33. Biomolecules - Multiple Choice Questions

1. Carbohydrates

1. Glucose will show mutarotation when solvent is

(a) Acidic (b) Basic

(c) Neutral (d) Amphoteric

2. Galactose is converted into glucose in

(a) Mouth (b) Stomach

c) Liver (d) Intestine

3. Glucose has difference from fructose in that it

(a) Does not undergo hydrolysis

(b) Gives silver mirror with Tollen's reagent

(c) Monosaccharide

(d) None of these

4. The letter '*D*' in *D* -glucose signifies

(a) Configuration at all chiral carbons

(b) Dextrorotatory

(c) That is a monosaccharide

(d) Configuration at a particular chiral carbon

5. Glucose in blood can be quantitatively determined with

(a) Tollen's reagent

(b) Benedict's solution

(c) Alkaline iodine solution

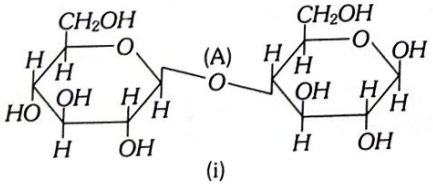
(d) Bromine water

6. Which of the following polymer is stored in the liver of animals

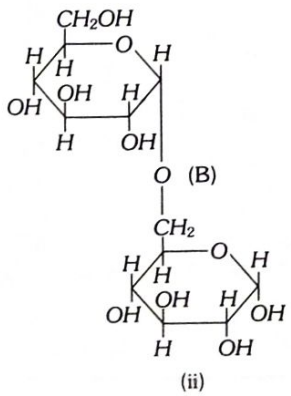
(a) Amylose (b) Cellulose

(c) Amylopectin (d) Glycogen

7. Three structures are given below in which two glucose units are linked. Which of these linkages between glucose units are between C_1 and C_4 and which linkages are between C_1 and C_6



(i)



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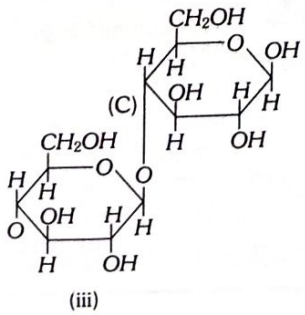


(iii)

(a) (A) is between C1 and C4, (B) and (C) are between C1 and C6

(b) (A) and (B) are between C1 and C4, (C) is between C1 and C6

(c) (A) and (C) are between C1 and C4, (B) is between C1 and C6

(d) (A) and (C) are between C1 and C6, (B) is between C_1 and C_4

8. Glucose when heated with CH_3OH in presence of dry *HCl* gas gives α and $\beta-$methyl glucosides because it contains

(a) An aldehyde group (b) A $-CH_2OH$ group

(c) A ring structure (d) Five hydroxyl groups

9. The reagent which forms crystalline osazone derivative when reacted with glucose, is

(a) Fehling solution (b) Phenylhydrazine

(c) Benedict solution (d) Hydroxylamine

10. Glucose reacts with acetic anhydride to form

(a) Mono-acetate (b) Tetra-acetate

(c) Penta-acetate (d) Hexa-acetate

11. Glucose and mannose are

(a) Epimers (b) Anomers

(c) Ketohexoses (d) Disaccharides

12. In fructose, the possible optical isomers are

(a) 12 (b) 8

(c) 16 (d) 4

13. If an aqueous solution of glucose allowed to freeze then crystal of which will be separated out first

(a) Glucose (b) Water

(c) Both of these (d) None of these

14. Which of the following indicates open chain structure of glucose

(a) Penta-acetyl derivative of glucose

(b) Cyanohydrin formation with *HCN*

(c) Reaction with Fehling solution

(d) Reaction with Tollen's reagent

15. Diabetes is detected using ..... by testing urine of patients

(a) Fehling's solution (b) Tollen's reagent

(c) Benedict's solution (d) Baeyer's reagent

16. During conversion of glucose into glucose cyanohydrin, what functional group/ atom of glucose is replaced

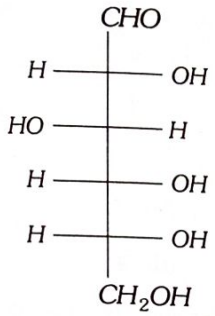
(a) Hydrogen

(b) Aldehydic group

(c) Primary alcoholic group

(d) Secondary alcoholic group

17. The structure of D-(+)-glucose is



The structure of L-(–)-glucose is

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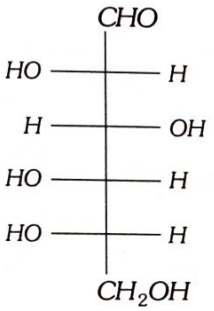

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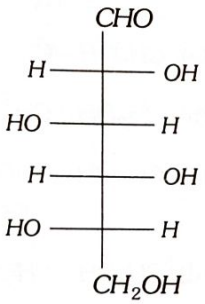

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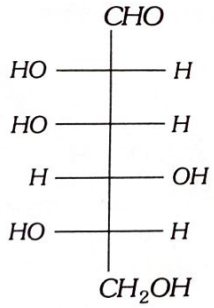

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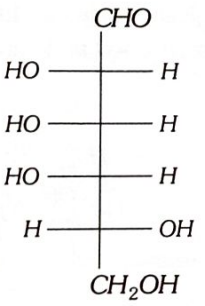

18. When glucose reacts with bromine water, the main product is

(a) Acetic acid (b) Saccharic acid

(c) Glyceraldehyde (d) Gluconic acid

19. Glycogen is a branched chain polymer of $\alpha - D$ glucose units in which chain is formed by $C1 - C4$ glycosidic linkage whereas branching occurs by the formation of $C1 - C6$ glycosidic linkage. Structure of glycogen is similar to .....

(a) Amylose (b) Amylopectin

(c) Cellulose (d) Glucose

20. Which of the following statements is not true about glucose

(a) It is an aldohexose

(b) On heating with HI it forms n-hexane

(c) It is present in furanose form

(d) It does not give 2, 4-DNP test

21. Which of the following reactions of glucose can be explained only by its cyclic structure

(a) Glucose forms pentaacetate

(b) Glucose reacts with hydroxylamine to form an oxime

(c) Pentaacetate of glucose does not react with hydroxyl amine

(d) Glucose is oxidised by nitric acid to gluconic acid

22. Hydrolysis of sucrose is called

(a) Esterification (b) Saponification

(c) Inversion (d) Hydration

23. The charring of sugar, when treated with conc. H_2SO_4, is due to

(a) Oxidation (b) Reduction

(c) Dehydration (d) Hydrolysis

24. When sucrose is heated to $483\,K$ temperature, it loses water and forms a brown amorphous substance called

(a) Aspartame (b) Caramel

(c) Alitame (d) Sucrolose

25. Sucrose (cane sugar) is a disaccharide. One molecule of sucrose on hydrolysis gives.....

(a) 2 molecules of glucose

(b) 2 molecules of glucose + 1 molecule of fructose

(c) 1 molecules of glucose + 1 molecule of fructose

(d) 2 molecules of fructose

26. Which enzyme converts sucrose into ethanol

(a) Diastase (b) Invertase

(c) Zymase (d) Both (b) and (c)

