

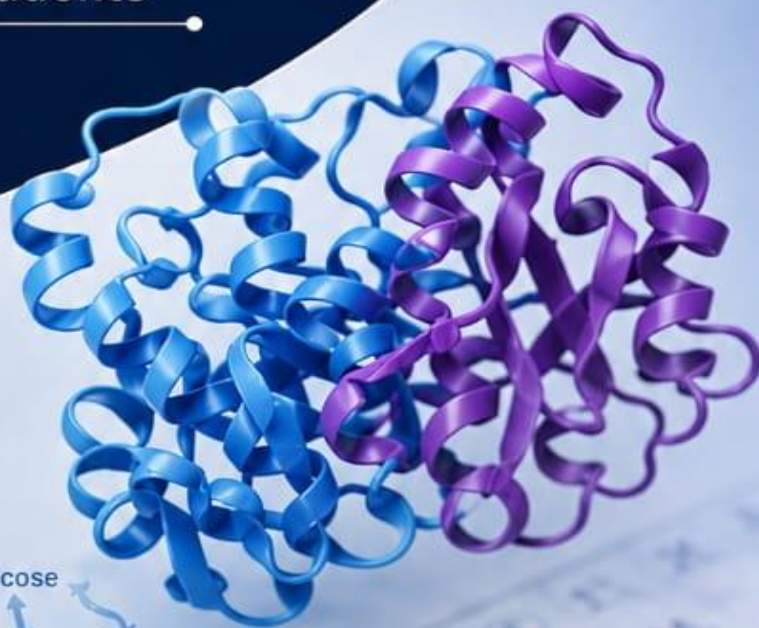
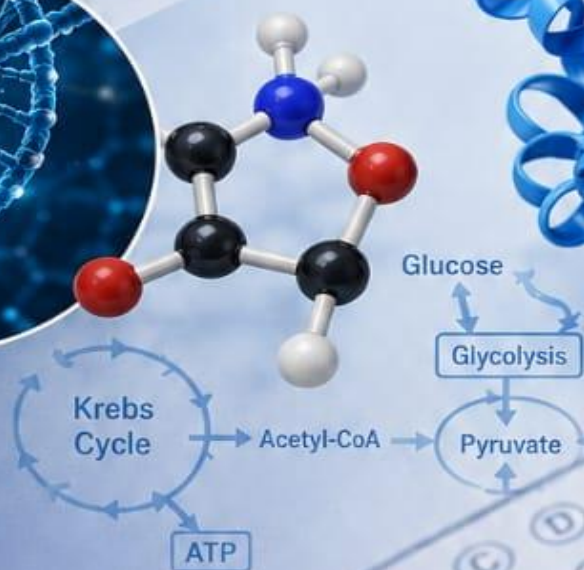
Reviewed

Multiple Choice Questions in Biochemistry

for D. Pharm and B. Pharm Students

Editor

Sarabjit Kaur



Reviewed Multiple Choice Questions in Biochemistry for D. Pharm and B. Pharm Students

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Preface

Biochemistry forms the molecular foundation of pharmaceutical sciences by explaining the chemical processes that govern life and health. A thorough understanding of biochemical principles is essential for students of Diploma in Pharmacy (D. Pharm) and Bachelor of Pharmacy (B. Pharm), as these concepts underpin subjects such as pharmacology, medicinal chemistry, pharmacotherapeutics, clinical pharmacy, and pathology. Developing a strong command of biochemistry is therefore indispensable for academic success and professional competence.

Reviewed Multiple Choice Questions in Biochemistry for D. Pharm and B. Pharm Students has been designed to serve as a comprehensive self-assessment and examination preparation resource aligned with the latest pharmacy curricula. The book presents a wide range of carefully selected multiple-choice questions that cover the fundamental and applied aspects of biochemistry, enabling students to evaluate their conceptual understanding while strengthening problem-solving skills.

The contents encompass major topics including the chemistry of biomolecules, enzymes, vitamins, minerals, carbohydrates, proteins, lipids, nucleic acids, bioenergetics, metabolism, molecular biology, clinical biochemistry, nutrition, acid-base balance, and other core areas relevant to pharmaceutical education. The questions have been organized systematically to facilitate progressive learning and effective revision.

This book is intended not only for semester and university examinations but also for competitive examinations, entrance tests, and recruitment examinations in pharmaceutical and allied health sciences. By practicing these questions, students can improve their analytical thinking, accuracy, confidence, and time-management skills.

Every effort has been made to ensure the accuracy, clarity, and relevance of the material presented. Nevertheless, constructive suggestions from teachers, students, and readers will be sincerely welcomed and highly appreciated for improving future editions of this book.

It is hoped that this book will prove to be a valuable companion for pharmacy students, teachers, and aspirants seeking a concise yet comprehensive review of biochemistry through multiple-choice questions.

- Sarabjit Kaur

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I am deeply thankful to my teachers, mentors, and colleagues for their invaluable guidance, constructive suggestions, and continuous encouragement throughout the development of this book. Their academic insights and professional expertise have been a constant source of inspiration.

I extend my heartfelt appreciation to the students of D. Pharm and B. Pharm programs, whose enthusiasm for learning and inquisitive approach inspired the preparation of this comprehensive collection of multiple-choice questions. Their academic needs have been the primary motivation behind this endeavor.

I also acknowledge the support of **Mantra Publication** for providing the opportunity and encouragement to publish this book. Their professional assistance and commitment to quality publishing are sincerely appreciated.

Finally, I express my deepest gratitude to my family for their unwavering love, patience, understanding, and constant encouragement throughout the writing process. Their support has been invaluable and remains the foundation of all my academic pursuits.

I hope this book serves as a useful resource for students, teachers, and pharmacy professionals in strengthening their understanding of biochemistry and achieving academic excellence.

- **Sarabjit Kaur**

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MCQ OF BIOCHEMISTRY**CHAPTER 1: NUCLEIC ACID**

1. Nucleic acids combine with which biomolecule?

- (a) Fats
- (b) Lipids
- (c) Carbohydrates
- (d) Proteins

Answer (d) Proteins

2. Nucleotides are linked together to form nucleic acid through

- (a) Glycosidic bond
- (b) Phosphor-di-ester bond
- (c) Both
- (d) None

Answer (b) Phosphor-di-ester bond

3. Nucleotides have how many components?

- (a) 2
- (b) 3
- (c) 4
- (d) 5

Answer (c) 4

4. The compound does not contain the phosphate group, is

- (a) Nucleotide
- (b) Nucleoside
- (c) Both
- (d) None

Answer (b) Nucleoside

5. Which of the following is purine nucleotide?

- (a) Adenine
- (b) Uracil

- (c) Thymine
- (d) All of the above

Answer (a) Adenine

6. Which of the following is pyrimidine nucleotide?

- (a) Uracil
- (b) Cytosine
- (c) Thymine
- (d) All of the above

Answer (d) All of the above

7. RNA doesn't have

- (a) Uracil
- (b) Adenine
- (c) Thymine
- (d) Guanine

Answer (c) Thymine

8. Where is RNA present?

- (a) Mitochondria
- (b) Nucleolus
- (c) Cytoplasm
- (d) Both B and C

Answer (d) Both B and C

9. Phosphate group is attached to which carbon of pentose sugar

- (a) C-1
- (b) C-2
- (c) C-4
- (d) C-5

Answer (d) C-5

10. What is the full form of AMP?

- (a) Adenine mini-phosphate
- (b) Aldehyde mono-phosphate

(c) Alcohol mono-phosphate

(d) None of the above

Answer (d) None of the above

11. Which of the following protein is the component of nucleoprotein?

(a) Proline

(b) Arginine

(c) Histones

(d) All of the above

Answer (c) Histones

12. Number of hydrogen bonds between adenine and thymine?

(a) 1

(b) 2

(c) 3

(d) 4

Answer (b) 2

13. Number of hydrogen bonds between guanine and cytosine?

(a) 1

(b) 2

(c) 3

(d) 4

Answer (c) 3

14. Which ratio is constant for DNA?

(a) $A + G / T + C$

(b) $A + T / G + C$

(c) $A + C / U + G$

(d) $A + U / G + C$

Answer (a) $A + G / T + C$

15. The disruption of nucleosomal structure is due to

(a) Acetylation

(b) Carboxylation

(c) Phosphorylation

(d) Methylation

Answer (d) Methylation

16. Left handed helix contained nucleic acid is

(a) M-RNA

(b) T-RNA

(c) A-DNA

(d) Z-DNA

Answer (d) Z-DNA

17. A phosphodiester bond is present in

(a) Nucleic acids in a nucleotide

(b) Monosaccharide in a polysaccharide

(c) Amino acids in a polypeptide

(d) Fatty acids in a diglyceride

Answer (a) Nucleic acids in a nucleotide

18. Uridine present in RNA is

(a) Nucleotides

(b) Pyrimidine

(c) Purine

(d) Nucleoside

Answer (d) Nucleoside

19. Nucleic acids are a polymer of nucleotide monomeric units. Each nucleotide consists of

(a) base-sugar-OH

(b) sugar-phosphate

(c) base-sugar-phosphate

(d) (base-sugar-phosphate)_x

Answer (c) base-sugar-phosphate

20. No. of nucleotide found in DNA segment if it contains 100 Adenine and 100 cytosines,

(a) 100

(b) 200

(c) 400

(d) 50

Answer (c) 400

21. Nucleoside contains

(a) base- sugar

(b) base-phosphate

(c) base-sugar-phosphate

(d) sugar-phosphate

Answer (a) base-sugar

22. ATP is a

(a) Nucleoside

(b) Nucleotide

(c) Vitamin

(d) Nucleic acid

Answer (b) Nucleotide

23. In nucleic acid the bond between the phosphate and hydroxyl group of sugar is

(a) Hydrogen bond

(b) Glycosidic bond

(c) Ester bond

(d) Peptide bond

Answer Ester bond

24. Which of the following represents uridylic acid?

(a) Uracil + Ribose

(b) Uridine + Phosphoric acid

(c) Uracil + Phosphoric acid

(d) Uridine + Ribose + Phosphoric acid

Answer (b) Uridine + Phosphoric acid

25. C' represents carbon of

(a) Sugar of nucleotides

(b) Nitrogenous bases of nucleotide

- (c) Both 1 and 2
- (d) None of the above

Answer (a) Sugar of nucleotides

26. A nucleoside consists of

- (A) Nitrogenous base
- (B) Purine or pyrimidine base + sugar
- (C) Purine or pyrimidine base + phosphorous
- (D) Purine + pyrimidine base + sugar + phosphorous

