

## Chapter 14

## Biomolecules

## Solutions

## SECTION - A

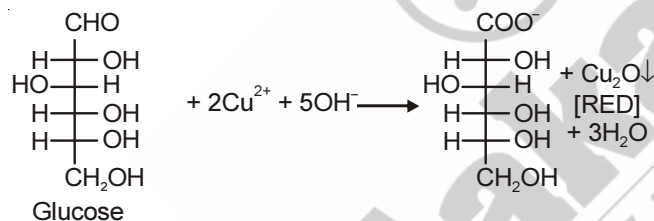
## Objective Type Questions

## (Carbohydrates)

1. The reagent which may be used to distinguish between cane sugar and glucose solution is

- |                       |                        |
|-----------------------|------------------------|
| (1) Molisch's reagent | (2) Iodine solution    |
| (3) Baeyer's reagent  | (4) Fehling's solution |

**Sol.** Answer (4)

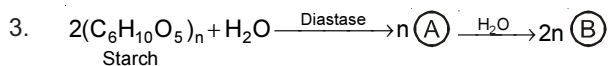


2. Which pair is an example of anomers?

- |  |                         |
|--|-------------------------|
| (1) $\alpha$ -D-glucose and $\beta$ -D-glucose | (2) Glucose and mannose |
| (3) Glucose and fructose                       | (4) Fructose and sugar  |

**Sol.** Answer (1)

$\alpha$  - D glucose &  $\beta$ -D glucose are the examples of anomers.



(A) and (B) in given sequence of reactions, respectively is

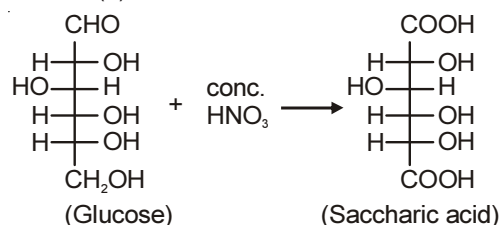
- |                        |                        |
|------------------------|------------------------|
| (1) Maltose, D-Glucose | (2) Lactose, D-Glucose |
| (3) Sucrose, D-Glucose | (4) Maltose, fructose  |

**Sol.** Answer (1)



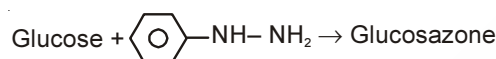
4. Glucose when oxidised with conc.  $\text{HNO}_3$  then the product formed is
- (1)  $\text{HOOC}(\text{CHOH})_4\text{COOH}$  (2)  $\text{HOCH}_2(\text{CHOH})_4\text{COOH}$   
 (3)  $\text{H}_3\text{CCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$  (4)  $\text{HOCH}_2(\text{CHOH})_4\text{CH}=\text{NOH}$

**Sol.** Answer (1)



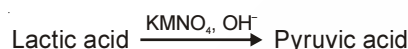
5. The reagent which forms crystalline osazone derivative when reacted with glucose is
- (1) Fehling solution (2) Phenylhydrazine  
 (3) Benedict's solution (4) Hydroxylamine

**Sol.** Answer (2)



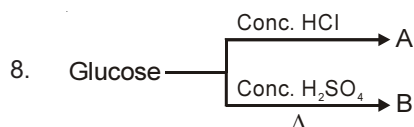
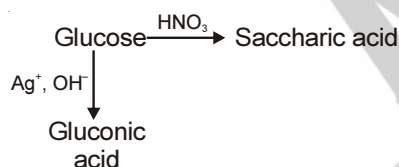
6. Lactic acid on oxidation by alkaline  $\text{KMnO}_4$  gives
- (1) Tartaric acid (2) Cinnamic acid  
 (3) Propionic acid (4) Pyruvic acid

**Sol.** Answer (4)



7. Glucose on oxidation with Tollen's reagent and conc.  $\text{HNO}_3$  produces respectively
- (1) Gluconic acid and saccharic acid (2) Glucaric acid and saccharic acid  
 (3) Saccharic acid and glucaric acid (4) Gluconic acid and no reaction

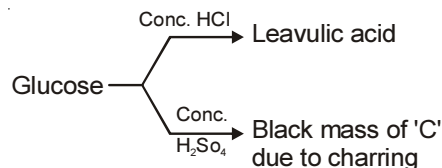
**Sol.** Answer (1)



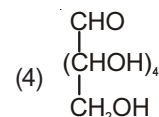
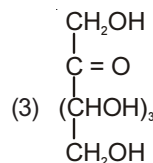
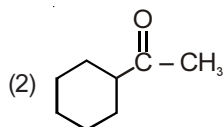
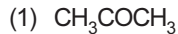
A and B are

- (1) Pyruvic acid and black mass (2) Levulinic acid and ethanol  
 (3) Pyruvic acid and ethanol (4) Levulinic and black mass

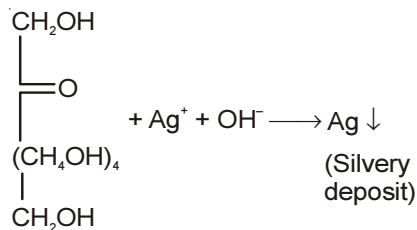
**Sol.** Answer (4)



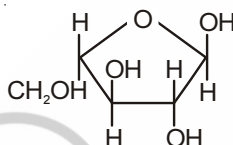
9. Which of the following ketone reduces Tollen's reagent in basic medium?