27. In disaccharides, if the reducing groups of monosaccharides, *i.e.*, aldehydic or ketonic groups are bonded, these are non-reducing sugars. Which of the following disaccharide is a non-reducing sugar

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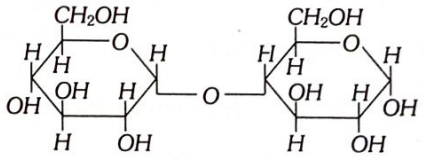

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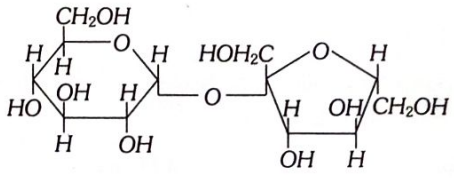

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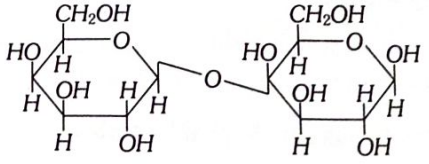

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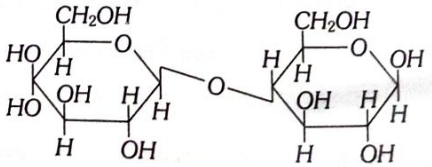


28. Sucrose molecule is made up of

(a) A gluco pyranose and a fructo pyranose

(b) A gluco pyranose and a fructo furanose

(c) A gluco furanose and a fructo pyranose

(d) A gluco furanose and a fructo furanose

29. The intermediate compound formed in the conversion of starch to glucose is

(a) Lactose (b) Sucrose

(c) Maltose (d) Fructose

30. Starch is converted into maltose by the

(a) Maltase (b) Invertase

(c) Zymase (d) Diastase

31. Which one of the following is a polysaccharide

(a) Nylon (b) Amylose

(c) Ribose (d) Polyethylene

32. Glycogen is

(a) Structurally very much similar to amylopectin

(b) A polymer of $\beta - D$ – glucose units

(c) Structurally similar to amylopectin but extensively branched

(d) A structural polysaccharide

33. Schweitzer's reagent used for dissolving cellulose in the manufacture of artificial silk is

(a) $CuSO_4 .5H_2O$

(b) CuI

(c) $[Cu(NH_3)_4]SO_4$

(d) $Cu(CH_3COO)_2 .Cu(OH)_2$

34. Which carbohydrates is an essential constituents of plant cells

(a) Cellulose (b) Sucrose

(c) Vitamins (d) Starch

35. An example of a disaccharide made up of two units of the same monosaccharides is

(a) Sucrose (b) Maltose

(c) Lactose (d) None of these

36. To become a carbohydrate a compound must contain at least

(a) 2 carbons (b) 3 carbons

(c) 4 carbons (d) 6 carbons

37. Which is used in motion picture films

(a) Cellulose acetate (b) Glucose acetate

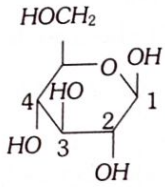
(c) Starch acetate (d) Sucrose acetate

38. Which of the following does not show any reducing test of aldehyde

(a) Sucrose (b) Fructose

(c) Maltose (d) Lactose

39. In the following structure,



anomeric carbon is

(a) 1 (b) 2

(c) 3 (d) 4

40. Which one of the following is the first member of monosaccharides

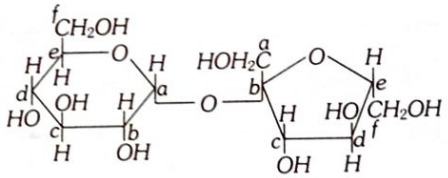
(a) $CH_2OH - \overset{O}{\overset{\|}{C}} - CH_2OH$

(b) $CH_2OH - CHOH - CHO$

(c) $CH_2OH - CHOH - CHOH - CHO$

(d) $CH_2OH - CHOH - \overset{O}{\overset{\|}{C}} - CH_2OH$

41. Structure of disaccharide formed by glucose and fructose is given below. Identify anomeric carbon atoms in monosaccharide units



(a) 'a' carbon of glucose and 'a' carbon of fructose

(b) 'a' carbon of glucose and 'e' carbon of fructose

(c) 'a' carbon of glucose and 'b' carbon of fructose

(d) 'f' carbon of glucose and 'f'' carbon of fructose

42. Glucose and fructose form

(a) Same osazone

(b) Same acid on oxidation

(c) Same alcohol when reduced

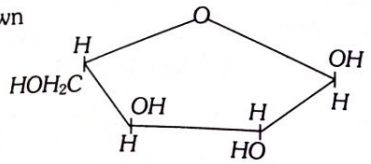
(d) Different osazone

43. Which one of the following is laevorotatory

(a) Glucose (b) Sucrose

(c) Fructose (d) None of these

44. Which set of terms correctly identifies the carbohydrate shown



1. Pentose
2. Hexose
3. Aldose
4. Ketose
5. Pyranose
6. Furanose

(a) 1, 3 and 6 (b) 1, 3 and 5

(c) 2, 3 and 5 (d) 2, 3 and 6

(e) 1, 4 and 6

45. An invert sugar is

(a) Isorotatory (b) Dextrorotatory

(c) Laevorotatory (d) Optically inactive

46. Which of the following is an aldohexose

(a) Cellulose (b) Sucrose

(c) Galactose (d) Raffinose

47. Raffinose is

(a) Trisaccharide (b) Monosaccharide

(c) Disaccharide (d) None of these

48. To detect the reducing and non-reducing sugars, which of the following test is used

(a) Molisch test (b) Biuret test

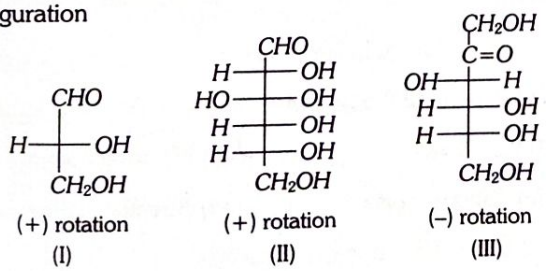
(c) Fehling's test (d) Millon's test

49. In which of the following compound, all the monosaccharide units are not joined by $C_1 - O - C_4$ chain

(a) Maltose (b) Lactose

(c) Cellulose (d) Amylopectin

50. Optical rotations of some compounds along with their structures are given below which of them have D configuration



(+) rotation (I)

(+) rotation (II)

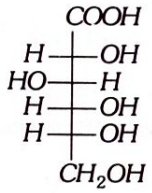
(–) rotation (III)

(a) I, II, III (b) II, III

(c) I, II (d) III

51. D-Glucose upon treatment with bromine-water gives

(a)



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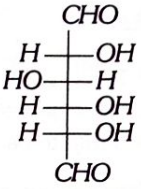

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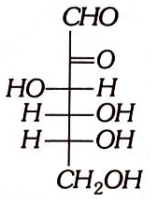

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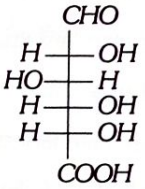


52. If $\alpha - D -$ glucose is dissolved in water and kept for a few hours, the major constituent (s) present in the solution is (are)