Answer (B) Purine or pyrimidine base + sugar

27. A nucleotide consists of

- (A) A nitrogenous base like choline
- (B) Purine + pyrimidine base + sugar +phosphorous
- (C) Purine or pyrimidine base + sugar
- (D) Purine or pyrimidine base + phosphorous

Answer (B) Purine + pyrimidine base + sugar +phosphorous

28. A purine nucleotide is

- (A) AMP
- (B) UMP
- (C) CMP
- (D) TMP

Answer (A) AMP

29. A pyrimidine nucleotide is

- (A) GMP
- (B) AMP
- (C) CMP
- (D) IMP

Answer (C) CMP

30. Adenine is

- (A) 6-Amino purine
- (B) 2-Amino-6-oxypurine

(C) 2-Oxy-4-aminopyrimidine

(D) 2, 4-Dioxypyrimidine

Answer (A) 6-Amino purine

31. Identify the complementary strand of the DNA primary structure ATGCCGATC.

(A) AUGCCGAUC

(B) TACGGCTAG

(C) UACGGCUAG

(D) GATCGGCAT

Answer (B) TACGGCTAG

32. Nucleotides are linked together by bonds between 5' and 2' carbons of two different pentose sugars.

(A) True

(B) False

Answer (B) False

33. The nitrogenous base present in the RNA molecule is

(A) Thymine

(B) Uracil

(C) Xanthine

(D) Hypoxanthine

Answer (B) Uracil

34. RNA does not contain

(A) Uracil

(B) Adenine

(C) Thymine

(D) Ribose

Answer (C) Thymine

35. The sugar moiety present in RNA is

(A) Ribulose

(B) Arabinose

(C) Ribose

(D) Deoxyribose

Answer (C) Ribose

36. In RNA molecule

(A) Guanine content equals cytosine

(B) Adenine content equals uracil

(C) Adenine content equals guanine

(D) Guanine content does not necessarily equal its cytosine content.

Answer (D) Guanine content does not necessarily equal its cytosine content.

CHAPTER 2: PROTEINS

1. One gram of protein contains

- (a) 4.3 kcal
- (b) 4.2 kcal
- (c) 5.2 kcal
- (d) 5.4 kcal

Answer (b) 4.2 kcal

2. The first class of proteins are

- (a) Animal proteins
- (b) Plant proteins
- (c) Both
- (d) None

Answer (a) Animal proteins

3. Proteins occur naturally in how many forms?

- (a) 25
- (b) 20
- (c) 21
- (d) 15

Answer (b) 20

4. Peptide bond formed by the enzymes is known as

- (a) Carbonic anhydrase
- (b) Peptidase
- (c) Carbohydrate
- (d) Peptidyl transferase

Answer (d) Peptidyl transferase

5. The proteins are synthesized at

- (a) Centrosomes
- (b) Ribosomes
- (c) Golgi bodies
- (d) Mitochondria

Answer (b) Ribosomes

6. Most abundant Protein is found in

- (a) Cytoplasm
- (b) Liver
- (c) Mitochondria
- (d) Brain

Answer (a) Cytoplasm

7. Which proteins are called messenger protein?

- (a) Enzymes
- (b) Hormones
- (c) Storage
- (d) Antibodies

Answer (b) Hormones

8. Proteins that helps in increasing the rate of chemical reaction in the body

- (a) Enzymes
- (b) Antibody
- (c) Structural proteins
- (d) Transport proteins

Answer (a) Enzymes

9. Example of a digestive enzyme

- (a) Lactase
- (b) Pepsin
- (c) Keratin
- (d) Collagen

Answer (b) Pepsin

10. In milk which enzymes break down sugar lactose

- (a) Keratin
- (b) Collagen
- (c) Lactase
- (d) None of these

Answer (c) Lactase

11. The protein helps to protect from any diseases in the body

- (a) Antibodies
- (b) Enzymes
- (c) Storage proteins
- (d) Transport proteins

Answer (a) Antibodies

12. Which proteins are called transport proteins?

- (a) Ovalbumin
- (b) Hemoglobin
- (c) Keratin
- (d) Enzymes

Answer (b) Hemoglobin

13. The protein that stores the iron in the transport protein is

- (a) Ferritin
- (b) Keratins
- (c) Elastin
- (d) None of these

Answer (a) Ferritin

14. Which protein is found in egg whites?

- (a) Collagens
- (b) Casein
- (c) Ovalbumin
- (d) Oxytocin

Answer (c) Ovalbumin

15. Proteins are synthesized in the body through

- (a) Translation
- (b) Transcription
- (c) Both
- (d) None of these

Answer (a) Translation

16. Translation occurs in the

- (a) Cytoplasm
- (b) Mitochondria
- (c) Ribosomes
- (d) Nucleus

Answer (a) Cytoplasm

17. Enzymes are

- (a) Proteins
- (b) Carbohydrates
- (c) Nucleic acids
- (d) DNA molecules

Answer (a) Proteins

18. Amino acids are

- (a) Building blocks of carbohydrates
- (b) Building blocks of DNA
- (c) Building blocks of lipids
- (d) Building blocks of proteins

Answer (d) Building blocks of proteins

19. The simplest amino acid is

- (a) Proline
- (b) Methionine
- (c) Glycine
- (d) Serine

Answer (c) Glycine

20. The numbers of amino acid synthesized in our body

- (a) 20
- (b) 30
- (c) 40

(d) 10

Answer (d) 10

21. The result of extreme lack of proteins is

- (a) Malaria
- (b) Typhoid
- (c) Kwashiorkor
- (d) None of these

Answer (c) Kwashiorkor

22. In hair the protein found is

- (a) Elastin
- (b) Myosin
- (c) Keratin
- (d) Tropocollage

Answer (c) Keratin

23. Proteins are soluble in

- (a) Benzene
- (b) Anhydrous acetone
- (c) Aqueous alcohol
- (d) Anhydrous alcohol

Answer (c) Aqueous alcohol

24. The milk of the cow, contain which protein

- (a) Albumin
- (b) Vitelline
- (c) Livetin
- (d) Casein

Answer (d) Casein

25. Which is not a food nutrient?

- (a) Carbohydrates
- (b) Vitamins

(c) Proteins

(d) Enzymes

Answer (d) Enzyme

26. A drug which prevents uric acid synthesis by inhibiting the enzyme Xanthine oxidase is

(A) Aspirin

(B) Allopurinol

(C) Colchicine

(D) Probenecid

Answer (b) Allopurinol

27. Which of the following is required for crystallization and storage of the hormone insulin?

(A) Mn^{++}

(B) Mg^{++}

(C) Ca^{++}

(D) Zn^{++}

Answer (d) Zn^{++}

28. Oxidation of which substance in the body yields the most calories

(A) Glucose

(B) Glycogen

(C) Protein

(D) Lipids

Answer (d) Lipids

29. Milk is deficient in which vitamins?

(A) Vitamin C

(B) Vitamin A

(C) Vitamin B2

(D) Vitamin K

Answer (a) Vitamin C

30. Milk is deficient of which mineral?

(A) Phosphorus

(B) Sodium

- (C) Iron
- D) Potassium

Answer (c) Iron

31. Synthesis of prostaglandins is inhibited by

- (A) Aspirin
- (B) Arsenic
- (C) Fluoride
- (D) Cyanide

Answer (a) Aspirin

32. HDL is synthesized and secreted from

- (A) Pancreas
- (B) Liver
- (C) Kidney
- (D) Muscle

Answer (b) Liver

33. Which are the cholesterol esters that enter cells through the receptor-mediated endocytosis of lipoproteins hydrolyzed?

- (A) Endoplasmic reticulum
- (B) Lysosomes
- (C) Plasma membrane receptor
- (D) Mitochondria

Answer (b) Lysosomes

34. Which of the following phospholipids is localized to a greater extent in the outer leaflet of the membrane lipid bilayer?

