- 2) Name the tests to assess hepatic function.
- 3) Give the importance of SGPT and SGOT.
- 4) What is normal serum bilirubin level? Give its significance.
- 5) Give example for bile salt and bile pigments.
- 6) What is dye test for excretory function of liver?

LIPID PROFILE TESTS:

- 1) List out lipid profile tests.
- 2) Differentiate between good and bad cholesterol.
- 3) Differentiate between triglyceride and lipoproteins.
- 4) Write the principle involved in the estimation of cholesterol in serum.
- 5) Write about HDL and LDL
- 6) What is the significance of lipid profiling?

IMMUNOLOGICAL TECHNIQUE:

- 1) What is RIA? Give its significance.
- 2) What is ELISA? Give its significance.

ELECTROLYTES:

- 1) How is the level of sodium determined in the body fluids?
- 2) Enumerate the functions of water.
- 3) How is the level of calcium determined in the body fluids?
- 4) How is the level of chloride determined in the body fluids?
- 5) Define hypokalemia and hyponatremia.
- 6) Write the composition of ORS.
- 7) Name the different fluid compartments in the body.
- 8) What is the role of kidney in water balance?

- 9) What is the role of aldosterone in the regulation of osmolarity?
- 10) What are the causes of water depletion in the body?
- 11) What are the causes of water excess in the body?
- 12) Name the clinical disorders associated with water depletion and water excess?
- 13) Define acidosis and alkalosis.