(a) $\alpha - D -$ glucose

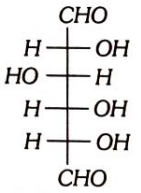
(b) Mixture of $\beta - D -$ glucose and open chain $D -$ glucose

(c) Open chain D-glucose

(d) Mixture of $\alpha - D -$ glucose and $\beta - D -$ glucose

53. The reaction of $D -$ glucose with ammoniacal $AgNO_3$ produces

(a)



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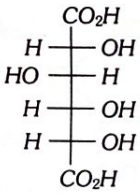

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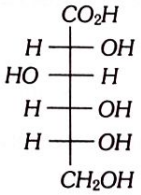

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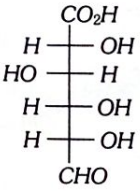


2. Proteins, Amino Acids and Enzymes

1. Amino acids have peptide linkage which is

(a) $-CO-NH-$ (b) $-C-NH_2$

(c) $SO-NH-$ (d) $-CO-N-$

2. Which of the following is not a classification of proteins

(a) Enzymes (b) Antibodies

(c) Antigens (d) Hormones

3. The optically inactive amino acid is

(a) Lysine (b) Glycine

(c) Arginine (d) Alanine

4. Which of the following element is present in insulin

(a) Na (b) Zn

(c) Li (d) None of these

5. Each polypeptide in a protein has amino acids linked with each other in a specific sequence. This sequence of amino acids is said to be .....

(a) Primary structure of proteins

(b) Secondary structure of proteins

(c) Tertiary structure of proteins

(d) Quateranary structure of proteins

6. Which of the following is not essential amino acid

(a) Valine (b) Lysine

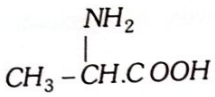
(c) Histidine (d) Glycine

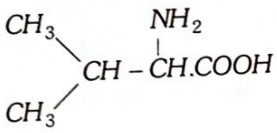
7. Which one of the following is an example of a globular protein

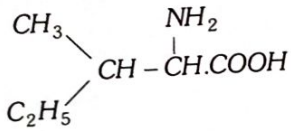
(a) Keratin (b) Insulin

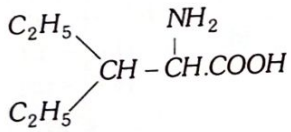
(c) Collagen (d) Myoglobin

8. The structural formula of an amino acid, isoleucine is

(a) 

(b) 

(c) 

(d) 

9. Proteins fulfil several functions in living systems. An example of a protein which acts as a hormone is

(a) Casein (b) Oxytocin

(c) Trypsin (d) Keratin

10. Proteins are found to have two different types of secondary structures *viz* α – helix and β – pleated sheet structure. α – helix structure of protein is stabilized by

(a) Peptide bonds (b) Van der Waals, forces

(c) Hydrogen bonds (d) Dipole-dipole interactions

11. Which amino acid has imidazole ring

(a) Alanine (b) Leucine

(c) Tyrosine (d) Histidine

12. Which part of the protein molecule is responsible for function and activity of the proteins

(a) Secondary structure (b) Peptide bond

(c) Primary structure (d) Binding sites

13. Sanger's reagent is used for the identification of

(a) *C*-terminal amino acid of peptide chain

(b) *N*-terminal amino acid of peptide chain

(c) Molecular mass of protein

(d) Secondary structure of protein

14. Which compound can exist in a dipolar (zwitter ion) state

(a) $C_6H_5CH_2CH(N=CH_2)COOH$

(b) $(CH_3)_2CH.CH(NH_2)COOH$

(c) $C_6H_5CONHCH_2COOH$

(d) $HOOC.CH_2CH_2COCOOH$

15. The pK_{a_1} and pK_{a_2} of an amino acid are 2.3 and 9.7 respectively. The isoelectric point of the amino acid is

(a) 12.0 (b) 7.4

(c) 6.0 (d) 3.7

16. Hydrolysis of proteins give

(a) α -amino acids only

(b) β -amino acids only

(c) γ -amino acids only

(d) Mixture of all *i.e.*, α, β and γ -amino acids

17. Which of the following amino acid is neutral

(a) Glycine (b) Aspartic acid

(c) Lysine (d) Arginine

18. Amino acids usually exist in the form of Zwitter ions. This means that it consists of

(a) The basic group $-NH_2$ and the acidic group $-COOH$

(b) The basic group $-NH_3^+$ and the acidic group $-CO_2$

(c) The basic group $-CO_2^-$ and the acidic group NH_3^+

(d) No acidic or basic group

19. Which one of the following biomolecules is insoluble in water

(a) α- Keratin (b) Haemoglobin

(c) Ribonuclease (d) Adenine

20. At $pH = 4$, glycine exists as

(a) $H_3\overset{+}{N}-CH_2-COO^-$ (b) $H_3\overset{+}{N}-CH_2-COOH$

(c) H_2N-CH_2-COOH (d) $H_2N-CH_2-COO^-$

21. Protein can be most easily removed from

(a) Alkanes (b) Alkenes

(c) Alkynes (d) Benzene

22. Which of the following ions can cause coagulation of proteins

(a) Na^+ (b) Ag^+

(c) Ca^{++} (d) Mg^{++}

23. A substance forms zwitter ion. It can have functional groups

(a) $-NH_2, -COOH$ (b) $-NH_2, -SO_3H$

(c) Both (d) None of these

24. The structural feature that distinguishes proline from other amino acids are

(a) It is a secondary amine

(b) It is a primary amine

(c) It is a tertiary amine

(d) It exists as cyclic amide

25. Pepsin enzyme hydrolyses

(a) Proteins to amino acids

(b) Fats to fatty acids

(c) Glucose to ethyl alcohol

(d) Polysaccharides to monosaccharides

26. Enzymes are

(a) Living organisms

(b) Dead organisms

(c) Complex nitrogenous substances produced in living cells

(d) None of these

27. Enzymes belong to which class of compounds

(a) Polysaccharides

(b) Polypeptides

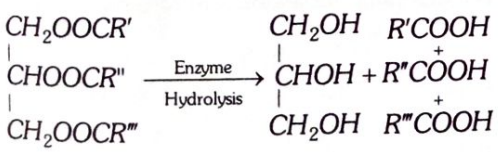
(c) Polynitrogen heterocyclic compounds

(d) Hydrocarbons

28. Cellulose is not digestible by human beings due to the absence of a cellulose hydrolysing enzyme, called

(a) Cellulase (b) Zymase

(c) Invertase (d) Urease

29. 

