



Programme: D. Pharm
Course: Biochemistry and Clinical Pathology
Course Code: ER20-23T
Enrolment No: _____

Full Marks: 80
Time: 3 Hrs.

Section I

1. Objective type questions. Answer all questions.

20 x 1 = 20

- i. What type of glycosides linkage is present in lactose?
a. $\alpha(1\rightarrow4)$ b. $\beta(1\rightarrow4)$ c. $\alpha(1\rightarrow2)$ d. $\beta(1\rightarrow2)$
- ii. Which of the following amino acids is nutritionally essential but chemically non-polar?
a. Glycine b. Phenylalanine c. Serine d. Tyrosine
- iii. The secondary structure of proteins is stabilized by:
a. Disulfide bridges b. Hydrogen bonds c. Ionic interactions d. Hydrophobic interactions
- iv. Which qualitative test is used to detect the presence of unsaturation (double bonds) in fatty acids?
a. Salkowski test b. Iodine number test c. Liebermann-Burchard test d. Acrolein test
- v. Which class of enzyme catalyzes the joining of two molecules using ATP?
a. Isomerases b. Ligases c. Hydrolases d. Lyases
- vi. Which of the following enzymes plays a major role in the regulation of blood glucose levels in the fasting state?
a. Glucokinase b. Pyruvate kinase c. Glycogen synthase d. Glucose-6-phosphatase
- vii. Which disorder results from defective homogentisic acid oxidase, leading to black urine?
a. Phenylketonuria b. Alkaptonuria c. Jaundice d. Maple syrup urine disease
- viii. What is the major transport protein for iron in the plasma?
a. Ferritin b. Transferrin c. Hemosiderin d. Ceruloplasmin
- ix. The RDA (Recommended Dietary Allowance) of iron for adult non-pregnant women is approximately:
a. 5 mg/day b. 8 mg/day c. 18 mg/day d. 45 mg/day
- x. Which of the following is NOT a direct application of recombinant DNA technology?
a. Insulin production b. Gene therapy c. Fermentation for ethanol production d. Herbicide-resistant crops
- xi. Which of the following is NOT a major product of industrial biotechnology?
a. Biofuels b. Recombinant vaccines c. Synthetic fibers d. Antibiotics
- xii. Which of the following abnormal erythrocyte shapes is typically seen in sickle cell anemia?
a. Spherocytes b. Target cells c. Crescent-shaped cells d. Elliptocytes
- xiii. Which of the following abnormal urinary constituents indicates kidney damage due to protein leakage?
a. Urobilinogen b. Proteinuria c. Bilirubin d. Hematuria
- xiv. Which pathway utilizes glucose for synthesis of NADPH and pentoses?
a. HMP shunt b. Gluconeogenesis c. Glycolysis d. None of these
- xv. Which of the following minerals plays a critical role in maintaining the resting membrane potential and acid-base balance?
a. Phosphorus b. Iron c. Sodium d. Calcium
- xvi. Presence of ketone bodies in urine is most commonly associated with:
a. Liver cirrhosis b. Diabetes mellitus c. Hemolytic anemia d. Renal calculi
- xvii. Which of the following is NOT normally found in urine under healthy conditions?
a. Urea b. Creatinine c. Glucose d. Uric acid
- xviii. Which of the following is NOT a step in the polymerase chain reaction (PCR)?
a. Denaturation b. Annealing c. Extension d. Translation
- xix. In β -oxidation of palmitic acid (C16), how many acetyl-CoA molecules are produced?
a. 6 b. 7 c. 8 d. 16

xix. An increased number of lymphocytes (lymphocytosis) in a blood smear is most commonly associated with which of the following?

a. Bacterial infection b. Viral infection c. Allergic reaction d. Hemolytic anemia

xx. Which of the following is not a role of glycogen metabolism?

a. Energy storage b. Maintaining blood glucose levels c. Synthesis of proteins d. Rapid glucose supply

Section II

2. Short Answer type questions. Answer any ten.

10 x 3 = 30

- a. Explain qualitative tests of Proteins & Lipids.
- b. Classify the Enzymes on the basis of IUB.
- c. Explain Michaelis- Menten & Briggs- Haldane Classification.
- d. What is Watson & Crick Model? Draw its Structure.
- e. Mention the source, requirements, functions & deficiency disease of any two Vitamins
- f. Draw the structure & mention the functions of Cholesterol.
- g. Give a brief description on the History of Bio-Technology.
- h. Write Short note on followings:
 - i. Glycogen Metabolism (with structure) ii. Blood Glucose level (with Flow Chart).
- i. Discuss the key steps involved in the catalytic mechanism of enzymes.
- j. Write short note on Water Turnover & Balance.
- k. What are the Chemical Properties of Monosaccharides?

Section III

3. Long Answer type questions. Answer any six.

6 x 5 = 30

- a. Explain Amino Acid Metabolism.
- b. Explain abnormalities present in Erythrocytes in detail.
- c. Elaborate the chemical nature of Starch & Glycogen.
- d. Discuss the electron transport chain (ETC) and oxidative phosphorylation.
- e. Describe the biochemical tests used for the identification of carbohydrates, proteins, and lipids.
- f. Explain the modes of Enzyme action.
- g. Elaborate the chemical nature of Starch & Glycogen.