- (A) Choline phosphoglycerides
- (B) Ethanolamine phosphoglycerides
- (C) Inositol phosphoglycerides

(D) Serine phosphoglycerides

Answer (a) Choline phosphoglycerides

35. All the following processes occur rapidly in the membrane lipid bilayer except

- (A) Flexing of fatty acyl chains
- (B) Lateral diffusion of phospholipids
- (C) Transbilayer diffusion of phospholipids
- (D) Rotation of phospholipids around their long axes

Answer (c) Transbilayer diffusion of phospholipids

36. Which of the following statement is correct about membrane cholesterol?

- (A) The hydroxyl group is located near the centre of the lipid layer
- (B) Most of the cholesterol is in the form of a cholesterol ester
- (C) The steroid nucleus form forms a rigid, planar structure
- (D) The hydrocarbon chain of cholesterol projects into the extracellular fluid

Answer (c) The steroid nucleus form forms a rigid, planar structure

37. Which one is the heaviest particulate component of the cell?

- (A) Nucleus
- (B) Mitochondria
- (C) Cytoplasm
- (D) Golgi apparatus

Answer (a) Nucleus

38. Which one is the largest particulate of the cytoplasm?

- (A) Lysosomes
- (B) Mitochondria
- (C) Golgi apparatus
- (D) Endoplasmic reticulum

Answer (b) Mitochondria

39. The degradative Processes are categorized under the heading of

- (A) Anabolism
- (B) Catabolism
- (C) Metabolism
- (D) None of the above

Answer (b) Catabolism

40. The exchange of material takes place

- (A) Only by diffusion
- (B) Only by active transport
- (C) Only by pinocytosis
- (D) All of these

Answer (d) All of these

41. The average pH of Urine is

- (A) 7.0
- (B) 6.0
- (C) 8.0
- (D) 3.0

Answer (b) 6.0

42. The pH of blood is 7.4 when the ratio between H_2CO_3 and NaHCO_3 is

- (A) 1 : 10
- (B) 1 : 20
- (C) 1 : 25
- (D) 1 : 30

Answer (b) 1:20

43. The phenomenon of osmosis is opposite to that of

- (A) Diffusion
- (B) Effusion
- (C) Affusion
- (D) Coagulation

Answer (a) Diffusion

44. The surface tension in intestinal lumen between fat droplets and aqueous medium is decreased by

- (A) Bile Salts
- (B) Bile acids
- (C) Conc. H₂SO₄
- (D) Acetic acid

Answer (a) Bile salts

45. Which of the following is located in the mitochondria?

- (A) Cytochrome oxidase
- (B) Succinate dehydrogenase
- (C) Dihydrolipoyl dehydrogenase
- (D) All of these

Answer (d) All of these

46. The most active site of protein synthesis is the

- (A) Nucleus
- (B) Ribosome
- (C) Mitochondrion
- (D) Cell sap

Answer (b) Ribosome

47. The fatty acids can be transported into and out of mitochondria through

- (A) Active transport
- (B) Facilitated transfer
- (C) Non-facilitated transfer
- (D) None of these

Answer (b) Facilitated transfer

48. Mitochondrial DNA is

- (A) Circular double stranded
- (B) Circular single stranded
- (C) Linear double helix
- (D) None of these

Answer (a) Circular double stranded

49. The absorption of intact protein from the gut in the foetal and newborn animals takes place by

- (A) Pinocytosis
- (B) Passive diffusion
- (C) Simple diffusion
- (D) Active transport

Answer (a) Pinocytosis

50. The cellular organelles called “suicide bags” are

- (A) Lysosomes
- (B) Ribosome's
- (C) Nucleolus
- (D) Golgi's bodies

Answer (a) Lysosomes

51. From the biological viewpoint, solutions can be grouped into

- (A) Isotonic solution
- (B) Hypotonic solutions
- (C) Hypertonic solution
- (D) All of these

Answer (d) All of these

52. Bulk transport across cell membrane is accomplished by

- (A) Phagocytosis
- (B) Pinocytosis
- (C) Extrusion
- (D) All of these

Answer (d) All of these

53. The ability of the cell membrane to act as a selective barrier depends upon

- (A) The lipid composition of the membrane
- (B) The pores which allows small molecules
- (C) The special mediated transport systems

(D) All of these

Answer (d) All of these

54. Carrier protein can

(A) Transport only one substance

(B) Transport more than one substance

(C) Exchange one substance to another

(D) Perform all of these functions

Answer (d) All of these

55. A lipid bilayer is permeable to

(A) Urea

(B) Fructose

(C) Glucose

(D) Potassium

Answer (a) Urea

56. The Golgi complex

(A) Synthesizes proteins

(B) Produces ATP

(C) Provides a pathway for transporting chemicals

(D) Forms glycoprotein's

Answer (d) Forms glycoproteins

57. The following points about microfilaments are true except

(A) They form cytoskeleton with microtubules

(B) They provide support and shape

(C) They form intracellular conducting channels

(D) They are involved in muscle cell contraction

Answer (c) They form intracellular conducting channels

58. The following substances are cell inclusions except

(A) Melanin

(B) Glycogen

(C) Lipids

(D) Centrosome

Answer (d) Centrosome

59. Fatty acids can be transported into and out of cell membrane by

(A) Active transport

(B) Facilitated transport

(C) Diffusion

(D) Osmosis

Answer (b) Facilitated transport

60. Enzymes catalyzing electron transport are present mainly in the

(A) Ribosome

(B) Endoplasmic reticulum

(C) Lysosomes

(D) Inner mitochondrial membrane

Answer (d) Inner mitochondrial membrane

61. Mature erythrocytes do not contain

(A) Glycolytic enzymes

(B) HMP shunt enzymes

(C) Pyridine nucleotide

(D) ATP

Answer (c) Pyridine nucleotide

62. In mammalian cells rRNA is produced mainly in the

(A) Endoplasmic reticulum

(B) Ribosome

(C) Nucleolus

(D) Nucleus

Answer (c) Nucleolus

63. Genetic information of nuclear DNA is transmitted to the site of protein synthesis by

(A) rRNA

(B) mRNA

(C) tRNA

(D) Polyosomes

Answer (d) Polyosomes

64. The power house of the cell is

(A) Nucleus

(B) Cell membrane

(C) Mitochondria

(D) Lysosomes

Answer (c) Mitochondria

65. The digestive enzymes of cellular compounds are confined to

(A) Lysosomes

(B) Ribosome

(C) Peroxisomes

(D) Polyosomes.

Answer (a) Lysosomes

CHAPTER 3: CARBOHYDRATES

1 .The general formula of monosaccharides is

(A) $C_nH_{2n}O_n$

(B) $C_{2n}H_{2n}O_n$

(C) $C_nH_{2n}O_{2n}$

(D) $C_nH_{2n}O_{2n}$

Answer (a) $C_nH_{2n}O_n$

2. Epimers of glucose is

(A) Fructose

(B) Galactose

(C) Ribose

(D) Deoxyribose

Answer (a) Fructose

3. On boiling Benedict's solution is not reduced by

(A) Sucrose

(B) Lactose

(C) Maltose

(D) Fructose

Answer (a) Sucrose

4. Human heart muscle contains

(A) D-Arabinose

(B) D-Ribose

(C) D-Xylose

(D) L-Xylose

Answer (c) D-Xylose

5. The carbohydrate reserved in human body is

(A) Starch

- (B) Glucose
- (C) Glycogen
- (D) Inulin

Answer (c) Glycogen

6. The distinguishing test between monosaccharides and disaccharide is

- (A) Bial's test
- (B) Seliwanoff's test
- (C) Barfoed's test
- (D) Hydrolysis test

Answer (C) Barfoed's test

7. Barfoed's solution is not reduced by

- (A) Glucose
- (B) Mannose
- (C) Sucrose
- (D) Ribose

Answer (c) Sucrose

8. Reduction of Glucose with Ca^{++} in water produces

- (A) Sorbitol
- (B) Dulcitol
- (C) Mannitol
- (D) Glucuronic acid

Answer (a) Sorbitol

9. Which one of the following statements concerning glucose metabolism is correct?

- (A) The conversion of Glucose to lactate occurs only in the R.B.C
- (B) Glucose enters most cells by a mechanism in which Na^+ and glucose are co-transported
- (C) Pyruvate kinase catalyses an irreversible reaction

(D) An elevated level of insulin leads to a decreased level of fructose 2, 6-bisphosphate in hepatocyte