The enzyme used in the above reaction is

(a) Amylase (b) Lactase

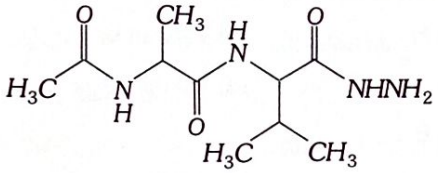
(c) Lipase (d) Invertase

30. The enzyme ptyalin used for the digestion of food is present in

(a) Saliva (b) Blood

(c) Intestines (d) Adrenal glands

31. The number of peptide bonds in the compound



is

(a) 1 (b) 2

(c) 3 (d) 4

32. Among the α –amino acids–threonine, tyrosine, methionine, arginine and tryptophan, those which contain an aromatic group in their side chain are

(a) Threonine and arginine (b) Tyrosine and tryptophan

(c) Methionine and tyrosine (d) Arginine and tryptophan

3. Vitamins, Hormones and Nucleic acids

1. Which substance is not present in nucleic acid

(a) Cytosine (b) Adenine

(c) Thymine (d) Guanidine

2. Vitamin B_1 is

(a) Riboflavin (b) Cobalamin

(c) Thiamine (d) Pyridoxine

3. The deficiency of vitamin-C causes

(a) Scurvy (b) Rickets

(c) Pyrrohea (d) Pernicious Anaemia

4. The best source of vitamin A is

(a) Beans (b) Pulses

(c) Orange (d) Carrot

5. Which of the following B group vitamins can be stored in our body

(a) Vitamin B_1 (b) Vitamin B_2

(c) Vitamin B_6 (d) Vitamin B_{12}

6. Acquired immune deficiency syndroms (AIDS) is characterised

(a) Killer T-cells

(b) Reduction in number of helper T-cells

(c) An autoimmune disease

(d) Inability of body to produce interferons

7. Vitamin B_6 is known as

(a) Pyridoxin (b) Thiamine

(c) Tocopherol (d) Riboflavin

8. Biotin is an organic compound present in yeast. Its deficiency in diet causes dermatitis and paralysis. It is also known as

(a) Vitamin *H* (b) Vitamin B_3

(c) Vitamin B_{12} (d) Vitamin *D*

(e) Vitamin *E*

9. Which vitamin is not obtained from plants

(a) Thiamine (b) Cyanocobalamine

(c) Pyridoxine (d) α -Tocopherol

10. Which do the following vitamins has isoprene units in its structure

(a) Vitamin *A* (b) Vitamin C

(c) Vitamin B_2 (d) Vitamin *D*

11. For which vitamin, liver is not the source

(a) Vitamin - B_1 (b) Vitamin - B_2

(c) Vitamin - B_{12} (d) Vitamin – *H*

12. Which of the following is not a sex hormone

(a) Testosterone (b) Estrone

(c) Estradiol (d) Cortisone

13. The first Hormone chemically synthesized in the laboratory is

(a) Cortisone (b) Insulin

(c) Adrenaline (d) Estrone

14. The base adenine occurs in

(a) DNA only (b) RNA only

(c) DNA and RNA both (d) Protein

15. The base present in DNA, but not in RNA is

(a) Guanine (b) Adenine

(c) Uracil (d) Thymine

16. The function of DNA in an organism is

(a) To assist in the synthesis of RNA molecule

(b) To store information of heredity characteristics

(c) To assist in the synthesis of proteins and polypeptides

(d) All of these

17. An alternation in the base sequence of nucleic acid molecule is called

(a) Replication (b) Mutation

(c) Duplication (d) Dislocation

(e) Flocculation

18. In DNA, the linkages between different nitrogenous bases are

(a) Phosphate linkage (b) H-bonding

(c) Glycosidic linkage (d) Peptide linkage

19. Which of the following bases is not present in DNA

(a) Adenine (b) Thymine

(c) Cytosine (d) Uracil

20. Which of the following is correct about *H*-bonding in DNA

(a) A – T, G – C (b) A – G, T – G

(c) G – T, A – C (d) A – A, T – T

21. Which of the following statements about the assembly of nucleotides in a molecule of deoxyribose nucleic acid (DNA) is correct

(a) A pentose of one unit connects to a pentose of another

(b) A pentose of one unit connects to the base of another

(c) A phosphate of one unit connects to a pentose of another

(d) A phosphate of one unit connects to the base of another

22. Mutation of DNA occurs due to changes in the sequence of one of the following

(a) Bases (b) Ribose units

(c) Phosphate units (d) Sugar units

23. Purine derivative among the following bases is

(a) Guanine (b) Cytosine

(c) Thymine (d) Uracil

24. Nucleic acid is a polymer of

(a) Nucleosides (b) α – amino acids

(c) Nucleotides (d) Glucose

25. A nucleoside on hydrolysis gives

(a) A heterocyclic base and orthophosphoric acid

(b) An aldopentose, a heterocyclic base and orthophosphoric acid

(c) An aldopentose and a heterocyclic base

(d) An aldopentose and orthophosphoric acid

26. Starting with three different amino acid molecules, how many different tripeptide molecules are formed

(a) 12 (b) 9

(c) 8 (d) 6

27. Ribose is an example of

(a) Ketohexose (b) Aldopentose

(c) Disaccharide (d) Aldohexose

28. Ribose and 2-deoxyribose can be differentiated by

(a) Fehling's reagent (b) Tollens's reagent

(c) Barfoed's reagent (d) Osazone formation

29. Dinucleotide is obtained by joining two nucleotides together by phosphodiester linkage. Between which carbon atoms of pentose sugars of nucleotides are these linkages present

(a) 5' and 3' (b) 1' and 5'

(c) 5' and 5' (d) 3' and 3'

4. Metabolism

1. Metabolic function in human bodies is carried out by

(a) Lipids (b) Peptides

(c) Nucleic acid (d) Enzymes

2. The most important energy carrier in all the living cells is

(a) AMP (b) ATP

(c) ADP (d) UDP

3. The source of energy in a cellular reaction is

(a) Chemical energy (b) Light energy

(c) Heat energy (d) Solar radiation

4. The decomposition of complex organic compounds into simpler compound with the help of enzyme is known as

(a) Catabolism (b) Anabolism

(c) Fermentation (d) Metabolism

5. Which one of the following metal ions is essential inside the cell for the metabolism of glucose/ synthesis of proteins

(a) Ca^{2+} (b) Mg^{2+}

(c) Na^{+} (d) K^{+}

5. Miscellaneous Biomolecules

1. A certain compound gives negative test with ninhydrin and positive test with Benedict's solution. The compound is

(a) A protein (b) A monosaccharide

(c) A lipid (d) An amino acid

2. Chlorophyll contains

(a) *Fe* (b) *Na*

(c) *Mg* (d) *Zn*

3. Which of the following is used to build and repair body tissues

(a) Cane sugar (b) Fructose

(c) Proteins (d) Glucose

4. The most important food reserves of animals and plants are

(a) Carbohydrates (b) Proteins

(c) Vitamins (d) Fats

5. Which of the following gives maximum energy in metabolic processes

(a) Proteins (b) Carbohydrates

(c) Lipids (d) Vitamins

6. α-helix is found in

(a) DNA (b) RNA

(c) Lipid (d) Protein

7. A codon has a sequence of *A*, and specifies a particular B that is to be incorporated into *C*. What are *A*, *B*, *C*

	A	B	C
(a)	3 bases	amino acid	carbohydrate
(b)	3 acids	carbohydrate	protein
(c)	3 bases	protein	amino acid
(d)	3 bases	amino acid	protein

8. Which of the following statements is not correct

(a) Allergic conditions are cured by anti-histamines

(b) Hormones are continuously produced but not stored in the body

(c) The function of the white blood cells is to protect the body against infection

