
*Biochemistry &
Clinical Pathology*

Chapter-1

Introduction to Biochemistry

1. A drug which prevents uric acid synthesis by inhibiting the enzyme xanthine oxidase is
 - (a) Aspirin
 - (b) Allopurinol
 - (c) Colchicine
 - (d) Probenecid
2. Which of the following is required for crystallization and storage of the hormone insulin?
 - (a) Mn^{++}
 - (b) Mg^{++}
 - (c) Ca^{++}
 - (d) Zn^{++}
3. Oxidation of which substance in the body yields the most calories
 - (a) Glucose
 - (b) Glycogen
 - (c) Protein
 - (d) Lipids
4. Milk is deficient in which vitamins?
 - (a) Vitamin C
 - (b) Vitamin A
 - (c) Vitamin B2
 - (d) Vitamin K
5. Milk is deficient of which mineral?
 - (a) Phosphorus
 - (b) Sodium
 - (c) Iron
 - (d) Potassium
6. Synthesis of prostaglandins is inhibited by
 - (a) Aspirin
 - (b) Arsenic
 - (c) Fluoride
 - (d) Cyanide
7. HDL is synthesized and secreted from
 - (a) Pancreas
 - (b) Liver
 - (c) Kidney
 - (d) Muscle
8. 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

9. 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
10. 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
11. 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
12. Which one is the heaviest particulate component of the cell?

(a) Nucleus	(b) Mitochondria
(c) Cytoplasm	(d) Golgi apparatus
13. Which one is the largest particulate of the cytoplasm?

(a) Lysosomes	(b) Mitochondria
(c) Golgi apparatus	(d) Entoplasmic reticulum
14. The degradative Processess are categorized under the heading of

(a) Anabolism	(b) Catabolism
(c) Metabolism	(d) None of the above
15. The exchange of material takes place

(a) Only by diffusion	(b) Only by active transport
(c) Only by pinocytosis	(d) All of these
16. The average pH of Urine is

(a) 7.0	(b) 6.0
(c) 8.0	(d) 0.0

17. 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 (c) 1 : 30
18. The phenomenon of osmosis is opposite to that of
(a) Diffusion (b) Effusion
(c) Affusion (d) Coagulation
19. The surface tension in intestinal lumen between fat droplets and aqueous medium is decreased by
(a) Bile Salts (b) Bile acids
(c) Conc. H_2SO_4 (d) Acetic acid
20. Which of the following is located in the mitochondria?
(a) Cytochrome oxidase
(b) Succinate dehydrogenase
(c) Dihydrolipoyl dehydrogenase
(d) All of these
21. The most active site of protein synthesis is the
(a) Nucleus (b) Ribosome
(c) Mitochondrion (d) Cell sap
22. 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
23. Mitochondrial DNA is
(a) Circular double stranded (b) Circular single stranded
(c) Linear double helix (d) None of these
24. 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
25. The cellular organelles called "suicide bags" are
(a) Lysosomes (b) Ribosomes
(c) Nucleolus (d) Golgi's bodies
26. From the biological viewpoint, solutions can be grouped into
(a) Isotonic solution (b) Hypotonic solutions
(c) Hypertonic solution (d) All of these

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- 27. Bulk transport across cell membrane is accomplished by**
(a) Phagocytosis (b) Pinocytosis
(c) Extrusion (d) All of these
- 28. 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
- 29. 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
- 30. A lipid bilayer is permeable to**
(a) Urea (b) Fructose
(c) Glucose (d) Potassium
- 32. The Golgi complex**
(a) Synthesizes proteins
(b) Produces ATP
(c) Provides a pathway for transporting chemicals
(d) Forms glycoproteins
- 33. 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
- 34. The following substances are cell inclusions except**
(a) Melanin (b) Glycogen
(c) Lipids (d) Centrosome
- 35. Fatty acids can be transported into and out of cell membrane by**
(a) Active transport (c) Facilitated transport
(c) Diffusion (d) Osmosis

36. Enzymes catalyzing electron transport are present mainly in the
(a) Ribosomes
(b) Endoplasmic reticulum
(c) Lysosomes
(d) Inner mitochondrial membrane
37. Mature erythrocytes do not contain
(a) Glycolytic enzymes (b) HMP shunt enzymes
(c) Pyridine nucleotide (d) ATP
38. In mammalian cells rRNA is produced mainly in the
(a) Endoplasmic reticulum
(b) Ribosome
(c) Nucleolus
(d) Nucleus
39. Genetic information of nuclear DNA is transmitted to the site of protein synthesis by
(a) rRNA (b) mRNA
(c) tRNA (d) Polysomes
40. The power house of the cell is
(a) Nucleus (b) Cell membrane
(c) Mitochondria (d) Lysosomes
41. The digestive enzymes of cellular compounds are confined to
(a) Lysosomes (b) Ribosomes
(c) Peroxisomes (d) Polysomes

ANSWERS

- | | | | | | |
|---------|---------|---------|---------|---------|---------|
| 1. (b) | 2. (d) | 3. (d) | 4. (a) | 5. (c) | 6. (a) |
| 7. (b) | 8. (b) | 9. (a) | 10. (c) | 11. (c) | 12. (a) |
| 13. (b) | 14. (b) | 15. (d) | 16. (b) | 17. (b) | 18. (a) |
| 19. (a) | 20. (d) | 21. (b) | 22. (b) | 23. (a) | 24. (a) |
| 25. (a) | 26. (d) | 27. (d) | 28. (d) | 29. (d) | 30. (a) |
| 31. (d) | 32. (c) | 33. (d) | 34. (b) | 35. (d) | 36. (c) |
| 37. (c) | 38. (d) | 39. (c) | 40. (a) | | |

Chapter-2 Carbohydrates

1. **The most abundant bio molecule on the earth**
 - (a) Nucleic acids
 - (b) proteins
 - (c) lipids
 - (d) carbohydrates
2. **The major functions of carbohydrates include**
 - (a) structural framework
 - (b) storage
 - (c) both a and b
 - (d) none of these
3. **The general formula of carbohydrate is**
 - (a) $(CH_2O)_n$
 - (b) $(C_4H_2O)_n$
 - (c) $(C_6H_2O)_n$
 - (d) $(C_2H_2O)_n COOH$
4. **Carbohydrates are**
 - (a) polyhydroxy aldehydes and phenols
 - (b) polyhydroxy aldehydes and ketones
 - (c) polyhydroxy ketones and phenols
 - (d) polyhydroxy phenols and alcohols
5. **Structural polysaccharides include**
 - (a) cellulose, hemicellulose and chitin
 - (b) cellulose, starch and chitin
 - (c) cellulose, starch and glycogen
 - (d) cellulose, glycogen and chitin
6. **Nutritional polysaccharides are**
 - (a) starch and glycogen
 - (b) starch and chitin
 - (c) starch and cellulose
 - (d) starch and glucose
7. **Glycogen in animals are stored in**
 - (a) liver and spleen
 - (b) liver and muscles
 - (c) liver and bile
 - (d) liver and adipose tissue
8. **Carbohydrates accounts**
 - (a) 30% in plants and 20% in animals
 - (b) 30% in plants and 10% in animals
 - (c) 30% in plants and 1% in animals
 - (d) 50% in plants and 50% in animals