Answer (c) Pyruvate kinase catalyses an irreversible reaction

10. The monosaccharide units are linked by 1 - 4 glycosidic linkage in

- (A) Maltose
- (B) Sucrose
- (C) Cellulose
- (D) Cellobiose

Answer (a) Maltose

11. Which of the following is a non-reducing sugar?

- (A) Isomaltose
- (B) Maltose
- (C) Lactose
- (D) Trehalose

Answer (d) Trehalose

12. Which of the following is a reducing sugar?

- (A) Sucrose
- (B) Trehalose
- (C) Isomaltose
- (D) Agar

Answer (c) Isomaltose

13. The carbohydrate of the blood group substances is

- (A) Sucrose
- (B) Fructose
- (C) Arabinose
- (D) Maltose

Answer (b) Fructose

14. The sugar found in DNA is

- (A) Xylose
- (B) Ribose
- (C) Deoxyribose
- (D) Ribulose

Answer (c) Deoxyribose

15. The sugar found in RNA is

- (A) Ribose
- (B) Deoxyribose
- (C) Ribulose
- (D) Erythrose

Answer (a) Ribose

16. The sugar found in milk is

- (A) Galactose
- (B) Glucose
- (C) Fructose
- (D) Lactose

Answer (d) Lactose

17. Mutarotation refers to change in

- (A) pH
- (B) Optical rotation
- (C) Conductance
- (D) Chemical properties

Answer (b) Optical rotation

18. The most abundant carbohydrate found in nature is

- (A) Starch
- (B) Glycogen

(C) Cellulose

(D) Chitin

Answer (c) Cellulose

19. Starch is a

(A) Polysaccharide

(B) Monosaccharide

(C) Disaccharide

(D) Oligosaccharide

Answer (a) Polysaccharide

20. A carbohydrate, commonly known as dextrose is

(A) Dextrin

(B) D-Fructose

(C) D-Glucose

(D) Glycogen

Answer (c) D-Glucose

21. Number of stereoisomer's of glucose is

(A) 4

(B) 8

(C) 16

(D) None of these

Answer (c) 16

22. Hyaluronic acid is found in

(A) Joints

(B) Brain

(C) Abdomen

(D) Mouth

Answer (a) Joints

23. Iodine gives a red colour with

- (A) Starch
- (B) Dextrin
- (C) Glycogen
- (D) Inulin

Answer (c) Glycogen

24. Fructose-2, 6-biphosphate is formed by the action of

- (A) Phosphofructokinase-1
- (B) Phosphofructokinase-2
- (C) Fructose biphosphate isomerase
- (D) Fructose-1, 6-biphosphatase

Answer (b) Phosphofructokinase-2

25. An amphibolic pathway among the following is

- (A) HMP shunt
- (B) Glycolysis
- (C) Citric acid cycle
- (D) Gluconeogenesis

Answer (c) Citric acid cycle

26. Excessive intake of ethanol increases the ratio:

- (A) NADH : NAD⁺
- (B) NAD⁺ : NADH
- (C) FADH₂ : FAD
- (D) FAD : FADH₂

Answer (a) NADH : NAD⁺

27. Worldwide, the most common vitamin deficiency is that of

- (A) Ascorbic acid
- (B) Folic acid

(C) Vitamin A

(D) Vitamin D

Answer (b) Folic acid

28. The carrier of the citric acid cycle is

(A) Succinate

(B) Fumarate

(C) Malate

(D) Oxaloacetate

Answer (d) Oxaloacetate

29. The purple ring of Molisch reaction is due to

(A) Furfural

(B) Furfural + α Naphthol

(C) $^{\circ}\text{C}$ Naphthol

(D) Furfural + H_2SO_4 + α -Naphthol

Answer (b) Furfural + α Naphthol

30. One of the following enzymes does not change glycogen synthase a to b.

(A) Glycogen synthase kinases 3, 4, 5

(B) Ca^{2+} calmodulin phosphorylase kinase

(C) Ca^{2+} calmodulin dependent protein kinase

(D) Glycogen phosphorylase

Answer (d) Glycogen phosphorylase

31. Specific test for ketohexoses:

(A) Seliwanoff's test

(B) Osazone test

(C) Molisch test

(D) None of these

Answer (a) Seliwanoff's test

32. Under anaerobic conditions the glycolysis of one mole of glucose yields ___ moles of ATP.

- (A) One
- (B) Two
- (C) Eight
- (D) Thirty

Answer (b) Two

33. Conversion of glucose to glucose-6-phosphate in human liver is by

- (A) Hexokinase only
- (B) Glucokinase only
- (C) Hexokinase and glucokinase
- (D) Glucose-6-phosphate dehydrogenase

Answer (c) Hexokinase and glucokinase

34. The normal glucose tolerance curve reaches peak at

- (A) 15 min
- (B) 1 hr
- (C) 2 hrs
- (D) 2 ½ hrs

Answer (b) 1hr

35. The 4 rate limiting enzymes of gluconeogenesis are

- (A) Glucokinase, Pyruvate carboxylase, phosphoenolpyruvate carboxykinase and glucose-6-phosphatase
- (B) Pyruvate carboxylase, phosphoenolpyruvate carboxykinase, fructose-1,6 diphosphatase and glucose-6-phosphatase
- (C) Pyruvate kinase, pyruvate carboxylase, phosphoenolpyruvate carboxykinase and glucose-6-phosphatase
- (D) Phosphofructokinase, pyruvate carboxylase, phosphoenolpyruvate carboxykinase and fructose-1,6 diphosphatase

Answer (b) Pyruvate carboxylase, phosphoenolpyruvate carboxykinase, fructose-1,6 diphosphatase and glucose-6-phosphatase

36. Fluoride inhibits _____ and arrests glycolysis.

- (A) Glyceraldehyde-3-phosphate dehydrogenase
- (B) Aconitase
- (C) Enolase
- (D) Succinate dehydrogenase

Answer (c) Enolase

37. Before pyruvic acid enters the TCA cycle it must be converted to

- (A) Acetyl CoA
- (B) Lactate
- (C) α -ketoglutarate
- (D) Citrate

Answer (a) Acetyl CoA

38. Acetyl CoA is not used for the synthesis of

- (A) Fatty acid
- (B) Cholesterol
- (C) Pyruvic acid
- (D) Citric acid

Answer (c) Pyruvic acid

39. Which one of the following cannot convert glucose to Vitamin C?

- (A) Albino rats
- (B) Dogs
- (C) Monkeys
- (D) Cows

Answer (c) Monkeys

40. Which of the following statements regarding T.C.A cycle is true?

- (A) It is an anaerobic process
- (B) It occurs in cytosol

(C) It contains no intermediates for Gluconeogenesis

(D) It is amphibolic in nature

Answer (d) It is amphibolic in nature

41. Electron transport and phosphorylation can be uncoupled by compounds that increase the permeability of the inner mitochondrial membrane to

(A) Electrons

(B) Protons

(C) Uncouplers

(D) All of these

Answer (b) Protons

42. The transport of a pair of electrons from NADH to O₂ via the electron transport chain produces

(A) -52,580 cal

(B) -50,580 cal

(C) 21,900 cal

(D) +52,580 cal

Answer (d) +52,580 cal

43. Pasteur effect is

(A) Inhibition of glycolysis

(B) Oxygen is involved

(C) Inhibition of enzyme phosphofructokinase

(D) All of these

Answer (d) All of these

44. D-Mannose is present in some plant products like

(A) Resins

(B) Pectins

(C) Mucilage

(D) Gums

Answer (d) Gums

45. The polysaccharide used in assessing the glomerular filtration rate (GFR) is

(A) Glycogen

(B) Agar

(C) Inulin

(D) Hyaluronic acid

Answer (c) Inulin

46. N-Acetylglucosamine is present in

(A) Hyaluronic acid

(B) Chondroitin sulphate

(C) Heparin

(D) All of these

Answer (a) Hyaluronic acid

47. The smallest monosaccharide having furanose ring structure is

(A) Erythrose

(B) Ribose

(C) Glucose

(D) Fructose

Answer (b) Ribose

48. Which of the following is an epimeric pair?

(A) Glucose and fructose

(B) Glucose and galactose

(C) Galactose and mannose

(D) Lactose and maltose

Answer (b) Glucose and Galactose

49. McArdle's disease is due to the deficiency of

- (A) Glucose-6-phosphatase
- (B) Phosphofructokinase
- (C) Liver phosphorylase
- (D) muscle phosphorylase

Answer (d) muscle phosphorylase

50. Tautomerisation is

- (A) Shift of hydrogen
- (B) Shift of carbon
- (C) Shift of both
- (D) None of these

Answer (d) None of these

CHAPTER 4- PROTEIN METABOLISM

1. Proteins contain

- (A) Only L- α - amino acids
- (B) Only D-amino acids
- (C) DL-Amino acids
- (D) Both (A) and (B)

Answer

2. Peptide bond is a _____

- a) Covalent bond
- b) Ionic bond
- c) Metallic bond
- d) Hydrogen bond

Answer (a) Covalent bond

3. A tri-peptide has _____

- a) 3 amino acids and 1 peptide bond
- b) 3 amino acids and 2 peptide bonds
- c) 3 amino acids and 3 peptide bonds
- d) 3 amino acids and 4 peptide bonds

Answer (b) 3 amino acids and 2 peptide bonds

4. Which of the following is a 39-residue hormone of the anterior pituitary gland?

- a) Corticotropin
- b) Glucagon
- c) Insulin
- d) Bradykinin

Answer (a) Corticotropin

5. A mutation has changed an isoleucine residue of a protein to Glutamic acid, which statement best describes its location in a hydrophilic exterior

- a) On the surface since it is hydrophilic in nature
- b) In side the core of the protein since it is hydrophobic in nature

- c) Any where inside or outside
- d) Inside the core of protein since it has a polar but uncharged side chain

Answer (a) On the surface since it is hydrophilic in nature

6- Glycine and proline are the most abundant amino acids in the structure of

- a) Hemoglobin
- b) Myoglobin
- c) Insulin
- d) Collagen

Answer (d) Collagen

7. Some proteins contain additional amino acids that arise by modification of an amino acid already present in a peptide, examples include

- a) 4 -hydroxy proline
- b) 5- hydroxy Lysine
- c) Gamma Amino Butyric Acid
- d) All of the above

Answer (d) All of the above

8. Choose the incorrect statement out of the followings

- a) Only L amino acids are found in the biological system
- b) Glycine is optical inactive
- c) Tyrosine is a modified amino acid
- d) Selenocysteine is 21st amino acid

Answer (c) Tyrosine is a modified amino acid

9. Choose a nano peptide out of the followings

- a) Oxytocin
- b) Vasopressin
- c) Bradykinin

d) All of the above

Answer (d) All of the above

10. Which out of the following amino acids carries a net positive charge at the physiological pH?

- a) Valine
- b) Leucine
- c) Isoleucine
- d) None of the followings

Answer (d) None of the following

11- Which out of the following amino acids is a precursor for a mediator of allergies and inflammation?