(d) Catabolism involves degradation of molecules

9. The cell membranes are mainly composed of

(a) Carbohydrates (b) Proteins

(c) Phospholipids (d) Fats

10. Artificial silk is

(a) Polyamides (b) Polyesters

(c) Polyacids (d) Polysaccharides

6. IIT-JEE/ AIEEE

1. The term anomers of glucose refers to **[2006]**

(a) Isomers of glucose that differ in configurations at carbons one and four (*C*-1 and *C*-4)

(b) A mixture of (*D*)-glucose and (*L*)-glucose

(c) Enantiomers of glucose

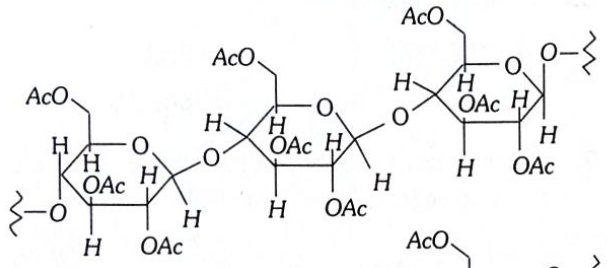
(d) Isomers of glucose that differ in configuration at carbon one (*C*-1)

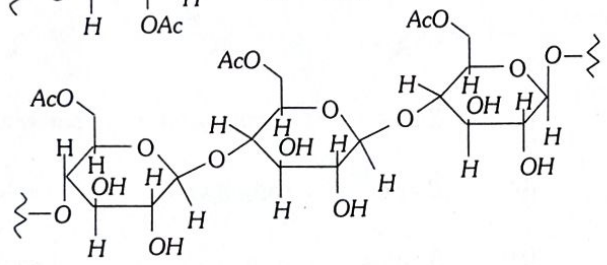
2. The two forms of *D*-glucopyranose obtained from the solution of *D*-glucose are called **[2005]**

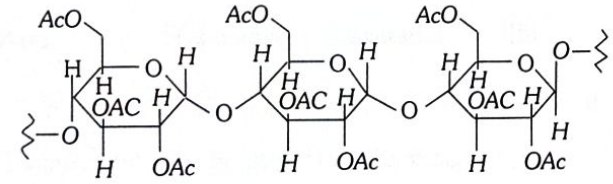
(a) Isomer (b) Anomer

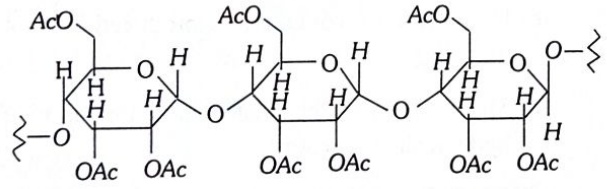
(c) Epimer (d) Enantiomer

3. Cellulose upon acetylation with excess acetic anhydride / H_2SO_4 (catalytic) triacetate whose structure is **[2008]**

(a) 

(b) 

(c) 

(d) 

4. The two functional groups present in a typical carbohydrate are **[2009]**

(a) *–OH* and *–COOH* (b) *–CHO* and *–COOH*

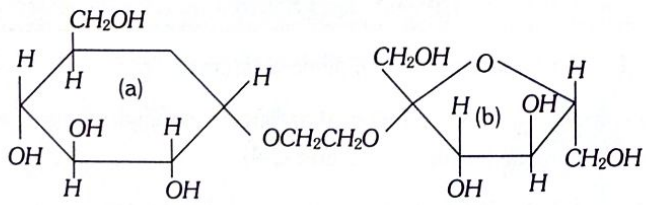
(c) $>C=O$ and *–OH* (d) *–OH* and *–CHO*

5. Which of the following compounds can be detected by Molisch's test **[2012]**

(a) Nitro compounds (b) Sugars

(c) Amines (d) Primary alcohols

6. The correct statement about the following disaccharide is



[2010]

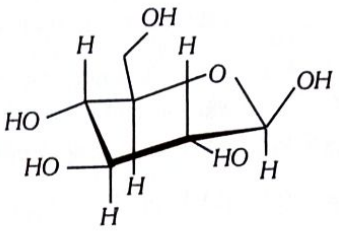
(a) Ring (a) is pyranose with α-glycosidic link

(b) Ring (a) is furanose with α-glycosidic link

(c) Ring (b) is furanose with α-glycosidic link

(d) Ring (b) is pyranose with β-glycosidic link

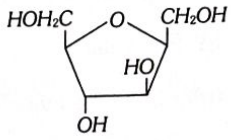
7. The following carbohydrate is **[2011]**

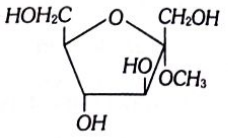


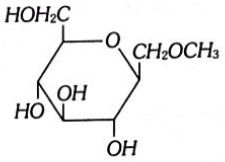
(a) A ketohexose (b) An aldohexose

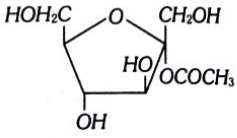
(c) An α – furanose (d) An α – pyranose

8. Which of the following compounds will behave as a reducing sugar in an aqueous *KOH* solution **[2017]**

(a) 

(b) 

(c) 

(d) 

9. Glucose on prolonged heating with *HI* gives **[2018]**

(a) Hexanoic acid (b) 6–iodohexanal

(c) *n*–Hexane (d) 1–Hexene

10. The secondary structure of a protein refers to **[2007]**

(a) α – helical backbone

(b) Hydrophobic interactions

(c) Sequence of α – amino acids

(d) Fixed configuration of the polypeptide backbone

11. Biuret test is *not* given by **[2010]**

(a) Proteins (b) Carbohydrates

(c) Polypeptides (d) Urea

12. Which one of the following statements is correct **[2012]**

(a) All amino acids except lysine are optically active

(b) All amino acids are optically active

(c) All amino acids except glycine are optically active

(d) All amino acids except glutamic acids are optically active

13. Thiol group is present in **[2016]**

(a) Cystine (b) Cysteine

(c) Methionine (d) Cytosine

14. Identify the correct statement regarding enzymes **[2004]**

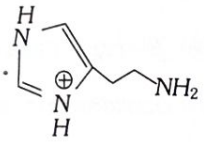
(a) Enzymes are specific biological catalysts that cannot be poisoned

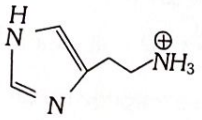
(b) Enzymes are normally heterogeneous catalysts that are very specific in their action

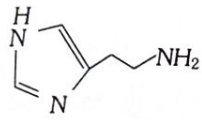
(c) Enzymes are specific biological catalysts that can normally function at very high temperature ($T \sim 1000K$)

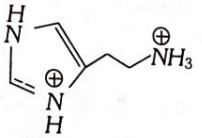
(d) Enzymes are specific biological catalysts that possess well-defined active sites

15. The predominant form of histamine present in human blood is (pK_a, Histidine $= 6.0$) **[2018]**

(a) 

(b) 

(c) 

(d) 

16. Which of the vitamins given below is water soluble **[2015]**

(a) Vitamin *C* (b) Vitamin *D*

(c) Vitamin *E* (d) Vitamin *K*

17. Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following categories **[2004]**