9. **Smallest carbohydrates are trioses. Which of the following is a triose?**
(a) glucose (b) ribulose
(c) ribose (d) glyceraldehyde
10. **Which of the following is a reducing sugar**
(a) glucose (b) dihydroxyacetone
(c) erythulose (d) none of these
11. **Oligosaccharides linked to proteins are called**
(a) glycoproteins (b) glycolipids
(c) galactosides (d) ganglioside
12. **In polysaccharides, monosaccharaides are joined by**
(a) peptide bond (b) glucose bond
(c) glycosidic bond (d) covalent bond
13. **Sucrose is a**
(a) monosaccharide (b) disaccharide
(c) polysaccharide (d) triose
14. **Lactose is a disaccharide consists of**
(a) glucose and fructose (b) glucose and galactose
(c) glucose and sucrose (d) glucose and ribose
15. **In lactose, the linkage is**
(a) β -1-4 linkage (b) β -1-2 linkage
(c) α -1-4 linkage (d) α -1-2 linkage
15. **Maltose is a disaccharide consists of**
(a) glucose and fructose (b) glucose and galactose
(c) glucose and sucrose (d) glucose and glucose
16. **In maltose, the linkage is**
(a) β -1-4 linkage (b) β -1-2 linkage
(c) α -1-4 linkage (d) α -1-2 linkage
17. **Starch consists of**
(a) unbranched amylose and branched amylopectin
(b) branched amylose and branched amylopectin
(c) unbranched amylose and unbranched amylopectin
(d) none of these
18. **Cellulose is made up of repeating units of**
(a) β -1-4 linkage between D-glucose units
(b) β -1-2 linkage between D-glucose units

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- (c) α -1-4 linkage between D-glucose units
- (d) α -1-2 linkage between D-glucose units
- 19. Amylopectin has**
 - (a) β -1-4 and β -1-6 linkage
 - (b) β -1-2 linkage
 - (c) α -1-4 and α -1-6 linkage
 - (d) α -1-2 linkage
- 20. Chitin consists of**
 - (a) N-acetyl muramic acid
 - (b) N-acetyl glucosamine
 - (c) D-glucose units
 - (d) N-acetyl muramic acid and N-acetyl glucosamine
- 21. The general formula of monosaccharides is**
 - (a) $C_nH_{2n}On$
 - (b) C_2nH_2On
 - (c) $C_nH_2O_{2n}$
 - (d) $C_nH_2nO_{2n}$
- 22. The general formula of polysaccharides is**
 - (a) $(C_6H_{10}O_5)_n$
 - (b) $(C_6H_{12}O_5)_n$
 - (c) $(C_6H_{10}O_6)_n$
 - (d) $(C_6H_{10}O_6)_n$
- 23. The aldose sugar is**
 - (a) Glycerose
 - (b) Ribulose
 - (c) Erythrulose
 - (d) Dihydroxyacetone
- 24. A triose sugar is**
 - (a) Glycerose
 - (b) Ribose
 - (c) Erythrose
 - (d) Fructose
- 25. A pentose sugar is**
 - (a) Dihydroxyacetone
 - (b) Ribulose
 - (c) Erythrose
 - (d) Glucose
- 26. The pentose sugar present mainly in the heart muscle is**
 - (a) Lyxose
 - (b) Ribose
 - (c) Arabinose
 - (d) Xylose
- 27. Polysaccharides are**
 - (a) Polymers
 - (b) Acids
 - (c) Proteins
 - (d) Oils
- 28. The number of isomers of glucose is**
 - (a) 2
 - (b) 4
 - (c) 8
 - (d) 16

29. Two sugars which differ from one another only in configuration around a single carbon atom are termed
- (a) Epimers
 - (b) Anomers
 - (c) Optical isomers
 - (d) Stereoisomers
30. Isomers differing as a result of variations in configuration of the —OH and —H on carbon atoms 2, 3 and 4 of glucose are known as
- (a) Epimers
 - (b) Anomers
 - (c) Optical isomers
 - (d) Stereoisomers
31. Which of the following Biomolecules simply refers to as “Staff of life”?
- (a) Lipids
 - (b) Proteins
 - (c) Vitamins
 - (d) Carbohydrates
32. Which of the following is the simplest form of carbohydrates?
- (a) Carboxyl groups
 - (b) Aldehyde and Ketone groups
 - (c) Alcohol and Carboxyl groups
 - (d) Hydroxyl groups and Hydrogen groups
33. Which of the following monosaccharides is the majority found in the human body?
- (a) D-type
 - (b) L-type
 - (c) LD-types
 - (d) None of the above
34. Which of the following is the most abundant biomolecule on the earth?
- (a) Lipids
 - (b) Proteins
 - (c) Carbohydrates
 - (d) Nucleic acids.
35. Which of the following are the major functions of Carbohydrates?
- (a) Storage
 - (b) Structural framework
 - (c) Transport Materials
 - (d) Both Storage and structural framework
36. Which of the following is the general formula of Carbohydrates?
- (a) $(C_4H_2O)_n$
 - (b) $(C_6H_2O)_n$
 - (c) $(CH_2O)_n$
 - (d) $(C_2H_2O)_n COOH$

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37. Which of the following is the smallest carbohydrate – triose?
(a) Ribose (b) Glucose
(c) Glyceraldehyde (d) Dihydroxyacetone
38. Which of the following is a reducing sugar?
(a) Dihydroxyacetone (b) Erythrulose
(c) Glucose (d) All of the above
39. Which of the following is an example of Epimers?
(a) Glucose and Ribose
(b) Glucose and Galactose
(c) Galactose, Mannose and Glucose
(d) Glucose, Ribose and Mannose
40. Which of the following has reducing properties?
(a) Mucic acid (b) Glucaric acid
(c) Gluconic acid (d) Glucuronic acid
41. Molisch test is used for _____.
(a) Lipids (b) Proteins
(c) Mucoproteins (d) Flavoproteins
42. What is Turanose?
(a) 7-methyl sugar
(b) A deoxy sugars
(c) Non reducing disaccharide
(d) Reducing disaccharides of glucose and fructose
43. Which of the following does not have sulphuric acid groups?
(a) Heparin (b) Kerato sulfate
(c) Hyaluronic acid (d) Chondroitin sulfate
44. Digitonin is a _____.
(a) Lipid (b) Protein
(c) Glycoside (d) Alkaloid
45. Which of the following is the simplest carbohydrate?
(a) Gulose (b) Glucose
(c) Dihydroxyacetone (d) Glyceraldehyde
46. Fructose is metabolized by
(a) fructose 1-phosphate pathway
(b) fructose 6-phosphate pathway
(c) glyceraldehyde 3-phosphate pathway
(d) both (a) and (b)

47. A common way that cells capture the energy released during the breakdown of large molecules is to add electrons to smaller, specialized molecules that can accept them. This process of electron acceptance is otherwise known as
- (a) biosynthesis
 - (b) metabolism
 - (c) Reduction
 - (d) catalysis
48. Humans are unable to digest
- (a) starch
 - (b) complex carbohydrates
 - (c) denatured proteins
 - (d) Cellulose
49. How many ATP equivalents per mole of glucose input are required for gluconeogenesis?
- (a) 2
 - (b) 6
 - (c) 8
 - (d) 4
50. Which of the following compounds is responsible for coordinated regulation of glucose and glycogen metabolism?
- (a) NAD^+
 - (b) Fructose 2,6 bisphosphate
 - (c) Acetyl-CoA
 - (d) Fructose 1,6 bisphosphate
51. Gluconeogenesis requires a higher amount of ATP equivalents as compared to that produced by glycolysis because
- (a) gluconeogenesis releases energy as heat
 - (b) glycolysis releases energy as heat
 - (c) glycolysis occurs in the mitochondria while gluconeogenesis occurs in the cytosol
 - (d) all of the above
52. Which of the following is carried out when cAMP functions as a second messenger?
- (a) Acts second in importance to AMP
 - (b) Activates all cytosolic protein kinases
 - (c) Activates the cAMP-dependent protein kinase
 - (d) Acts outside the cell to influence cellular processes
53. The production or break down of _____ is often coupled with the metabolic reactions of biosynthesis and catabolism.
- (a) aspirin
 - (b) DNA
 - (c) ATP
 - (d) CO_2