- a) Histidine
- b) Tyrosine
- c) Phenyl Alanine
- d) Tryptophan

Answer (a) Histidine

12- All of the following amino acids are both glucogenic as well as ketogenic except

- a) Isoleucine
- b) Leucine
- c) Tyrosine
- d) Phenyl Alanine

Answer (b) Leucine

13- Which out of the following amino acid is a precursor of niacin (Vitamin)?

- a) Tyrosine
- b) Threonine
- c) Tryptophan
- d) Phenylalanine

Answer (c) Tryptophan

14- Which out of the followings is not a fibrous protein?

- a) Carbonic anhydrase
- b) Collagen
- c) Fibrinogen
- d) Keratin

Answer (a) Carbonic anhydrase

15- Which of the following amino acids is most compatible with an α - helical structure?

- a)Tryptophan
- b) Alanine
- c) Leucine
- d) Proline

Answer (b) Alanine

16- The highest concentration of cystine can be found in

- a) Melanin
- b) Keratin
- c) Collagen
- d) Myosin

Answer(b) Keratin

17- In scurvy, which amino acid that is normally part of collagen is not synthesized?

- a) Hydroxy Tryptophan
- b) Hydroxy Tyrosine
- c) Hydroxy Alanine
- d) Hydroxy Proline

Answer (d) Hydroxy Proline

18- Which one of the following amino acids may be considered a hydrophobic amino acid at physiological p H of 7.4?

- a) Isoleucine
- b) Arginine
- c) Aspartic acid
- d) Threonine

Answer (a) Isoleucine

19. Which of the characteristics below apply to amino acid Glycine?

- a) Optically inactive
- b) Hydrophilic, basic and charged
- c) Hydrophobic
- d) Hydrophilic, acidic and charged

Answer (a) Optically inactive

20. Which of the following amino acids in Myoglobin, a globular protein, is highly likely to be localized within the interior of the molecule?

- a) Arginine
- b) Valine
- c) Aspartic acid
- d) Lysine

Answer (b) Valine

21. Sakaguchi reaction is answered by

- (A) Lysine
- (B) Ornithine
- (C) Arginine
- (D) Arginino succinic acid

Answer (c) Arginine

22. Zwitter ion is one which has in aqueous solution:

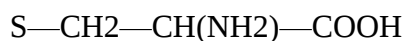
- (A) One positive charge and one negative charge
- (B) Two positive charges and one negative charge
- (C) Two negative charges and one positive charge
- (D) No electrical charges at all

Answer (a) one positive charge and one negative charge

23. Cysteine has the formula:

- (A) CH₃SH
- (B) H₂N—CH₂—COOH
- (C) HS—CH₂—CH(NH₂)—COOH
- (D) S—CH₂—CH(NH₂)—COOH

|



Answer (c) HS—CH₂—CH(NH₂)—COOH

24. For biosynthesis of proteins

- (A) Amino acids only are required
- (B) Amino acids and nucleic acids only are required
- (C) Amino acid, nucleic acids and ATP only are required
- (D) Amino acids, nucleic acids, ATP, GTP, enzymes and activators are required

Answer (d) Amino acids, nucleic acids, ATP, GTP, enzymes and activators are required

25. Citrulline is an intermediate of

- (A) TCA cycle
- (B) Urea cycle
- (C) Pentose cycle
- (D) Calvin cycle

Answer (b) Urea cycle

26. In protein structure the α -helix and β -pleated sheets are example of

- (A) Primary structure
- (B) Secondary structure
- (C) Tertiary structure
- (D) Quaternary structure

Answer (b) Secondary structure

27. An essential amino acid in man is

- (A) Proline
- (B) Threonine
- (C) Asparagine
- (D) Tyrosine

Answer (b) Threonine

28. An amino acid that does not form an α -helix is

- (A) Asparagine
- (B) Tyrosine
- (C) Tryptophan
- (D) Proline

Answer (d) Proline

29. The protein present in hair is

- (A) Elastin
- (B) Prolamine
- (C) Keratin
- (D) Gliadin

Answer (c) Keratin

30. Plasma protein can be separated by

- (A) Salting out with $(\text{NH}_4)_2\text{SO}_4$
- (B) Ultracentrifugation

(C) Immuno-electrophoresis

(D) All of these

Answer (d) All of these

31. RNA does not contain

(A) Uracil

(B) Adenine

(C) Hydroxy methyl cytosine

(D) Phosphate

Answer (c) Hydroxy methyl cytosine

32. In mammalian cells, ribosomal RNA is produced mainly in the

(A) Nucleus

(B) Nucleolus

(C) Ribosome

(D) Golgi apparatus

Answer (b) Nucleolus

33. Which co-enzyme is not involved in oxidative decarboxylation of Pyruvic acid?

(A) TPP

(B) Mg^{++}

(C) Biotin

(D) CoA-SH

Answer (c) Biotin

34. A polymeric unit of starch which has a branched structure is

(A) Glucose

(B) Amylopectin

(C) Isomaltose

(D) Amylose

Answer (B) Amylopectin

35 The repeating unit in hyaluronic acid is

- (A) Glucuronic acid and Galactosamine
- (B) Glucuronic acid and glucosamine
- (C) Glucuronic acid and N-acetyl glucosamine
- (D) Glucuronic acid and N-acetyl galactosamine

Answer (c) Glucuronic acid and N-acetyl glucosamine

36 The repeating disaccharide unit in cellulose is

- (A) Sucrose
- (B) Maltose
- (C) Dextrose
- (D) Cellobiose

Answer (D) Cellobiose

37. All α -amino acids give positive

- (A) Million's test
- (B) Biurete test
- (C) Xanthoproteic test
- (D) Ninhydrine test

Answer (d) Ninhydrine test

38. N-terminal amino acids of a polypeptide are estimated by

- (A) Erdmann reaction
- (B) Sanger's reagent
- (C) Formaldehyde test
- (D) Ninhydrine reaction

Answer (a) Erdmann reaction

39. Million's test is positive for

- (A) Phenylalanine
- (B) Glycine
- (C) Tyrosine
- (D) Proline

Answer (c) Tyrosine

40. Indole group of tryptophan responds positively to

- (A) Glyoxylic acid
- (B) Schiff's reagent
- (C) Biuret test
- (D) Resorcinol test

Answer (a) Glyoxylic acid

41. Deficiency of biotin results in decrease in

- (A) Amino acid synthesis
- (B) Lipid synthesis
- (C) Kidney
- (D) Fatty acid synthesis

Answer (d) Fatty acid synthesis

42. The precursor of bile salts, sex hormones and vitamin D is

- (A) Diosgenin
- (B) Cholesterol
- (C) Campesterol
- (D) Ergosterol

Answer (b) Cholesterol

43 Unsaturated fatty acids is known as

- (A) Non-essential fatty acids
- (B) Essential fatty acids
- (C) Cerebrosides
- (D) Phospholipids

Answer (a) Non-essential fatty acids

44 Biuret test is specific for

- (A) Two peptide linkage
- (B) Phenolic group
- (C) Imidazole ring
- (D) None of these

Answer (a) Two peptide linkage

45. The half-life of antibody protein is about

- (A) 4 weeks
- (B) 3 weeks
- (C) 2 weeks
- (D) 1 week

Answer (c) 2 weeks

46. Protein anabolism is stimulated by

- (A) ACTH
- (B) Testosterone
- (C) Glucagon
- (D) Epinephrine

Answer (b) Testosterone

47. The example of metalloproteins:

- (A) Siderophilin
- (B) OREES mucoid

(C) Elastin

(D) All of these

Answer (a) Siderophilin

48. The example of chromoprotein:

(A) Salmine

(B) Catalase

(C) Zein

(D) Gliadin

Answer (b) Catalase

49 Deamination is _____ of amino group.

(A) Removal

(B) Addition

(C) Supplementation

(D) None of these

Answer (a) Removal

50. Proteins produce polypeptides from proteins by

(A) Oxidizing

(B) Reducing

(C) Hydrolyzing

(D) None of these

Answer (c) Hydrolyzing

CHAPTER 5 :VITAMINS

1. Vitamin A or retinal is a

- (A) Steroid
- (B) Polyisoprenoid compound containing a cyclohexenyl ring
- (C) Benzoquinone derivative
- (D) 6-Hydroxychromane

Answer (b) Polyisoprenoid compound containing a cyclohexenyl ring

2. Vitamins are

- (A) Accessory food factors
- (B) Generally synthesized in the body
- (C) Produced in endocrine glands
- (D) Proteins in nature