(a) An enzyme (b) A hormone

(c) A co-enzyme (d) An antibiotic

18. RNA is different from DNA because RNA contains **[2002]**

(a) Ribose sugar and thymine

(b) Ribose sugar and uracil

(c) Deoxyribose sugar and thymine

(d) Deoxyribose sugar and uracil

19. Which one of the following bases is not present in DNA **[2014]**

(a) Quinoline (b) Adenine

(c) Cytosine (d) Thymine

20. The presence or absence of hydroxy group on which carbon atom of sugar differentiates RNA and DNA **[2011]**

(a) 1^{st} (b) 2^{nd}

(c) 3^{rd} (d) 4^{th}

21. The pyrimidine bases present in DNA are **[2006]**

(a) Cytosine and adenine (b) Cytosine and guanine

(c) Cytosine and thymine (d) Cytosine and uracil

22. In both DNA and RNA, heterocyclic base and phosphate ester linkages are at **[2005]**

(a) C_5' and C_2' respectively of the sugar molecule

(b) C_2' and C_5' respectively of the sugar molecule

(c) C_1' and C_5' respectively of the sugar molecule

(d) C_5' and C_1' respectively of the sugar molecule

7. NEET/ AIPMT/ CBSE-PMT

1. $\alpha-D-$glucose and $\beta-D-$glucose differ from each other due to difference in one of the carbons with respect to its **[1995]**

(a) Size of hemiacetal ring (b) Number of *OH* groups

(c) Configuration (d) Conformation

2. On heating glucose with Fehling's solution, we get a precipitate whose colour is **[1988]**

(a) Yellow (b) Red

(c) Black (d) White

3. Fructose reduces Tollen's reagent due to **[2010]**

(a) Asymmetric carbons

(b) Primary alcoholic group

(c) Secondary alcoholic group

(d) Enolisation of fructose followed by conversion to aldehyde by base

4. Glycolysis is **[2003]**

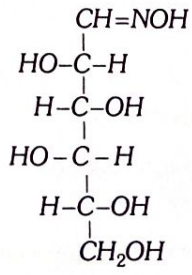
(a) Conversion of glucose to haem

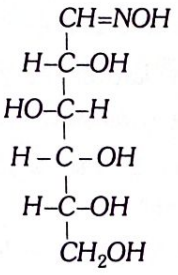
(b) Oxidation of glucose to glutamate

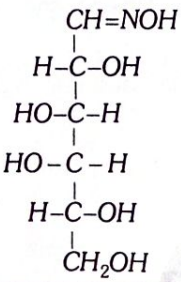
(c) Conversion of pyruvate to citrate

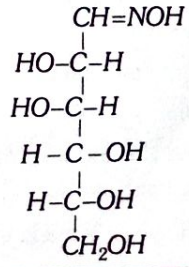
(d) Oxidation of glucose to pyruvate

5. *D*(+) glucose reacts with hydroxyl amine and yields an oxime. The structure of the oxime would be **[2014]**

(a) 

(b) 

(c) 

(d) 

6. Number of chiral carbons in $\beta-D-(+)$-glucose is **[2004]**

(a) Three (b) Four

(c) Five (d) Six

7. Glucose molecule reacts with X number of molecules of phenylhydrazine to yield osazone. The value of X is **[1998]**

(a) One (b) Two

(c) Three (d) Four

8. Which one of the following sets of monosaccharides forms sucrose **[2012]**

(a) α- D - galactopyranose and α - D – glucopyranose

(b) α - D - glucopyranose and β - D - fructofuranose

(c) β - D - glucopyranose and α - D - fructofuranose

(d) α - D - glucopyranose and β - D - fructopyranose

9. On complete hydrolysis of starch, we finally get **[1991]**

(a) Glucose (b) Fructose

(c) Glucose and fructose (d) Sucrose

10. Which one given below is a non-reducing sugar **[2016]**

(a) Maltose (b) Lactose

(c) Glucose (d) Sucrose

11. Which does not show mutarotation **[2010]**

(a) Sucrose (b) Maltose

(c) Glucose (d) Fructose

12. Which of the following is correct statement **[2001]**

(a) Troleins are amino acid

(b) α-hydrogen is present in fructose

(c) Starch is polymer of α-glucose

(d) Amylose is compound of cellulose

13. Which one of the following statements is not true regarding (+) Lactose **[2011]**

(a) (+) Lactose, $C_{12}H_{22}O_{11}$ contains 8 - OH groups

(b) On hydrolysis (+) Lactose gives equal amount of D(+) glucose and D(+) galactose

(c) (+) Lactose is a $\beta-$glycoside formed by the union of a D(+) glucose and a molecule of D(+) galactose

(d) (+) Lactose is reducing sugar and does not exhibit mutarotation

14. The difference between amylose and amylopectin is **[2018]**

(a) Amylopectin have $1\rightarrow4\,\alpha-$ linkage and $1\rightarrow6\,\alpha-$ linkage

(b) Amylose have $1\rightarrow4\,\alpha-$linkage and $1\rightarrow6\,\beta-$linkage

(c) Amylopectin have $1\rightarrow4\,\alpha-$linkage and $1\rightarrow6\,\beta-$ linkage

(d) Amylose is made up of glucose and galactose

15. Insulin is **[1991]**

(a) An amino acid (b) Protein

(c) A carbohydrate (d) A lipid

16. Proteins are built up of **[2001]**

(a) Dicarboxylic acids (b) Amino acids

(c) Alcohols (d) Hydroxy acids

17. The number of essential amino acids in human is **[2000]**

(a) 8 (b) 10

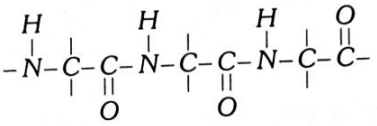
(c) 18 (d) 20

18. In a protein molecule, various amino acids are linked together by **[2016]**

(a) $\alpha-$glycosidic bond (b) $\beta-$glycosidic bond

(c) Peptide bond (d) Dative bond

19. Which one of the following structures represents the peptide chain **[2004]**

(a)


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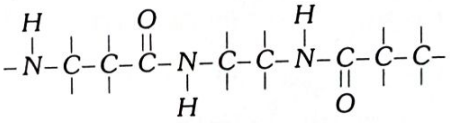
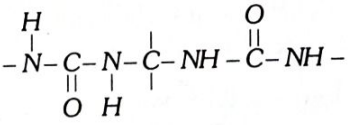
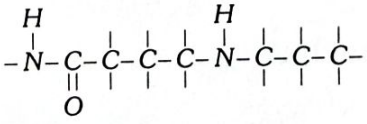


(c)


(d)


20. The helical structure of proteins is stabilized by **[2004]**

(a) Coordinate bond (b) Covalent bond

(c) Hydrogen bond (d) Peptide bond

21. Which one of the following is a peptide hormone **[2006]**

(a) Thyroxin (b) Adrenaline

(c) Glucagon (d) Testosterone

22. Which of the statements about "denaturation" given below are correct

(A) Denaturation of proteins causes loss of secondary and tertiary structures of the protein

(B) Denaturation leads to the conversion of double strand of DNA into single strand

(C) Denaturation affects primary structure which gets distorted **[2011]**

(a) (A) and (B) (b) (A) (B) and (C)

(c) (B) and (C) (d) (A) and (C)