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54. The cells dependent solely on glucose as an energy source are
(a) muscle cells (b) brain cells
(c) kidney cells (d) liver cells
55. The main site for gluconeogenesis is
(a) kidney (b) Liver
(c) brain (d) muscle
56. During vigorous exercise, pyruvate produced by glycolysis is converted to
(a) acetate (b) Lactate
(c) monosodium phosphate (d) pyruvic acid
57. Glucagon and epinephrine
(a) inhibits gluconeogenesis and stimulates glycolysis
(b) stimulates gluconeogenesis and glycolysis
(c) stimulates gluconeogenesis and inhibits glycolysis
(d) inhibits gluconeogenesis and glycolysis
58. Gluconeogenesis uses
(a) 3 ATPs and 2 GTPs per glucose
(b) 2 ATPs and 1 GTPs per glucose
(c) 3 ATPs and 3 GTPs per glucose
(d) 4 ATPs and 2 GTPs per glucose
59. Saliva contains all of the following except
(a) Hormones (b) amylase
(c) bacteria-killing enzymes (d) Antibodies
60. Gluconeogenesis is the
(a) formation of glycogen
(b) breakdown of glucose to pyruvate
(c) breakdown of glycogen to glucose
(d) synthesis of glucose from non-carbohydrate precursors

Answer Keys

- | | | | | | |
|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (c) | 3. (a) | 4. (b) | 5. (a) | 6. (a) |
| 7. (a) | 8. (b) | 9. (d) | 10. (a) | 11. (a) | 12. (c) |
| 13. (b) | 14. (b) | 15. (d) | 16. (c) | 17. (a) | 18. (a) |
| 19. (c) | 20. (b) | 21. (a) | 22. (a) | 23. (a) | 24. (a) |
| 25. (b) | 26. (a) | 27. (a) | 28. (d) | 29. (a) | 30. (a) |

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|---------|---------|---------|---------|---------|---------|
| 31. (d) | 32. (b) | 33. (a) | 34. (c) | 35. (d) | 36. (c) |
| 37. (c) | 38. (d) | 39. (b) | 40. (d) | 41. (c) | 42. (d) |
| 43. (c) | 44. (c) | 45. (d) | 56. (d) | 47. (c) | 58. (d) |
| 49. (b) | 50. (b) | 51. (b) | 42. (c) | 53. (c) | 54. (b) |
| 55. (b) | 56. (b) | 57. (c) | 58. (d) | 49. (a) | 60. (d) |

□□

Chapter-3

Lipids

- Fats are abundantly found in**
(a) Reproductive tissue (b) Vegetative tissue
(c) Both a and b (d) None of these
- Natural lipids are readily soluble in**
(a) Oil (b) Mercury
(c) Water (d) None of these
- Which of the following is/are unsaturated fatty acids?**
(a) Linoleic acid (b) Oleic acid
(c) Palmitoleic acid (d) All of these
- Fats can be stored in the cell without disturbing their**
(a) Hygroxyl bond (b) Aleurone layer
(c) Osmotic relations (d) None of these
- Liquid form of triglycerides at ordinary room temperature are called**
(a) Oils (b) Solid
(c) Fats (d) None of these
- The synthesis of glucose from fat is called**
(a) Glycolysis (b) Krebs cycle
(c) Saponification (d) Gluconeogenesis
- Hydrolysis of fats by alkalies into fatty acids and glycerol is called**
(a) Coagulation (b) Saponification
(c) Suspension (d) Colloidal
- The fats and oils are respectively rich in**
(a) Unsaturated fatty acids
(b) Saturated fatty acids

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- (c) Saturated and unsaturated fatty acids
- (d) None of these
- 9. β -oxidation takes place in**
 - (a) Mitochondria
 - (b) cytoplasm
 - (c) Chloroplasts
 - (d) nucleus
- 10. Which is a phospholipid**
 - (a) Lecithin
 - (b) Cholesterol
 - (c) Sterol
 - (d) Steroid
- 11. The number of double bonds in Arachidonic acid**
 - (a) 1
 - (b) 2
 - (c) 3
 - (d) 4
- 12. Essential fatty acids are**
 - (a) Linoleic acid
 - (b) Arachidonic acid
 - (c) Linolenic acid
 - (d) All of these
- 13. The following is not a phospholipid**
 - (a) Sphingomyelin
 - (b) Lecithin
 - (c) Cephalin
 - (d) Cerebroside
- 14. Examples of monounsaturated fatty acids are:**
 - (a) Oleic acid
 - (b) Arachidonic acid
 - (c) Palmitic acid
 - (d) Linolenic acid
- 15. High content of Triglycerides are seen in**
 - (a) LDL
 - (b) HDL
 - (c) VLDL
 - (d) Chylomicrons
- 16. This molecule acts as molecular chaperones to assist the folding of proteins**
 - (a) Vitamins
 - (b) Carbohydrates
 - (c) Amides
 - (d) Lipids
- 17. Which of these is not a lipid?**
 - (a) Fats
 - (b) Oils
 - (c) Proteins
 - (d) Waxes
- 18. The abundantly distributed enzyme in germinating seeds and adipocytes is**
 - (a) Lipase
 - (b) Proteases
 - (c) Cellulase
 - (d) Nuclease
- 19. Beta-oxidation of fatty acids occurs in**
 - (a) Peroxisome
 - (b) Peroxisome and Mitochondria

- (c) Mitochondria
- (d) Peroxisome, Mitochondria and ER
- 20. An example of _____ is Carnauba wax
 - (a) Soft wax
 - (b) Liquid wax
 - (c) Hard wax
 - (d) Archaeobacterial wax
- 21. In fats, the number of OH groups can be expressed as
 - (a) Reichert-Meissil number
 - (b) Polenske number
 - (c) Iodine number
 - (d) Acetyl number
- 22. Rancidity of lipids of lipid-rich foodstuff is because of
 - (a) Reduction of fatty acids
 - (b) Hydrogenation of unsaturated fatty acids
 - (c) Dehydrogenation of saturated fatty acids
 - (d) Oxidation of fatty acids
- 23. This is an example of derived lipids
 - (a) Terpenes
 - (b) Steroids
 - (c) Carotenoids
 - (d) All of the above
- 24. The degree of unsaturation of lipids can be measured as
 - (a) Iodine number
 - (b) Saponification number
 - (c) Reichert Meissel number
 - (d) Polenske number
- 25. The specific gravity of lipid is
 - (a) 1.5
 - (b) 1.0
 - (c) 0.8
 - (d) 0.2
- 26. Which of the following molecules is a typical fatty acid?
 - (a) A molecule that has an even number of carbon atoms in a branched chain.
 - (b) An amphipathic dicarboxylic acid with unconjugated double bonds.
 - (c) A molecule that has one cis double bond in a linear carbon chain.
 - (d) A polar hydrocarbon with that reacts with NaOH to form a salt.
- 27. Which of the following is a characteristic of both triacylglycerols and glycerophospholipids?
 - (a) Both contain carboxyl groups and are amphipathic
 - (b) Both contain fatty acids and are saponifiable.
 - (c) Both contain glycerol and ether bonds.
 - (d) Both can be negatively charged at cellular pH