Answer (a) Accessory food factors

3. The normal serum concentration of vitamin A in mg/100 ml is

- (A) 5–10
- (B) 15–60
- (C) 100–150
- (D) 0–5

Answer (d) 0–5

4. One manifestation of vitamin A deficiency is

- (A) Painful joints
- (B) Night blindness
- (C) Loss of hair
- (D) Thickening of long bones

Answer (b) Night blindness

5. Deficiency of Vitamin A causes

- (A) Xerophthalmia
- (B) Hypoprothrombinemia
- (C) Megaloblastic anemia
- (D) Pernicious anemia

Answer (a) Xerophthalmia

6. Vitamin D absorption is increased in

- (A) Acid pH of intestine
- (B) Alkaline pH of intestine
- (C) Impaired fat absorption
- (D) Contents of diet

Answer (a) Acid pH of intestine

7. An important function of vitamin A is

- (A) To act as coenzyme for a few enzymes
- (B) To play an integral role in protein synthesis
- (C) To prevent hemorrhages
- (D) To maintain the integrity of epithelial tissue

Answer (d) To maintain the integrity of epithelial tissue

8. Retinal is a component of

- (A) Iodopsin
- (B) Rhodopsin
- (C) Cardiolipin
- (D) Glycoproteins

Answer (b) Rhodopsin

9. On exposure to light rhodopsin forms

- (A) All trans-retinal

(B) Cis-retinal

(C) Retinol

(D) Retinoic acid

Answer (a) All trans-retinal

10. Deficiency of vitamin D causes

(A) Ricket and osteomalacia

(B) Tuberculosis of bone

(C) Hypothyroidism

(D) Skin cancer

Answer (a) Ricket and osteomalacia

11. Insignificant amount of Vitamin E is present in

(A) Wheat germ oil

(B) Sunflower seed oil

(C) Safflower seed oil

(D) Fish liver oil

Answer (d) Fish liver oil

12. The activity of tocopherols is destroyed by

(A) Commercial cooking

(B) Reduction

(C) Conjugation

(D) All of these

Answer (a) Commercial cooking

13. The requirement of vitamin E is increased with greater intake of

(A) Carbohydrates

(B) Proteins

(C) Polyunsaturated fat

(D) Saturated fat

Answer (c) Polyunsaturated fat

14. Vitamin E reduces the requirement of

- (A) Iron
- (B) Zinc
- (C) Selenium
- (D) Magnesium

Answer (c) Selenium

15. The most important natural antioxidant is

- (A) Vitamin D
- (B) Vitamin E
- (C) Vitamin B12
- (D) Vitamin K

Answer (b) Vitamin E

16. Tocopherols prevent the oxidation of

- (A) Vitamin A
- (B) Vitamin D
- (C) Vitamin K
- (D) Vitamin C

Answer (a) Vitamin A

17. Creatinuria is caused due to the deficiency of vitamin

- (A) A
- (B) K
- (C) E
- (D) D

Answer (c) E

18. All the following conditions produce a real or functional deficiency of vitamin K except

- (A) Prolonged oral, broad spectrum antibiotic therapy

- (B) Total lack of red meat in the diet
- (C) The total lack of green leafy vegetables in the diet
- (D) Being a new born infant

Answer (b) Total lack of red meat in the diet

19. Vitamin K is found in

- (A) Green leafy plants
- (B) Meat
- (C) Fish
- (D) Milk

Answer (a) Green leafy plants

20. Function of Vitamin A:

- (A) Healing epithelial tissues
- (B) Protein synthesis regulation
- (C) Cell growth
- (D) All of these

Answer (d) All of these

21. Vitamin K2 was originally isolated from

- (A) Soyabean
- (B) Wheat gram
- (C) Alfa Alfa
- (D) Putrid fish meal

Answer (d) Putrid fish meal

22. Vitamin synthesized by bacterial in the intestine is

- (A) A
- (B) C
- (C) D
- (D) K

Answer (d) K

23. Vitamin K is involved in posttranslational modification of the blood clotting factors by acting as cofactor for the enzyme:

- (A) Carboxylase
- (B) Decarboxylase
- (C) Hydroxylase
- (D) Oxidase

Answer (a) Carboxylase

24. Vitamin K is a cofactor for

- (A) Gamma carboxylation of glutamic acid residue
- (B) β -Oxidation of fatty acid
- (C) Formation of γ -amino butyrate
- (D) Synthesis of tryptophan

Answer (a) Gamma carboxylation of glutamic acid residue

25. Hypervitaminosis K in neonates may cause

- (A) Porphyria
- (B) Jaundice
- (C) Pellagra
- (D) Prolonged bleeding

Answer (b) Jaundice

26. Dicoumarol is antagonist to

- (A) Riboflavin
- (B) Retinol
- (C) Menadione
- (D) Tocopherol

Answer (c) Menadione

27. The precursor of CoA is

- (A) Riboflavin
- (B) Pyridoxamine
- (C) Thiamin
- (D) Pantothenate

Answer (d) Pantothenate

28. 'Burning foot syndrome' has been ascribed to the deficiency of

- (A) Pantothenic acid
- (B) Thiamin
- (C) Cobalamin
- (D) Pyridoxine

Answer (a) Pantothenic acid

29. Pyridoxal phosphate is central to

- (A) Deamination
- (B) Amidation
- (C) Carboxylation
- (D) Transamination

Answer (d) Transamination

30. The vitamin required as coenzyme for the action of transaminases is

- (A) Niacin
- (B) Pantothenic acid
- (C) Pyridoxal phosphate
- (D) Riboflavin

Answer (c) Pyridoxal phosphate

31. Niacin contains a

- (A) Sulphydryl group
- (B) Carboxyl group
- (C) Amide group

(D) All of these

Answer (b) Carboxyl group

32. NADP is required as a coenzyme in

(A) Glycolysis

(B) Citric acid cycle

(C) HMP shunt

(D) Gluconeogenesis

Answer (c) HMP shunt

33. NAD is required as a coenzyme for

(A) Malate dehydrogenase

(B) Succinate dehydrogenase

(C) Glucose-6-phosphate dehydrogenase

(D) HMG CoA reductase

Answer (a) Malate dehydrogenase

34. Vitamin B12 is synthesized by

(A) Bacteria only

(B) Plants only

(C) Animals only

(D) Both (A) and (C)

Answer (a) Bacteria only

35. Deficiency of vitamin C causes

(A) Beriberi

(B) Pellagra

(C) Pernicious anemia

(D) Scurvy

Answer (d) Scurvy

36. Calcification of soft tissues can occur in

- (A) Osteomalacia
- (B) Rickets
- (C) Hypervitaminosis D
- (D) None of these

Answer (c) Hypervitaminosis D

37. Vitamin E protects

- (A) Polyunsaturated fatty acids against aeroxidation
- (B) Vitamin A and carotenes against oxidation
- (C) Lung tissue against atmospheric pollutants
- (D) All of these

Answer (d) All of these

38. A water soluble form of vitamin K is

- (A) Phylloquinone
- (B) Farnoquinone
- (C) Menadione
- (D) None of these

Answer (c) Menadione

39. Prothrombin time is prolonged in

- (A) Vitamin K deficiency
- (B) Liver damage
- (C) Both (A) and (B)
- (D) None of these

Answer (c) Both (A) and (B)

40. The poor sources of vitamin D:

- (A) Eggs
- (B) Butter
- (C) Milk

(D) Liver

Answer (c) Milk

41. The activity of tocopherols is destroyed by

(A) Oxidation

(B) Reduction

(C) Conjugation

(D) All of these

Answer (a) Oxidation

42. Vitamin E stored in

(A) Mitochondria

(B) Microsomes

(C) Both (A) and (B)

(D) None of these

Answer (c) Both (A) and (B)

43. Vitamin E protects the polyunsaturated fatty acids from oxidation by molecular oxygen in the formation of

(A) Superoxide

(B) Peroxide

(C) Trioxide

(D) All of these

Answer (B) Peroxide

44. The tocopherols prevent the oxidation of

(A) Vitamin A

(B) Vitamin D

(C) Vitamin K

(D) Vitamin C

Answer (a) Vitamin A

45. Vitamin E protects enzymes from destruction in

- (A) Muscles
- (B) Nerves
- (C) Gonads
- (D) All of these

Answer (d) All of these

46. Marasmus is due to malnutrition of

- (A) Proteins
- (B) Proteins and calories
- (C) Proteins and vitamins
- (D) Proteins and minerals

Answer (c) Proteins and vitamins

47. The essential amino acids

- (A) must be supplied in the diet because the organism has lost the capacity to aminate the corresponding ketoacids
- (B) must be supplied in the diet because the human has an impaired ability to synthesize the carbon chain of the corresponding ketoacids
- (C) are identical in all species studied
- (D) are defined as these amino acids which cannot be synthesized by the organism at a rate adequate to meet metabolic requirements

Answer (b) must be supplied in the diet because the human has an impaired ability to synthesize the carbon chain of the corresponding ketoacids

48. Fibre in the diet is beneficial in

- (A) Hyper glycemia
- (B) Hyper cholesteraemia
- (C) Colon cancer
- (D) All of these