23. Which functional group participates in disulphide bond formation in proteins **[2005]**

(a) Thiolactone (b) Thiol

(c) Thioether (d) Thioester

24. The correct statement in respect of protein haemoglobin is that, it **[2004]**

(a) Acts as an oxygen carrier in the blood

(b) Forms antibodies and offers resistance to diseases

(c) Functions as a catalyst for biological reactions

(d) Maintains blood sugar level

25. Enzymes are made up of **[2002]**

(a) Carbohydrates

(b) Edible proteins

(c) Nitrogen containing carbohydrates

(d) Proteins with specific structure

26. Which one of the following, statements is incorrect about enzyme catalysis **[2012]**

(a) Enzymes are mostly proteinous in nature

(b) Enzyme action is specific

(c) Enzymes are denaturated by ultraviolet rays and at high temperature

(d) Enzymes are least reactive at optimum temperature

27. Of the following statements about enzymes which ones are true

(i) Enzymes lack in nucleophilic groups

(ii) Enzymes are highly specific both in binding chiral substrates and in catalyzing their reactions

(iii) Enzymes catalyse chemical reactions by lowering the activation energy

(iv) Pepsin is a proteolytic enzyme **[1995]**

(a) (i) and (iv) (b) (i) and (iii)

(c) (ii), (iii) and (iv) (d) (i)

28. Which of the following statement is not correct **[2017]**

(a) Insulin maintains sugar level in the blood of a human body

(b) Ovalbumin is a simple food reserve in egg white

(c) Blood proteins thrombin and fibrinogen are involved in blood clotting

(d) Denaturation makes the proteins more active

29. Which of the following compounds can form a zwitter ion **[2018]**

(a) Aniline (b) Acetanilide

(c) Benzoic acid (d) Glycine

30. The deficiency of vitamin B_1 causes **[2012]**

(a) Beri-beri (b) Scurvy

(c) Rickets (d) Anaemia

31. Which one of the following vitamins is water–soluble **[2007]**

(a) Vitamin *B* (b) Vitamin *E*

(c) Vitamin *K* (d) Vitamin *A*

32. Which of the following is not a fat soluble vitamin **[2011]**

(a) Vitamin *E* (b) Vitamin *A*

(c) Vitamin *B* complex (d) Vitamin *D*

33. Vitamin B_{12} contains metal **[2003]**

(a) *Ca* (II) (b) *Zn* (II)

(c) *Fe* (II) (d) *Co* (III)

34. Which of the following hormones contains iodine **[2009]**

(a) Insulin (b) Testosterone

(c) Adrenaline (d) Thyroxine

35. The Hormone that helps in the conversion of glucose to glycogen is **[2004]**

(a) Adrenaline (b) Insulin

(c) Cortisone (d) Bile acids

36. Which one of the following is an amine hormone **[2008]**

(a) Insulin (b) Progesterone

(c) Thyroxine (d) Oxypurin

37. Which of the following hormones is produced under the condition of stress which stimulates glycogenolysis in the liver of human beings **[2014]**

(a) Adrenaline (b) Estradiol

(c) Thyroxin (d) Insulin

38. The central dogma of molecular genetics states that the genetic information flows from **[2016]**

(a) DNA → RNA → Carbohydrates

(b) Amino acids → Proteins → DNA

(c) DNA → Carbohydrates → Proteins

(d) DNA → RNA → Proteins

39. The reason for double helical structure of DNA, is operation of **[2003]**

(a) Vander Waal's forces (b) Dipole-dipole interaction

(c) Hydrogen bonding (d) Electrostatic attractions

40. The segment of DNA which acts as the instructional manual for the synthesis of the protein is **[2009]**

(a) Nucleoside (b) Nucleotide

(c) Ribose (d) Gene

41. In DNA, the complementary bases are **[1998]**

(a) Uracil and adenine; cytosine and guanine

(b) Adenine and thymine; guanine and cytosine

(c) Adenine and thymine; guanine and uracil

(d) Adenine and guanine; thymine and cytosine

42. The correct statement regarding RNA and DNA, respectively is **[2016]**

(a) The sugar component in RNA is arabinose and the sugar component in DNA is 2' - deoxyribose

(b) The sugar component in RNA is ribose and the sugar component in DNA is 2' - deoxyribose

(c) The sugar component in RNA is arabinose

(d) The sugar component in RNA is 2' - deoxyribose and the sugar component in DNA is arabinose

43. A sequence of how many nucleotides in messenger RNA makes a codon for an amino acid **[2004]**

(a) One (b) Two

(c) Three (d) Four

44. RNA and DNA are chiral molecules, their chirality is due to **[2007]**

(a) L–sugar component

(b) Chiral bases

(c) Chiral phosphate ester units

(d) D– sugar component

45. Energy is stored in our body in the form of **[2001]**

(a) ATP (b) ADP

(c) Fats (d) Carbohydrates

46. Oxidation of glucose is one of the most important reactions in a living cell. What is the number of ATP molecules generated in cells from one molecule of glucose **[1995]**

(a) 38 (b) 12

(c) 18 (d) 28

47. During the process of digestion, the proteins present in food materials are hydrolysed to amino acids. The two enzymes involved in the process

$$\text{Proteins} \xrightarrow{\text{Enzyme (A)}} \text{Polypeptides} \xrightarrow{\text{Enzyme (B)}}$$

Amino acids, are respectively **[2006]**

(a) Pepsin and Trypsin (b) Invertase and Zymase

(c) Amylase and Maltase (d) Diastage and Lipase

48. Haemoglobin is **[1997]**

(a) An enzyme (b) A globular protein

(c) A vitamin (d) A carbohydrate

49. The human body does not produce **[2006]**

(a) Hormones (b) Enzymes

(c) DNA (d) Vitamins

50. Antibodies are **[2001]**

(a) Carbohydrate (b) Globular protein

(c) Immunoglobulins (d) Cellulose compounds

8. AIIMS

1. The beta and alpha glucose have different specific rotations. When either is dissolved in water, their rotation changes until the same fixed value results. This is called **[2008]**

(a) Epimerisation (b) Racemisation

(c) Anomerisation (d) Mutarotation

2. Yeast cell derive their energy from glucose by **[2001]**

(a) Glycolysis (b) Respiration formation

(c) Formation (d) None of these

3. Methyl – α – *D* – glucoside and methyl– β –*D*–glucoside are **[2006]**

(a) Epimers

(b) Anomers

(c) Enantiomers

(d) Conformational diastereomers

4. Glucose forms many derivatives. The derivative which will help to prove the furanose structure is **[1980]**

(a) Acetyl (b) Benzoyl

(c) Osazone (d) Isopropylidene

5. The commonest disaccharide has the molecular formula **[1999]**

(a) $C_{10}H_{18}O_9$ (b) $C_{10}H_{20}O_{10}$

(c) $C_{18}H_{22}O_{11}$ (d) $C_{12}H_{22}O_{11}$

6. Which of the following is the sweetest sugar **[2000]**

(a) Glucose (b) Fructose

(c) Lactose (d) Sucrose

7. Which α amino acid can cross link peptide chains **[2001]**

(a) Serine (b) Cysteine

(c) Glutamine (d) Tyrosine

8. Among the following, the achiral amino acid is **[2003]**

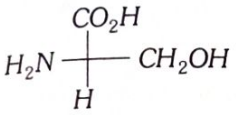
(a) 2-ethylalanine

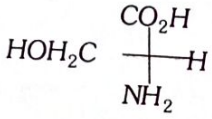
(b) 2-methylglycine

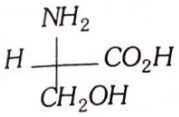
(c) 2-hydroxymethyl serine

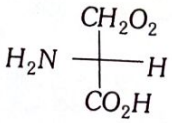
(d) Tryptophan

9. Among the following *L*-series is **[2006]**

(a) 