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- 28. Which of the following is a characteristic of both waxes and terpenes?**
- (a) Both can contain an amino alcohol.
 - (b) Both can contain a fatty acid.
 - (c) Both can be non-saponifiable.
 - (d) Both can contain oxygen.
- 29. Which is a characteristic of sphingolipids?**
- (a) They all contain a fatty acid joined to glycerol.
 - (b) They all contain a long-chain alcohol joined to isoprene.
 - (c) They all contain ceramide joined to a polar group.
 - (d) They all contain a carbohydrate joined to a phosphate group.
- 30. Which is a property of eicosanoids?**
- (a) All eicosanoids contain three conjugated double bonds.
 - (b) All eicosanoids contain arachidonic acid and sphingosine.
 - (c) Prostaglandins and leukotrienes both contain a ring structure.
 - (d) Thromboxanes and prostaglandins both contain a carboxyl group.
- 31. Which is a characteristic of all the fatty acid components in this lipid?**
- (a) They all contain an unbranched carbon chain.
 - (b) They all contain unconjugated cis double bonds.
 - (c) They all are joined to glycerol through an ester bond.
 - (d) They all are hydrophilic because they contain oxygen.
- 32. Which property does this lipid share with a typical triacylglycerol?**
- (a) Both contain an ether bond.
 - (b) Both contain a long-chain alcohol.
 - (c) Both are amphipathic.
 - (d) Both are saponifiable.
- 33. Which characteristic does this lipid share with a wax?**
- (a) Both contain a polar head.
 - (b) Both contain three fatty acids.
 - (c) Both contain one or more ester bonds.
 - (d) Both contain one or more carboxyl groups.

- 34. Which characteristic is shared by this lipid and an eicosanoid?**
- (a) This lipid and a leukotriene are both polyunsaturated molecules.
 - (b) This lipid and a thromboxane can both be hydrolyzed in base to produce soaps.
 - (c) This lipid and a prostaglandin can both be hydrolyzed in acid to create fatty acids.
 - (d) This lipid and an arachidonic acid both contain glycerol and hydrocarbon chains.
- 35. Which property can be shared by this lipid and a terpene?**
- (a) Both can contain isoprene.
 - (b) Both can form micelles.
 - (c) Both can contain a saturated fatty acid
 - (d) Both can be very hydrophobic molecules.
- 36. Based on its structural similarity to other lipids, this lipid most likely functions as**
- (a) a membrane component.
 - (b) an energy storage molecule.
 - (c) a sex hormone.
 - (d) a vitamin required for vision.
- 37. Which is a characteristic of biological membranes?**
- (a) Membranes contain proteins and amphipathic lipids.
 - (b) Membranes have an asymmetrical micelle structure.
 - (c) Membranes have hydrophobic groups on the surfaces.
 - (d) Membranes contain lipids that polymerize into one large molecule.
- 38. Which membrane lipid contains an amide bond?**
- (a) cholesterol
 - (b) phosphatidylserine
 - (c) phosphatidic acid
 - (d) sphingomyelin
- 39. Which type of membrane lipid contains an acidic oligosaccharide?**
- (a) phosphatidylinositol
 - (b) cerebroside
 - (c) ganglioside
 - (d) globoside

- 40. Which would be a property of all the major types of lipids in this membrane?**
- (a) They would be saponifiable in base and hydrolyzed in acid.
 - (b) They would have polar heads and non-polar tails.
 - (c) They would be composed of five-carbon units.
 - (d) They would be joined to each other through covalent bonds.
- 41. Which is a characteristic of the lipids in a biological membrane?**
- (a) Specific glycerophospholipids are distributed equally on the two membrane surfaces.
 - (b) Lipid molecules are held in fixed positions by non-covalent bonds with proteins.
 - (c) The fluidity of the membrane decreases with lower levels of saturated fatty acids.
 - (d) The fatty acids of lipid molecules are found in the interior of the membrane.
- 42. Which is a property of integral membrane proteins?**
- (a) All integral membrane proteins contain hydrophilic regions.
 - (b) All integral membrane proteins span the entire membrane.
 - (c) All integral membrane proteins contain carbohydrate groups within the membrane.
 - (d) All integral membrane proteins transport non-polar molecules through the membrane.
- 43. Which property is shared by integral membrane proteins and peripheral membrane proteins?**
- (a) Both can contain an unusually high proportion of hydrophobic R-groups.
 - (b) Both can contain regions of α -helices and β -pleated sheets.
 - (c) Both can flip between the two sides of the membrane.
 - (d) Both can form hydrogen bonds with the hydrocarbons of lipids.
- 44. Which characteristic is most likely shared by a cell membrane and a lipoprotein particle?**
- (a) Both are composed of a lipid bilayer.
 - (b) Both contain a high amount of triacylglycerols.
 - (c) Both contain hydroxyl groups on the surface.
 - (d) Both contain proteins in the interior.

- 45. Which is a general property of cell membranes?**
(a) Membranes contain more lipid than protein.
(b) Membrane proteins have a polar head and a non-polar tail.
(c) Membrane lipids are amphipathic.
(d) Membranes contain covalent bonds between fatty acids.
- 46. Which will be a characteristic of a steroid that is part of a cell membrane?**
(a) It will contain a hydroxyl group.
(b) It will contain four aromatic rings.
(c) It will contain choline.
(d) It will contain an amide bond.
- 47. Which component is found in all sphingolipids?**
(a) a carbohydrate (b) a negative charge
(c) a phosphate group (d) an amino alcohol
- 48. Which type of membrane lipid could contain serine?**
(a) a globoside (b) a cerebroside
(c) a glycerophospholipid (d) a ganglioside
- 49. Which is a property of lipids in cell membranes?**
(a) The hydrophobic groups of lipid molecules are found on membrane surfaces.
(b) Some types of lipids are found preferentially in the outer membrane layer.
(c) Most of the lipids are hydrocarbons composed of five-carbon units.
(d) Most of the lipids function in transporting biomolecules into the cell.
- 50. Which characteristic is shared by a cell membrane and a chylomicron?**
(a) Both contain specific proteins.
(b) Both have a bilayer structure.
(c) Both contain a high proportion of triglycerides.
(d) Both contain a high proportion of sterols.

Answer Keys

- | | | | | | |
|--------|--------|--------|---------|---------|---------|
| 1. (a) | 2. (d) | 3. (d) | 4. (c) | 5. (a) | 6. (d) |
| 7. (b) | 8. (c) | 9. (a) | 10. (a) | 11. (d) | 12. (d) |

- | | | | | | |
|---------|---------|---------|---------|---------|---------|
| 13. (d) | 14. (a) | 15. (d) | 16. (d) | 17. (c) | 18. (a) |
| 19. (c) | 20. (c) | 21. (d) | 22. (d) | 23. (d) | 24. (a) |
| 25. (c) | 26. (c) | 27. (b) | 28. (d) | 29. (c) | 30. (d) |
| 31. (a) | 32. (d) | 33. (c) | 34. (a) | 35. (d) | 36. (b) |
| 37. (a) | 38. (d) | 39. (c) | 40. (b) | 41. (d) | 42. (a) |
| 43. (b) | 44. (c) | 45. (c) | 56. (d) | 47. (d) | 58. (c) |
| 49. (b) | 50. (a) | | | | |