Answer (d) All of these

49 Sucrose intolerance leads to

- (A) Hyper glycemia
- (B) Glycosuria
- (C) Diarrhea
- (D) Hypoglycemia

Answer (c) Diarrhea

50. There can be intolerance with respect to the following sugar:

- (A) Glucose
- (B) Lactose
- (C) Maltose
- (D) Xylose

Answer (b) Lactose

51. Milk contains very poor amounts of

- (A) Calcium
- (B) Phosphate
- (C) Iron
- (D) Riboflavin

Answer (c) Iron

52. Egg contains very little

- (A) Fat
- (B) Proteins
- (C) Carbohydrates
- (D) Calcium and phosphorus

Answer (c) Carbohydrates

53. BMR (Basal Metabolic rate) is elevated in

- (A) Hyperthyroidism
- (B) Under nutrition

(C) Starvation

(D) Hypothyroidism

Answer (a) Hyperthyroidism

54. Soyabean proteins are rich in

(A) Lysine

(B) Alanine

(C) Glycine

(D) Aspartic acid

Answer (b) Alanine

55. Corn and Gliadin are low in

(A) Lysine

(B) Alanine

(C) Glycine

(D) Aspartic acid

Answer (d) Aspartic acid

56. What is the disease caused by thiamine deficiency?

(A) Nyctalopia

(B) Scurvy

(C) Rickets

(D) Beriberi

Answer (d) Beriberi

57. Retinol and retinol –binding protein (RBP) bound with this protein:

(A) Albumin

(B) Prealbumin

(C) α 2-globulin

(D) β -globulin

Answer (b) Prealbumin

58. Megaloblastic anemia is caused by the deficiency of

- (A) Folic acid
- (B) Vitamin B6
- (C) Iron
- (D) Protein

Answer (a) Folic acid

59. This vitamin acts as anti-oxidant:

- (A) Vitamin A
- (B) Vitamin D
- (C) Vitamin E
- (D) Vitamin K

Answer (c) Vitamin E

60 .Retinol and retinal are interconverted requiring dehydrogenase or reductase in the presence of

- (A) NAD or NADP
- (B) NADH + H⁺
- (C) NADP
- (D) FAD

Answer (a) NAD or NADP

CHAPTER 6 : ENZYMES

1. Enzymes are

- (a) Carbohydrates
- (b) RNA
- (c) Proteins
- (d) Fats

Answer (c) Proteins

2. Enzymes, which are produced in inactive form in the living cells, are called

- (A) Pepsin
- (B) Lysozymes
- (C) Apoenzymes
- (D) Proenzymes

Answer (D) Proenzymes

3. The term enzymes are coined by

- (A) Pasteur
- (B) Bucher
- (C) Urey Miller
- (D) Kuhne

Answer (D) Kuhne

4. Enzymes

- (A) Do not require activation energy
- (B) Do not change requirement of activation energy.
- (C) Increase requirement of activation energy
- (D) Lowest requirement of activation energy.

Answer (D) Lowest requirement of activation energy.

5. Fischer's 'lock and key' model of the enzyme action implies that

- (A) The active site is complementary in shape to that of substance only after interaction.
- (B) The active site is complementary in shape to that of substance
- (C) Substrates change conformation prior to active site interaction
- (D) The active site is flexible and adjusts to substrate

Answer (B) The active site is complementary in shape to that of substance

6. Lock and Key theory of enzyme action was proposed by

- (A) Fischer
- (B) Koshland
- (C) Kuhne
- (D) Arrhenius

Answer (A) Fischer

7. The enzymes which forms the peptide bond is known as

- (A) Carbonic anhydrase
- (B) Peptidase
- (C) Carbohydrase
- (D) Peptidyl transferase

Answer (D) Peptidyl transferase

8. A Holoenzyme is

- (A) Functional unit
- (B) Apo enzyme
- (C) Coenzyme
- (D) All of these

Answer (D) All of these

9. Fat is hydrolysed by the enzyme known as

- (A) Trypsin
- (B) Lipase

(C) Pepsin

(D) Amylase

Answer (B) Lipase

10. The enzyme, tyrosine is activated by

(A) Iron

(B) Copper

(C) Zinc

(D) Potassium

Answer (B) Copper

11. A sigmoidal plot of substrate concentration ($[S]$) verses reaction velocity (V) indicate

(A) Michaelis-Menten kinetics

(B) Co-operative binding

(C) Competitive inhibition

(D) Non-competitive inhibition

Answer (B) Co-operative binding

12. The enzymes involved in feedback inhibition are called

(A) Allosteric enzymes

(B) Holoenzymes

(C) Apoenzymes

(D) Coenzymes

Answer (A) Allosteric enzymes

13. Trypsin are active in

(A) Acidic

(B) Alkaline

(C) Neutral

(D) None of these

Answer (B) Alkaline

14. The kinetic effect of purely 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

Answer (A) Increases K_m without affecting V_{max}

15. An inducer is absent in the type of enzyme:

- (A) Allosteric enzyme
- (B) Constitutive enzyme
- (C) Co-operative enzyme
- (D) Isoenzymic enzyme

Answer (B) Constitutive enzyme

16. Enzyme involved in joining together two substrates is

- (A) Glutamine synthetase
- (B) Aldolase
- (C) Guanine deaminase
- (D) Arginase

Answer (A) Glutamine synthetase

17. Coenzymes are

- (A) Heat stable, dialyzable, non protein organic molecules
- (B) Soluble, colloidal, protein molecules
- (C) Structural analogue of enzymes
- (D) Different forms of enzymes

Answer (A) Heat stable, dialyzable, non protein organic molecules

18. A coenzyme containing non aromatic hetero ring is

- (A) ATP
- (B) NAD

(C) FMN

(D) Biotin

Answer (D) Biotin

19. Isoenzymes can be characterized by

(A) Proteins lacking enzymatic activity that are necessary for the activation of enzymes

(B) Proteolytic enzymes activated by hydrolysis

(C) Enzymes with identical primary structure

(D) Similar enzymes that catalyze different reaction

Answer (B) Proteolytic enzymes activated by hydrolysis

20. Glycolysis is regulate by enzyme which is known as

(A) Phosphofructokinase

(B) Glyceraldehyde-3-phosphate dehydrogenase

(C) Phosphotriose isomerase

(D) Phosphohexose isomerase

Answer (A) Phosphofructokinase

21. The net number of ATP formed per mole of glucose in anaerobic Glycolysis is

(A) 1

(B) 2

(C) 6

(D) 8

Answer (B) 2

22. The initial step of the citric acid cycle is

(A) Conversion of Pyruvate to acetyl-CoA

(B) Condensation of acetyl-CoA with oxaloacetate

(C) Conversion of citrate to isocitrate

(D) Formation of α -ketoglutarate catalysed by isocitrate dehydrogenase

Answer (B) Condensation of acetyl-CoA with oxaloacetate

23. The number of ATP molecules generated for each turn of the citric acid cycle is

- (A) 8
- (B) 12
- (C) 24
- (D) 38

Answer (B) 12

24. The coenzyme not involved in the formation of acetyl-CoA from Pyruvate is

- (A) TPP
- (B) Biotin
- (C) NAD
- (D) FAD

Answer (B) Biotin

25. Mc Ardle's syndrome is characterized by the absence of

- (A) Liver phosphorylase
- (B) Muscle phosphorylase
- (C) Branching enzyme
- (D) Debranching enzyme

Answer (B) Muscle phosphorylase

26. Pompe's disease is caused due to deficiency of

- (A) Lysosomal α -1 $\rightarrow$ 4 and 1 $\rightarrow$ 6-glucosidase
- (B) Glucose-6-phosphatase
- (C) Glycogen synthase
- (D) Phosphofructokinase