(b) 

(c) 

(d) 

10. Proteins are hydrolysed by enzymes into **[1996]**
(a) Dicarboxylic acids (b) Hydroxy acids
(c) Amino acids (d) Aromatic acids

11. Protein can be denatured by **[2007]**
(a) Carbon dioxide (b) Carbon monoxide
(c) Heat (d) Oxygen

12. Which of the following protein destroys the antigen when it enters in body cell **[2001]**
(a) Antibodies (b) Insulin
(c) Chromoprotein (d) Phosphoprotein

13. Lysine is least soluble in water in the *pH* range **[2006]**
(a) 3 to 4 (b) 5 to 6
(c) 6 to 7 (d) 8 to 9

14. Enzymes in the living systems **[2000]**
(a) Provide energy
(b) Provide immunity
(c) Transport oxygen
(d) Catalyse biological processes

15. Enzymes **[1996]**
(a) Accelerate biochemical reactions
(b) Have optimum activity at body temperature
(c) Consist of amino acids
(d) Have all these properties

16. The pair in which both species have iron is **[2006]**
(a) Nitrogenase, cytochromes
(b) Carboxypeptidase, haemoglobin
(c) Haemocyanin, nitrogenase
(d) Haemoglobin, cytochromes

17. In nucleic acids, the sequence is **[1996]**
(a) Base-phosphate-sugar (b) Phosphate-base-sugar
(c) Sugar-base-phosphate (d) Base-sugar-phosphate

18. Thymine is **[2006]**
(a) 5-methyluracil (b) 4-methyluracil
(c) 3-methyluracil (d) 1-methyluracil

19. Which one of the following statements is true for protein synthesis (translation) **[2005]**
(a) Amino acid are directly recognized by *m*-RNA
(b) The third base of the codon is less specific
(c) Only one codon codes for an amino acid
(d) Every *t*-RNA molecule has more than one amino acid attachment site

20. The statement which is not correct, is **[2008]**
(a) Chlorophyll is responsible for the synthesis of carbohydrates in plants
(b) The compound formed by the addition of oxygen to haemoglobin is called oxyhaemoglobin
(c) Acetyl salicyclic acid is known as aspirin
(d) The metal ion present in vitamin B_{12} is Mg^{2+}

9. Assertion and Reason

1. Assertion : Glycine is amphoteric in nature.
Reason : Glycine contains both acid and basic groups. **[AIIMS 1996]**

2. Assertion : Hydrolysis of sucrose is known as inversion of cane sugar.
Reason : Sucrose is a disaccharide. **[AIIMS 1997]**

3. Assertion : Proteins on hydrolysis produce amino acids.
Reason : Amino acids contain $-NH_2$ and $-COOH$ groups. **[AIIMS 1998]**

4. Assertion : Sucrose undergo mutarotation.
Reason : Sucrose is a disaccharide. **[AIIMS 2000]**

5. Assertion : DNA molecules and RNA molecules are found in the nucleus of a cell.
Reason : On heating, the enzyme does not lose their specific activity. **[AIIMS 2002]**

6. Assertion : All Amino acids exist as Zwitter ions.
Reason : Amino acids have both $-NH_2$ and $-COOH$ group. **[AIIMS 2002]**

7. Assertion : Activity of an enzyme is *pH*-dependent.
Reason : Change in *pH* affects the solubility of the enzyme in water. **[AIIMS 2003]**

8. Assertion : Glycosides are hydrolyzed in acidic conditions.
Reason : Glycosides are acetals. **[AIIMS 2003]**

9. Assertion : Haemoglobin is an oxygen carrier.
Reason : Oxygen binds as O_2^- to *Fe* of haemoglobin. **[AIIMS 2003]**

10. Assertion : Carboxypeptidase is an exopeptidase.
Reason : It cleaves the *N*-terminal bond. **[AIIMS 2004]**

11. Assertion : Sucrose is a non-reducing sugar.
Reason : It has glycosidic linkage. **[AIIMS 2004]**

12. Assertion : Disruption of the natural structure of a protein is called denaturation.
Reason : The change in colour and appearance of egg during cooking is due to denaturation. **[AIIMS 2008]**

33. Biomolecules – Answers Keys

1. Carbohydrates

1	c	2	c	3	d	4	d	5	a
6	d	7	c	8	c	9	b	10	c
11	a	12	b	13	b	14	a	15	c
16	b	17	a	18	d	19	b	20	c
21	c	22	c	23	c	24	b	25	c
26	d	27	b	28	b	29	c	30	d
31	b	32	c	33	c	34	a	35	b
36	b	37	a	38	a	39	a	40	b
41	c	42	a	43	c	44	a	45	c
46	c	47	a	48	c	49	d	50	a
51	a	52	d	53	c				

2. Proteins, Amino Acids and Enzymes

1	a	2	c	3	b	4	b	5	a
6	d	7	d	8	c	9	b	10	c
11	d	12	d	13	b	14	b	15	c
16	a	17	a	18	c	19	a	20	b
21	d	22	b	23	c	24	a	25	a
26	c	27	b	28	a	29	c	30	a
31	a	32	b						

3. Vitamins, Hormones and Nucleic acids

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

4. Metabolism

1	d	2	b	3	a	4	a	5	b

5. Miscellaneous Biomolecules

1	b	2	c	3	c	4	d	5	c
6	d	7	d	8	b	9	b	10	d

6. IIT-JEE/ AIEEE

1	d	2	b	3	a	4	d	5	b
6	a	7	b	8	d	9	c	10	d
11	b	12	c	13	b	14	d	15	b
16	a	17	b	18	b	19	a	20	b
21	c	22	c						

7. NEET/ AIPMT/ CBSE-PMT

1	c	2	b	3	d	4	d	5	b
6	b	7	b	8	b	9	a	10	d
11	a	12	c	13	d	14	a	15	b
16	b	17	b	18	c	19	a	20	c
21	c	22	a	23	b	24	a	25	d
26	d	27	c	28	d	29	d	30	a
31	a	32	c	33	d	34	d	35	b
36	c	37	a	38	d	39	c	40	d
41	b	42	b	43	c	44	d	45	a
46	a	47	a	48	b	49	d	50	c

8. AIIMS

1	d	2	a	3	b	4	d	5	d

6	b	**7**	b	**8**	c	**9**	c	**10**	c
11	c	**12**	a	**13**	c	**14**	d	**15**	d
16	d	**17**	d	**18**	a	**19**	b	**20**	d

9. Assertion and Reason

1	a	**2**	b	**3**	b	**4**	e	**5**	d
6	a	**7**	b	**8**	d	**9**	c	**10**	c
11	a	**12**	b						