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Chapter-4 Vitamins

- The cause of short-term or acute vitamin A poisoning is due to
 - Eating the liver of Mule deer
 - Eating the liver of Buffalo
 - Eating the liver of Ostrich
 - Eating the liver of Polar bear
- Which of the following is the most essential nutrient for a woman during her initial stages of pregnancy to prevent birth defects?
 - Thiamin
 - Folic acid
 - Vitamin C
 - Vitamin E
- Which of the following food sources has the highest levels of vitamin C?
 - Parsley
 - Broccoli
 - Black currants
 - Orange juice
- Which of the following vitamin helps in blood clotting?
 - Vitamin A
 - Vitamin C
 - Vitamin D
 - Vitamin K
- Which is the leading cause of blindness in children worldwide?
 - Glaucoma
 - Cataracts
 - Colour blindness
 - Vitamin A deficiency
- Which of the following vitamin deficiency causes Beriberi?
 - Vitamin B1
 - Vitamin B2
 - Vitamin B6
 - Vitamin B12

7. **Who is most likely to develop scurvy – A vitamin C deficiency?**
 - (a) A pregnant woman
 - (b) A malnourished child
 - (c) A long-time alcoholic
 - (d) A person with the eating disorder anorexia nervosa
8. **Which of the following vitamin functions as both, hormone and visual pigment?**
 - (a) Thiamine
 - (b) Retinal
 - (c) Riboflavin
 - (d) Folic acid
9. **Which of the following nutrient deficiency causes megaloblastic anaemia?**
 - (a) Folic acid
 - (b) Niacin
 - (c) Pyridoxine
 - (d) Cobalamin
10. **Which of the following is a fat-soluble vitamin?**
 - (a) Vitamin B
 - (b) Vitamin C
 - (c) Vitamin B₁₂
 - (d) Vitamin K
11. **Which of the following diseases is caused by the deficiency of Niacin?**
 - (a) Scurvy
 - (b) Rickets
 - (c) Pellagra
 - (d) Pernicious anaemia
12. **Which of the following vitamins serves as a hormone precursor?**
 - (a) Vitamin A
 - (b) Vitamin C
 - (c) Vitamin D
 - (d) Vitamin K
13. **Which of the following is a component of the coenzyme A?**
 - (a) Retinol
 - (b) Pyridoxine
 - (c) Retinoic acid
 - (d) Pantothenic acid
14. **Which of the following vitamins is also known as cobalamin?**
 - (a) Vitamin B₁₁
 - (b) Vitamin B₂
 - (c) Vitamin B₆
 - (d) Vitamin B₁₂
15. **Which of the following statements is false about Ascorbic acid?**
 - (a) It shows antioxidant activity
 - (b) It is a strong reducing agent
 - (c) It can be synthesized in the body
 - (d) Involved in the hydroxylation of prolyl- and lysyl- residues of collagen

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- 16. Which of the following vitamins has a coenzyme function?**
(a) Vitamin A (b) Vitamin C
(c) Vitamin B (d) All of the above
- 17. Which of the following food source are the best sources of vitamin A?**
(a) Sweet potato (b) Poultry
(c) Legumes (d) Dairy products
- 18. Which of the following is a water-soluble vitamin?**
(a) Vitamin B1 (b) Vitamin C
(c) Vitamin B2 (d) All of the above
- 19. Weakness in muscles and increase in the fragility of red blood cells is caused due to the _____.**
(a) Deficiency of vitamin E (b) Deficiency of vitamin D
(c) Deficiency of vitamin C (d) Deficiency of vitamin A
- 20. Which of the following is the scientific name of Vitamin K?**
(a) Ascorbic acid (b) Phytonadione
(c) Tocopherol (d) Pantothenic Acid
- 21. Which vitamin is required for vision in dim light?**
(a) Vitamin A (b) Vitamin D
(c) Vitamin E (d) Vitamin K
- 22. Which vitamin is required for calcium absorption from the small intestine?**
(a) Vitamin A (b) Vitamin D
(c) Vitamin E (d) Vitamin K
- 23. Which vitamin is a major lipid-soluble antioxidant in cell membranes?**
(a) Vitamin A (b) Vitamin D
(c) Vitamin E (d) Vitamin K
- 24. Which vitamin is required for synthesis of the blood clotting proteins?**
(a) Vitamin A (b) Vitamin D
(c) Vitamin E (d) Vitamin K
- 25. Which of the following is not a function of vitamin A**
(a) Detection of light in the eye
(b) Synthesis of the blood clotting proteins
(c) Activation of vitamin D receptors

- (d) Activation of thyroid hormone receptors
- (e) Regulation of gene expression and cell differentiation
- 26. Which of the following is closest to the amount of retinol formed from β -carotene?**
 - (a) 2 mol retinol /mol β -carotene
 - (b) 1 mol retinol /mol β -carotene
 - (c) 0.5 mol retinol /mol β -carotene
 - (d) 0.15 mol retinol /mol β -carotene
 - (e) 0.1 mol retinol /mol β -carotene
- 27. Which of the following is not a function of vitamin D?**
 - (a) Lipid-soluble antioxidant in cell membranes
 - (b) Fast responses to increase calcium absorption with no change in gene expression
 - (c) Slow responses to increase calcium absorption related to changes in gene expression
 - (d) Regulation of differentiation of adipocytes
 - (e) Regulation of bone turnover
- 28. Which of the following will be increased in vitamin K deficiency**
 - (a) The plasma concentration of calcitonin
 - (b) The plasma concentration of prothrombin
 - (c) The time for blood to clot
 - (d) The time for broken bones to heal
 - (e) Haemolysis due to oxidative damage to red cell membranes
- 29. Which of the following will increase in vitamin D deficiency?**
 - (a) The plasma concentration of prothrombin
 - (b) The plasma concentration of preprothrombin
 - (c) The plasma activity of alkaline phosphatase
 - (d) The plasma activity of acid phosphatase
- 30. Which of the following best explains the antioxidant action of vitamin E?**
 - (a) It forms a stable radical that can be reduced back to active vitamin E by reaction with vitamin C
 - (b) It is a radical, so when it reacts with another radical a non-radical product is formed
 - (c) It is converted to a stable radical by reaction with vitamin C

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- (d) It is lipid soluble and can react with free radicals in the bloodstream resulting from nitric oxide formation by vascular epithelium
 - (e) It forms a stable radical that can be reduced back to active vitamin E by reaction with glutathione and glutathione peroxidase
- 31. Niacin or nicotinic acid is a monocarboxylic acid derivative of**
- (a) Pyridine
 - (b) Pyrimidine
 - (c) Flavin
 - (d) Adenine
- 32. Niacin is synthesized in the body from**
- (a) Tryptophan
 - (b) Tyrosine
 - (c) Glutamate
 - (d) Aspartate
- 33. Pellagra occurs in population dependent on**
- (a) Wheat
 - (b) Rice
 - (c) Maize
 - (d) Milk
- 34. Pantothenic acid is a constituent of the coenzyme involved in**
- (a) Decarboxylation
 - (b) Dehydrogenation
 - (c) Acetylation
 - (d) Oxidation
- 35. The precursor of CoA is**
- (a) Riboflavin
 - (b) Pyridoxamine
 - (c) Thiamin
 - (d) Pantothenate
- 36. 'Burning foot syndrome' has been ascribed to the deficiency of**
- (a) Pantothenic acid
 - (b) Thiamin
 - (c) Cobalamin
 - (d) Pyridoxine
- 37. 'Xanthurenic acid index' is a reliable criterion for the deficiency of the vitamin**
- (a) Pyridoxal
 - (b) Thiamin
 - (c) Pantothenic acid
 - (d) Cobalamin
- 38. Biotin is a coenzyme of the enzyme**
- (a) Carboxylase
 - (b) Hydroxylase
 - (c) Decarboxylase
 - (d) Deaminase
- 39. Folate deficiency causes**
- (a) Microcytic anemia
 - (b) Hemolytic anemia
 - (c) Iron deficiency anemia
 - (d) Megaloblastic anemia