Answer (A) Lysosomal α -1 $\rightarrow$ 4 and 1 $\rightarrow$ 6-glucosidase

27. The sites for Gluconeogenesis are

- (A) Liver and kidney
- (B) Skin and pancreas

(C) Lung and brain

(D) Intestine and lens of eye

Answer (A) Liver and kidney

28. An enzyme involved in Gluconeogenesis is

(A) Pyruvate kinase

(B) Pyruvate Carboxylase

(C) Hexokinase

(D) Phosphohexose isomerase

Answer (B) Pyruvate Carboxylase

29. Galactose is synthesized from glucose in

(A) Mammary gland

(B) Intestine

(C) Kidney

(D) Adipose tissue

Answer (A) Mammary gland

30. The best known cause of galactosemia is the deficiency of

(A) Galactose 1-phosphate and uridyl transferase

(B) Phosphoglucomutase

(C) Galactokinase

(D) Lactose synthase

Answer (A) Galactose 1-phosphate and uridyl transferase

31. Enzymes responsible for ketone body formation are associated mainly with the

(A) Mitochondria

(B) Endoplasmic reticulum

(C) Nucleus

(D) Golgi apparatus

Answer (A) Mitochondria

32. The main pathway for denovo synthesis of fatty acids occur in

- (A) Cytosol
- (B) Mitochondria
- (C) Microsomes
- (D) Nucleus

Answer (A) Cytosol

33. The main pathway for denovo synthesis of fatty acids occur in

- (A) Cytosol
- (B) Mitochondria
- (C) Microsomes
- (D) Nucleus

Answer (D) Nucleus

34. Fatty liver is caused due to accumulation of

- (A) Fatty acids
- (B) Cholesterol
- (C) Phospholipids
- (D) Triacylglycerol

Answer (D) Triacylglycerol

35. A lipotropic factor is

- (A) Choline
- (B) Palmitic acid
- (C) Calcium
- (D) Vitamin C

Answer (A) Choline

36. Fatty liver is also caused by

- (A) CH₃Cl
- (B) CCl₄

(C) Na_2SO_4

(D) Riboflavin

Answer (B) CCl_4

37. Biotin is a coenzyme for

(A) Pyruvate dehydrogenase

(B) Pyruvate Carboxylase

(C) PEP carboxykinase

(D) Glutamate Pyruvate transaminase

Answer (B) Pyruvate Carboxylase

38. Acetyl-CoA can be formed from

(A) Pyruvate

(B) Fatty acids

(C) Ketone bodies

(D) All of these

Answer (D) All of these

39. Pyruvate is converted into acetyl-CoA by

(A) Decarboxylation

(B) Dehydrogenation

(C) Oxidative decarboxylation

(D) Oxidative Deamination

Answer (C) Oxidative decarboxylation

40. The first pentose formed in HMP shunt is

(A) Ribose-5-phosphate

(B) Ribulose-5-phosphate

(C) Xylose-5-phosphate

(D) Xylulose-5-phosphate

Answer (B) Ribulose-5-phosphate

41. The regulatory enzyme in HMP shunt is

- (A) Glucose-6-phosphate dehydrogenase
- (B) 6-Phosphogluconate dehydrogenase
- (C) Both (A) and (B)
- (D) None of these

Answer (C) Both (A) and (B)

42. The rate of HMP shunt reactions is

- (A) Increased by Insulin
- (B) Increased in diabetes mellitus
- (C) Increased by glucagon's
- (D) Increased in starvation

Answer (A) Increased by Insulin

43. Coenzyme A contains the vitamin:

- (A) Riboflavin
- (B) Pantothenic acid
- (C) Pyridoxine
- (D) Thiamine

Answer (B) Pantothenic acid

44. The Michaelis-Menten hypothesis:

- (A) Postulates the formation of an enzyme substrate complex
- (B) Enables us to calculate the isoelectric point of an enzyme
- (C) States that the rate of a chemical reaction may be independent of substrate concentration
- (D) States that the reaction rate is proportional to substrate concentration

Answer (A) Postulates the formation of an enzyme substrate complex

45. An enzyme which brings about lysis of bacterial cell wall is

- (A) Amylase
- (B) Lysozyme

(C) Trypsin

(D) Lipase

Answer (B) Lysozyme

46. Multiple forms of the same enzymes are known as

(A) Zymogens

(B) Isoenzymes

(C) Proenzymes

(D) Pre-enzymes

Answer (B) Isoenzymes

47. Which of the following statements is true?

(A) Enzymes have names ending ase

(B) Enzymes are highly specific in their action

(C) Enzymes are living organisms

(D) Enzymes get activated on heating

Answer (B) Enzymes are highly specific in their action

48. Enzymes activity is controlled by

(A) pH of the solution

(B) Temperature

(C) Concentration of the enzyme

(D) Concentration of the substrate

(E) All of these

Answer (C) Concentration of the enzyme

49. The Michaelis constant, K_m is

(A) Numerically equal to $\frac{1}{2} V_{max}$

(B) Dependent on the enzyme concentration

(C) Independent of pH

(D) Numerically equal to the substrate concentration that gives half maximal velocity

Answer (D) Numerically equal to the substrate concentration that gives half maximal velocity

50. An enzyme promotes a chemical reaction by

- (A) Lowering the energy of activation
- (B) Causing the release of heat which acts as a primer
- (C) Increasing molecular motion
- (D) Changing the free energy difference between substrate and product

Answer (A) Lowering the energy of activation

51. Enzyme catalyzed reactions occur in

- (A) Pico seconds
- (B) Micro seconds
- (C) Milli seconds
- (D) None of these

Answer (C) Milli seconds

52. Zymogen is a

- (A) Vitamin
- (B) Enzyme precursor
- (C) Modulator
- (D) Hormone

Answer (B) Enzyme precursor

53. Cofactor (Prosthetic group) is a part of holoenzyme, it is

- (A) Inorganic part loosely attached
- (B) Accessory non-protein substance attached firmly
- (C) Organic part attached loosely
- (D) None of these

Answer (B) Accessory non-protein substance attached firmly

54. Enzymes are different from catalysts in

- (A) Being proteinaceous
- (B) Not used up in reaction
- (C) Functional at high temperature
- (D) Having high rate of diffusion

Answer (B) Not used up in reaction

55. Enzymes, vitamins and hormones are common in

- (A) Being proteinaceous
- (B) Being synthesized in the body of organisms
- (C) Enhancing oxidative metabolism
- (D) Regulating metabolism

Answer (D) Regulating metabolism

56. An enzyme brings about

- (A) Decrease in reaction time
- (B) Increase in reaction time
- (C) Increase in activation energy
- (D) Reduction in activation energy

Answer (D) Reduction in activation energy

57. Feedback inhibition of enzyme is influenced by

- (A) Enzyme
- (B) External factors
- (C) End product
- (D) Substrate

Answer (C) End product

58. Coenzyme is

- (A) Often a vitamin
- (B) Always an inorganic compound
- (C) Always a protein

(D) Often a metal

Answer (A) Often a vitamin

59. An enzyme that joins the ends of two strands of nucleic acid is:

(A) Polymerase

- A. ligase
- B. synthetase
- C. Helicase

Answer (A) Ligase

60. Which one among them is the example of competitive inhibition of an enzyme:

- A. Succinic dehydrogenase by malonic acid
- B. Cytochrome oxidase by cyanide
- C. Hexokinase by glucose-6-phosphate
- D. Carbonic anhydrase by carbon dioxide

Answer (A) Succinic dehydrogenase by malonic acid

61 Blocking of enzyme action by blocking its active site is called as:

- A. Allosteric inhibition
- B. Feedback inhibition
- C. Competitive inhibition
- D. Non-competitive inhibition

Answer (C) Competitive inhibition

62 Diastase takes part in digestion of which one:

- A. Protein
- B. Starch
- C. Amino acids
- D. Fat

Answer (A) Starch

63 Enzyme catalyzing rearrangement of atomic grouping without altering molecular weight or number of atom is:

- A. Ligase
- B. Isomerase
- C. Oxidoreductase
- D. Hydrolase

Answer (B) Isomerase

64. Enzyme complex involved in alcoholic fermentation is:

- A. Zymase
- B. Invertase
- C. Lipase
- D. Amylase

Answer (A) Zymase

65 This enzyme was first isolated and purified in the form of crystals:

- A. Urease
- B. pepsin
- C. Amylase
- D. Ribonuclease

Answer (A) Urease

66 Koshland proposed which model:

- A. Fluid mosaic model
- B. Induced fit model
- C. Lock and key model
- D. Reflective index model

Answer (B) Induced fit model

67 In the human body optimum temperature for enzymatic activities is:

- A. 37-degree celsius
- B. 25-degree celsius

C. 20-degree celsius

D. 15-degree celsius

Answer (A) 37 degrees celsius

68 Optimum pH value of pepsin is:

A. 1.4

B. 2

C. 3.5

D. 5

Answer (A) 1.4

69 Which of the following is the non-protein component of the enzyme?

A. Cofactor

B. Activator

C. Coenzyme

D. All of these

Answer (D) All of these

70 Which among them is not attribute of enzymes:

A. Specific in nature

B. Protein in chemistry

C. Consumed in reaction

D. Increased rate of reaction

Answer (C) Consumed in reaction

71. Zn^{+2} is an inorganic activator for enzymes:

A. Carbonic anhydrase

B. Phosphatase

C. Chymotrypsin

D. Maltase

Answer (C) Chymotrypsin

72. Mg^{+2} is an inorganic activator for enzymes:

- A. Phosphatase
- B. Carbonic anhydrase
- C. Amylase
- D. Enterokinase

Answer (A) Phosphatase

73. Which among them is a cofactor?

- A. Inorganic ion
- B. Organic molecule
- C. Both A and B
- D. None of these

Answer (C) Both A and B



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About Book

Reviewed Multiple Choice Questions in Biochemistry for D. Pharm and B. Pharm Students has been designed to serve as a comprehensive self-assessment and examination preparation resource aligned with the latest pharmacy curricula. The book presents a wide range of carefully selected multiple-choice questions that cover the fundamental and applied aspects of biochemistry, enabling students to evaluate their conceptual understanding while strengthening problem-solving skills. The contents encompass major topics including the chemistry of biomolecules, enzymes, vitamins, minerals, carbohydrates, proteins, lipids, nucleic acids, bioenergetics, metabolism, molecular biology, clinical biochemistry, nutrition, acid-base balance, and other core areas relevant to pharmaceutical education. The questions have been organized systematically to facilitate progressive learning and effective revision. This book is intended not only for semester and university examinations but also for competitive examinations, entrance tests, and recruitment examinations in pharmaceutical and allied health sciences. By practicing these questions, students can improve their analytical thinking, accuracy, confidence, and time-management skills. Every effort has been made to ensure the accuracy, clarity, and relevance of the material presented. Nevertheless, constructive suggestions from teachers, students, and readers will be sincerely welcomed and highly appreciated for improving future editions of this book.



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