40. Niacin can be synthesised in human beings from
(a) Histidine (b) Phenylalanine
(c) Tyrosine (d) Tryptophan
41. Pantothenic acid contains an amino acid which is
(a) Aspartic acid (b) Glutamic acid
(c) β -Alanine (d) β -Aminoisobutyric acid
42. Coenzyme A contains a nitrogenous base which is
(a) Adenine (b) Guanine
(c) Choline (d) Ethanolamine
43. Pyridoxal phosphate is a coenzyme for
(a) Glycogen synthetase (b) Phosphorylase
(c) Both (a) and (b) (d) None of these
44. Pyridoxine deficiency can be diagnosed by measuring urinary excretion of
(a) Pyruvic acid (b) Oxaloacetic acid
(c) Xanthurenic acid (d) None of these
45. When eggs are cooked
(a) Biotin is destroyed but avidin remains unaffected
(b) Avidin is inactivated but biotin remains unaffected
(c) Both avidin and biotin are inactivated
(d) Both avidin and biotin remain unaffected
46. Chemically, lipoic acid is
(a) Saturated fatty acid (b) Unsaturated fatty acid
(c) Amino acid (d) Sulphur containing fatty acid
47. Deficiency of vitamin B12 can be diagnosed by
(a) Carr-Price reaction (b) Ames assay
(c) Watson-Schwartz test (d) Schilling test
48. Anti-oxidant activity is present in
(a) β -Carotene (b) Retinol
(c) Retinoic acid (d) All of these
49. Nyctalopia is
(a) Drying of eyes (b) Destruction of cornea
(c) Blindness (d) Inability to see in dimlight
50. Ascorbic acid can reduce
(a) 2, 4-dinitro benzene
(b) 2, 6-Dichlorophenol Indophenol

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- (c) 2, 4-dibromobenzene
(d) 2, 6-dibromo benzene

Answer Keys

- | | | | | | |
|---------|---------|---------|---------|---------|---------|
| 1. (d) | 2. (b) | 3. (c) | 4. (d) | 5. (d) | 6. (a) |
| 7. (c) | 8. (b) | 9. (a) | 10. (d) | 11. (c) | 12. (c) |
| 13. (d) | 14. (d) | 15. (c) | 16. (d) | 17. (a) | 18. (d) |
| 19. (a) | 20. (b) | 21. (a) | 22. (d) | 23. (c) | 24. (d) |
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| 31. (a) | 32. (a) | 33. (c) | 34. (c) | 35. (d) | 36. (a) |
| 37. (a) | 38. (a) | 39. (d) | 40. (d) | 41. (d) | 42. (a) |
| 43. (b) | 44. (c) | 45. (b) | 56. (d) | 47. (d) | 58. (a) |
| 49. (d) | 50. (b) | | | | |

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Chapter-5
Enzymes

- Which of the following biomolecule is known as enzymes?
(a) lipids (b) carbohydrates
(c) proteins (d) all of the above
- On which factor, the catalytic behavior of an enzyme depends?
(a) primary structure of protein
(b) secondary structure of proteins
(c) tertiary structure of proteins
(d) all of the above
- What is the inactive form of enzyme known as?
(a) co-enzyme (b) zymogen
(c) co-factor (d) both b and c
- Which enzymes activates the chymotrypsinogen in digestive tract?
(a) elastase (b) trypsin
(c) chymotrypsin (d) none of the above

5. In which year, enzymes were classified by the enzyme commission of IUB?
- (a) 1966 (b) 1961
(c) 1861 (d) 1962
6. What prefix is used for the inactive or precursor enzymes?
- (a) pre (b) pra
(c) pro (d) en
7. What suffix is used for the inactive or precursor enzymes?
- (a) en (b) gen
(c) ken (d) sen
8. Match the following-
- | | |
|--------------------|-------------------------|
| (A) Hydrolase | 1. ceruloplasmin |
| (B) Ligase | 2. ALT |
| (C) Transferase | 3. Pyruvate carboxylase |
| (D) Oxidoreductase | 4. lipase |
- (a) A - 4 B - 3 C - 2 D - 1
(b) A - 1 B - 2 C - 3 D - 4
(c) A - 3 B - 2 C - 1 D - 4
(d) A - 1 B - 2 C - 3 D - 4
9. Which enzymes are used for catalyzing the reaction involving transfer of hydrogen?
- (a) reductase (b) dehydrogenase
(c) oxidases (d) peroxidases
10. All digestive enzymes are the example of which category of enzyme classification?
- (a) transferase (b) oxidoreductase
(c) hydrolase (d) all of the above
11. ligases are also known as?
- (a) synthetase (b) synthase
(c) both (d) none
12. Which of the following statement is NOT true?
- (a) ec-5 is ligases
(b) the 2nd digit indicates the type of group involved
(c) the 4th digit denotes the serial no. of the enzyme
(d) all enzymes are not proteins, there are exceptions

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- 13. Which of the following enzyme catalyzes the transfer a group from one molecule to another?**
(a) transferase (b) oxidoreductase
(c) hydrolase (d) all of the above
- 14. Which of the following enzyme forms the double bond in the product?**
(a) transferase (b) oxidoreductase
(c) hydrolase (d) none of the above
- 15. Phosphoglucomutase is the example of which category of enzyme classification?**
(a) ligase (b) isomerase
(c) lyase (d) both a and b
- 16. The allosteric inhibitor of an enzyme _____**
(a) Causes the enzyme to work faster
(b) Binds to the active site
(c) Participates in feedback regulation
(d) Denatures the enzyme
- 17. Which of the following is false about allosteric feedback inhibition?**
(a) Bacterial enzyme system is the first known example
(b) Conversion of L-leucine to L-isoleucine
(c) Threonine dehydratase is inhibited by isoleucine
(d) If the isoleucine concentration decreases, the rate of threonine dehydration increases
- 18. Which of the following is false?**
(a) Methyl, phosphoryl, adenylyl, uridylyl and adenosine diphosphate ribosyl groups are the modifying groups
(b) An example of an enzyme regulated by methylation is the methyl-donating chemo taxis protein of bacteria
(c) The protein is a part of the system that permits a bacterium to swim towards attractant
(d) The methylating agent is S- adenosylmethionine
- 19. Which of the following enzyme is responsible for the regulation of biological nitrogen fixation?**
(a) Dinitrogenase reductase (b) Dinitrogenase oxidase
(c) Phosphatase (d) Kinase

20. Which of the following enzymes catalyze the ADP-ribosylation of key cellular enzymes or proteins?
- (a) Diphtheria toxin and cholera toxin
 - (b) Dinitrogenase reductase
 - (c) Protein phosphatases
 - (d) Kinase
21. Removal of phosphoryl groups is catalyzed by _____
- (a) Diphtheria toxin and cholera toxin
 - (b) Dinitrogenase reductase
 - (c) Protein phosphatases
 - (d) Protein kinases
22. The attachment of phosphoryl groups to specific amino acid residues is catalyzed by _____
- (a) Diphtheria toxin and cholera toxin
 - (b) Dinitrogenase reductase
 - (c) Protein phosphatases
 - (d) Protein kinases
23. Which of the following is false about the following reaction?
- Phosphorylase a + 2H₂O → phosphorylase b + 2P_i**
- (a) Phosphorylase a is less active and phosphorylase b is more active
 - (b) Glycogen phosphorylase catalyzes this reaction
 - (c) Phosphorylase b can be transformed back into phosphorylase a by phosphorylase kinase
 - (d) Phosphorylase kinase catalyzes the transfer of phosphoryl groups from ATP to Phosphorylase b
24. Which of the following takes place due to phosphorylation of isocitrate dehydrogenase?
- (a) Inhibits the binding of citrate at active site
 - (b) Degrades the enzyme
 - (c) Enhances the substrate-binding affinity
 - (d) No reaction
25. Which of the following enzyme catalyzes a reaction that introduces reduced nitrogen into cellular metabolism?
- (a) Bacterial glutamine synthase
 - (b) Bacterial dinitrogenase reductase
 - (c) Bacterial dinitrogenase oxidase
 - (d) Phosphatase

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- 26. The nature of an enzyme is**
(a) Lipid (b) Vitamin
(c) Carbohydrate (d) Protein
- 27. In alcoholism, this enzyme is elevated**
(a) acid phosphatase (b) hepatitis
(c) serum glutamate pyruvate transaminase
(d) glutamyl transpeptidase
- 28. With regards to enzyme action, this statement is incorrect**
(a) Malonate is a competitive inhibitor of succinic dehydrogenase
(b) the substrate binds with the enzyme at its active site
(c) the non-competitive inhibitor binds the enzyme at a site distinct from that binding the substrate
(d) addition of a lot of succinates does not reverse the inhibition of succinic dehydrogenase by malonate
- 29. What is the count of genes that determine the synthesis of one enzyme?**
(a) One (b) Four
(c) Eight (d) Sixteen
- 30. This enzyme was first isolated and purified in the form of crystals**
(a) Urease (b) pepsin
(c) Amylase (d) Ribonuclease
- 31. Macromolecule chitin is**
(a) a simple polysaccharide
(b) sulphur containing polysaccharide
(c) phosphorous containing polysaccharide
(d) nitrogen containing polysaccharide
- 32. Enzyme-driven metabolic pathways can be made more efficient by**
(a) grouping enzymes into multienzyme free-floating complexes
(b) concentrating enzymes with specific cellular compartments
(c) fixing enzymes into membranes so they are adjacent to each other
(d) all of these
- 33. Tryptophan synthetase of *E.coli*, a typical bifunctional oligomeric enzyme consists of**
(a) a protein A and one subunit A
(b) a protein designated A
(c) two proteins designated A and B
(d) a protein designated B

- 34. This statement about enzymes is true**
- (a) enzymes accelerate reactions by lowering the activation energy
 - (b) enzymes are proteins whose three-dimensional form is key to their function
 - (c) enzymes do not alter the overall change in free energy for a reaction
 - (d) all of these
- 35. The enzyme COX-1 is vital for human health in this way:**
- (a) it is a chemical derivative of aspirin
 - (b) catalyzes the hormone-production which maintains the stomach lining
 - (c) critical for the biosynthesis of DNA
 - (d) helps in the transportation of carbon dioxide in the blood
- 36. The general mechanism is that an enzyme acts by**
- (a) reducing the energy of activation
 - (b) increasing the energy of activation
 - (c) decreasing the pH
 - (d) increasing the pH
- 37. The coenzyme is**
- (a) often a metal
 - (b) always a protein
 - (c) often a vitamin
 - (d) always an inorganic compound
- 38. An enzyme that joins the ends of two strands of nucleic acid is**
- (a) polymerase
 - (b) ligase
 - (c) synthetase
 - (d) helicase
- 39. Which of the following is produced with the combination of apoenzyme and coenzyme?**
- (a) Holoenzyme
 - (b) Enzyme substrate complex
 - (c) Prosthetic group
 - (d) Enzyme product complex
- 40. An example of competitive inhibition of an enzyme is the inhibition of**
- (a) succinic dehydrogenase by malonic acid
 - (b) cytochrome oxidase by cyanide
 - (c) hexokinase by glucose-6-phosphate
 - (d) carbonic anhydrase by carbon dioxide
- 41. Blocking of enzyme action by blocking its active sites is**
- (a) allosteric inhibition
 - (b) feedback inhibition
 - (c) competitive inhibition
 - (d) non-competitive inhibition

42. Diastase takes part in digestion of _____.
 (a) Protein (b) Starch
 (c) Amino acids (d) Fat
43. Enzyme catalyzing rearrangement of atomic groupings without altering molecular weight or number of atoms is
 (a) ligase (b) isomerase
 (c) oxidoreductase (d) hydrolase
44. Enzyme complex involved in alcoholic fermentation is
 (a) Zymase (b) Invertase
 (c) Lipase (d) Amylase
45. Zymogen or proenzyme is a
 (a) Modulator (b) Vitamin
 (c) Enzyme precursor (d) Hormone
46. Enzymes are basically made up of
 (a) Fats (b) Proteins
 (c) Nucleic acids (d) Vitamins
47. Catalysts are different from enzymes in
 (a) functional at high temperature
 (b) not used up in reaction
 (c) being proteinaceous (d) having high rate diffusion
48. Enzymes are polymers of
 (a) Hexose sugar (b) Amino acids
 (c) Fatty acids (d) Inorganic phosphate
49. The enzyme which hydrolyses starch to maltose is
 (a) protease (b) amylase
 (c) lactase (d) maltase
50. Value needed for enzyme action is _____.
 (a) Low K_m (b) Low K_i
 (c) High K_m (d) High K_i

Answer Keys

- | | | | | | |
|---------|---------|---------|---------|---------|---------|
| 1. (c) | 2. (d) | 3. (b) | 4. (b) | 5. (b) | 6. (c) |
| 7. (b) | 8. (a) | 9. (b) | 10. (c) | 11. (a) | 12. (a) |
| 13. (a) | 14. (d) | 15. (b) | 16. (c) | 17. (b) | 18. (b) |
| 19. (a) | 20. (a) | 21. (c) | 22. (d) | 23. (a) | 24. (a) |
| 25. (a) | 26. (d) | 27. (d) | 28. (d) | 29. (a) | 30. (a) |
| 31. (d) | 32. (d) | 33. (c) | 34. (d) | 35. (b) | 36. (a) |
| 37. (c) | 38. (b) | 39. (a) | 40. (a) | 41. (c) | 42. (b) |

43. (b) 44. (a) 45. (c) 56. (b) 47. (b) 58. (b)
49. (b) 50. (b)

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- 8. Presence of sugar in urine indicate-**
(a) Kidney stone (b) Hepatitis
(c) Diabetes (d) Proteinuria
- 9. Normal blood PH is----**
(a) 4.5 (b) 6.5
(c) 7.4 (d) 8.0
- 10. The level of.....increased in hepatitis.**
(a) Sugar (b) Bile pigments
(c) Ketone bodies (d) Pus cells
- 11. The normally urinary output ranges between.....ml/day.**
(a) 1000-1500 (b) 500-1000
(c) 1500-2000 (d) 800-1000
- 12. The normal life span of a matured red blood cells is about-**
(a) 60 ± 20 days (b) 80 ± 20 days
(c) 120 ± 20 days (e) 75 ± 20 days
- 13. What is the normal WBC count at birth ?**
(a) 10,000/Cu.mm of blood (b) 20,000/Cu.mm of blood
(c) 30,000/Cu.mm of blood (d) 40,000/Cu.mm of blood
- 14. What is the normal percentage of basophil in TLC**
(a) 75% (b) 10%
(c) 4% (d) 1%
- 15. What is the normal range of platelets-**
(a) 4000-10,000/Cu.mm of blood
(b) 50,000-1,00,000/Cu.mm of blood
(c) 1,50,000-3,50,000/Cu.mm of blood
(d) 2000-8,000/Cu.mm of blood
- 16. In pernicious anemia, the intrinsic factor is secreted by----**
—cells present in GI mucosa.
(a) Visceral (b) Langerhan
(c) Parietal (d) All of the above
- 17. How does anemia affect body ?**
(a) The blood becomes thin
(b) The blood does not deliver enough oxygen to the body
(c) Tissues retain fluid (d) None of the above
- 18. The shape of normal red blood cells is-**
(a) Round shape (b) Sickle shape
(c) Spherical (d) Disc shape

19. Presence of sugar in urine is detected by.....
(a) Sanger's test (b) Ninhydrin test
(c) Benedict's test (d) Saponification test
20. Rothera's test is used to detectpresent in urine.
(a) Sugar (b) Ketone bodies
(c) Proteins (d) Pus cells
21. When the volume of urine excreted in 24 hrs. is less than 100 ml, it is.....
(a) Oliguria (b) Polyuria
(c) Anuria (d) Dysuria
22. The color of the normal urine is-
(a) Pale Yellow (b) Dark Yellow
(c) Pale Yellow (d) None of the Above
23. Red coloured urine indicates -
(a) Proteinuria (b) Ketonuria
(c) Pyuria (d) Haematuria
24. For Detection of presence of Ketone bodies in urine,.....test is used.
(a) Biuret (b) Benedict
(c) Rothera's (d) Sulphosalicylic acid
25. When the urine contains substances required for the body, it is
(a) Pathological urine (b) Physiological urine
(c) Both of the above (d) None of the above
26. Sulphur powder test is used for detection of in the urine
(a) Ketone bodies (b) Bile salts
(c) Proteins (d) Pus cells
27. Blood In the urine sample is detected by-
(a) Hay's Test (b) Sakaguchi test
(c) Benzidine test (d) Benedict Test
28. Common identification test for lipid is-
(a) Ninhydrin test (b) Grease spot test
(c) Benedict test (d) Biuret test
29. Following are the abnormal constituents of urine except
(a) Sugar (b) Proteins
(c) Uric acid (d) Pus cells

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30. Salkowski test is used for identification of-
- (a) Cholesterol
 - (b) Proteins
 - (c) Sugar
 - (d) None of the above
31. Deep Yellow coloured urine indicates-
- (a) Diabetes
 - (b) Hypertension
 - (c) Jaundice
 - (d) Fungal infection
32. The Specific gravity of normal urine is
- (a) 1.00-1.10
 - (b) 1.03-1.30
 - (c) 1.003-1.030
 - (d) 1.20-1.30
33. Proteins present in the urine can be detected by-----
- (a) Benedict test
 - (b) Hay's test
 - (c) Heller's test
 - (d) Rothera's test
34. Heat coagulation test is used for identification of Present in the urine
- (a) Protein
 - (b) Carbohydrate
 - (c) Sugar
 - (d) Bile pigments
35. Melting point of fat is..... And melting point of oil is.....
- (a) Higher, higher
 - (b) Lower, lower
 - (c) Lower, higher
 - (d) Higher, lower
36. Saponification is done by-
- (a) Acids
 - (b) Alkaline hydrolysis
 - (c) Salts
 - (d) All of the above
37. Fats with unsaturated fatty acids are.... At room temperature.
- (a) Liquid
 - (b) Solid
 - (c) Gas
 - (d) All of the above
38. Fat and oil are
- (a) monoester of glycerol
 - (b) diester of glycerol
 - (c) triester of glycerol
 - (d) all of the above
39. Pyuria is presence of... in urine.
- (a) Glucose
 - (b) Pus cells
 - (c) Proteins
 - (d) Bile salts
40. The color produced in libermann's test
- (a) Orange
 - (b) Red
 - (c) Yellow
 - (d) Black

- 41. Lymphocytes are of two types, they are**
(a) T-cells and erythrocytes (b) Erythrocytes and Platelets
(c) T-cells and Platelets (d) T-cells and B-cells
- 42. Which of these immune cells are able to quickly respond post any subsequent encounter with the same antigen?**
(a) helper T cells (b) memory cells
(c) plasma cells (d) basophil
- 43. Basophils, eosinophils and Neutrophils are referred to as**
(a) Platelets (b) Astrocytomas
(c) Granulocytes (d) Buffers
- 44. Cytotoxic T cells destroy the target cells**
(a) through injection of tumor necrosis factor
(b) by phagocytosis
(c) through insertion of perforins into the target's membrane
(d) by releasing oxidizing agents
- 45. This is not a cardinal sign of inflammation**
(a) redness (b) heat
(c) swelling and pain (d) opsonization
- 46. _____ are released in the respiratory burst having the potent of cell-killing ability**
(a) histamines (b) neutrophils
(c) free radicals
(d) platelets-derived growth factors
- 47. The phenomena that initiates when a helper T cell binds with a class II MHC protein on a displaying cell is referred to as**
(a) T cell proliferation (b) costimulation
(c) self-antigen recognition (d) antigen proliferation
- 48. The lymphocytes which can develop immunocompetence in the thymus is**
(a) B lymphocytes (b) T lymphocytes
(c) NK cells (d) None of these
- 49. An immune response when provoked by a nonself particle is known as**
(a) immunoglobulin (b) antibody
(c) antigen (d) interferon

50. The only blood cells which are not viewed as a part of the immune system are
(a) fat cells (b) glial cells
(c) osteocytes (d) red blood cells
51. The blood cells that do not have any pigment and nucleus are
(a) Agranulocytes (c) erythrocytes
(c) leukocytes (d) thrombocytes
52. The dengue fever leads to the decrease in
(a) sucrose (b) white blood cells
(c) platelets (d) red blood cells
53. The temporary seal at damaged areas is classified as
(a) Clot (b) cristae
(c) sternum (d) none of above
54. The white substance seen at sites of infection which is the accumulation of dead cells is called
(a) Cristae (b) sternum
(c) clot (d) pus
55. The number of platelets in one cubic millimeter of blood is
(a) 100000 (b) 150000
(c) 250000 (d) 350000

Answer Keys

- | | | | | | |
|---------|---------|---------|---------|---------|---------|
| 1. (b) | 2. (c) | 3. (a) | 4. (c) | 5. (b) | 6. (c) |
| 7. (d) | 8. (c) | 9. (c) | 10. (b) | 11. (a) | 12. (c) |
| 13. (b) | 14. (d) | 15. (c) | 16. (c) | 17. (b) | 18. (d) |
| 19. (c) | 20. (b) | 21. (c) | 22. (a) | 23. (d) | 24. (c) |
| 25. (a) | 26. (b) | 27. (c) | 28. (b) | 29. (c) | 30. (a) |
| 31. (c) | 32. (c) | 33. (c) | 34. (a) | 35. (d) | 36. (b) |
| 37. (a) | 38. (c) | 39. (b) | 40. (b) | 41. (d) | 42. (b) |
| 43. (c) | 44. (c) | 45. (d) | 56. (c) | 47. (b) | 58. (b) |
| 49. (c) | 50. (d) | 51. (d) | 42. (c) | 53. (a) | 54. (d) |
| 55. (c) | | | | | |