**Sol.** Answer (3)



10. In the given structure of the carbohydrate, which of the following are used while naming it?



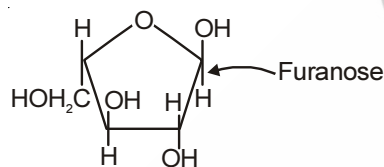
(1) Tetrose

(2) Hexose

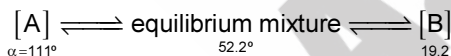
(3) Aldose

(4) Furanose

**Sol.** Answer (4)



11. An optically active compound having molecular formula  $\text{C}_6\text{H}_{12}\text{O}_6$  is found in two isomeric forms. When isomers dissolved in water, they show the following equilibria



Such isomers are called

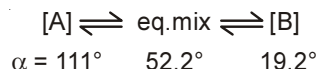
(1) Anomers

(2) Enantiomers

(3) Positional isomers

(4) Geometrical isomers

**Sol.** Answer (1)



Such isomers [A] & [B] called anomers.

### (Proteins and Enzymes)

12. Select the correct statement

(1) For exergonic reactions  $\Delta G > 0$

(2) ATP undergoes a three step hydrolysis

(3) Conversion of ATP to ADP is highly endergonic reaction

(4) Dark reactions do not proceed even on being coupled with hydrolysis of ATP

**Sol.** Answer (2)

ATP undergoes three-step hydrolysis.

13. Formation of 1° and secondary structure of proteins involves linkages

- (1) Peptide linkage, H-bond (2) H-Bond, disulphide bond  
(3) Disulphide bond, peptide linkage (4) H-bond, H-bond

**Sol.** Answer (1)

Primary structure → Peptide linkage

Secondary structure → Hydrogen bonding

14. Which of the following is not used for testing proteins?

- (1) Molisch's test (2) Biuret test (3) Ninhydrin test (4) Millon's test

**Sol.** Answer (1)

Molisch's test is used to detect the presence of carbohydrates.

### (Vitamins)

15. Vitamin A is called

- (1) Ascorbic acid (2) Retinol (3) Calciferol (4) Tocopherol

**Sol.** Answer (2)

Vitamin A is also called retinol.

16. Which of the following is not a pyrimidine base?

- (1) Thymine (2) Cytosine (3) Uracil (4) Guanine

**Sol.** Answer (4)

Guanine is not a pyrimidine base.

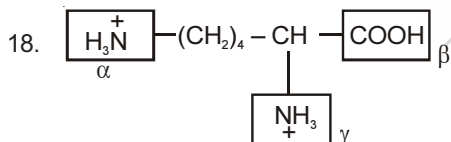
17. Which of the following is not a fat soluble vitamin?

- (1) Vitamin A (2) Vitamin K  
(3) Vitamin E (4) Vitamin H

**Sol.** Answer (4)

Vitamin H + fat → Insoluble

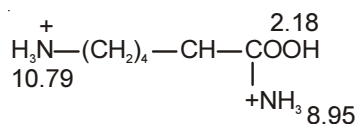
### (Nucleic Acid)



$\text{pK}_a$  of the sites  $\alpha$ ,  $\beta$  and  $\gamma$  are 10.79, 2.18 and 8.95. Isoelectric point will be

- (1) 9.87 (2) 5.07  
(3) 6.5 (4) 2.18

**Sol.** Answer (1)



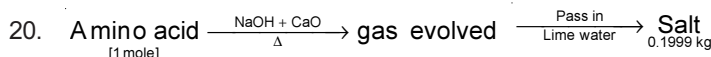
$$\text{I.P.} = \frac{10.79 + 8.95}{2} = 9.87$$

19. A polypeptide on complete hydrolysis gives three amino acids. How many sequences are possible for that polypeptide?

(1) 1 (2) 3 (3) 6 (4) 9

**Sol.** Answer (3)

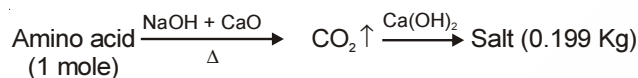
Six sequences are possible.



Amino acid having

- (1) Two  $\text{NH}_2$  groups (2) One  $-\text{COOH}$  group  
(3) Two  $-\text{COOH}$  groups (4) Three  $-\text{COOH}$  groups

**Sol.** Answer (3)



This is acidic amino acid has two  $-\text{COOH}$  group.

## SECTION - B

### Previous Years Questions

1. Which structure(s) of proteins remain(s) intact during denaturation process? [NEET-2019 (Odisha)]

- (1) Tertiary structure only  
(2) Both secondary and tertiary structures  
(3) Primary structure only  
(4) Secondary structure only

**Sol.** Answer (3)

During denaturation primary structure of proteins remain intact.

2. The non-essential amino acid among the following is [NEET-2019]

- (1) Valine (2) Leucine  
(3) Alanine (4) Lysine

**Sol.** Answer (3)

Alanine

3. The difference between amylose and amylopectin is [NEET-2018]

- (1) Amylopectin have  $1 \rightarrow 4$   $\alpha$ -linkage and  $1 \rightarrow 6$   $\alpha$ -linkage  
(2) Amylose have  $1 \rightarrow 4$   $\alpha$ -linkage and  $1 \rightarrow 6$   $\beta$ -linkage  
(3) Amylose is made up of glucose and galactose  
(4) Amylopectin have  $1 \rightarrow 4$   $\alpha$ -linkage and  $1 \rightarrow 6$   $\beta$ -linkage

**Sol.** Answer (1)

Amylose and Amylopectin are polymers of  $\alpha$ -D-glucose, so  $\beta$ -link is not possible. Amylose is linear with  $1 \rightarrow 4$   $\alpha$ -linkage whereas Amylopectin is branched and has both  $1 \rightarrow 4$  and  $1 \rightarrow 6$   $\alpha$ -linkages.

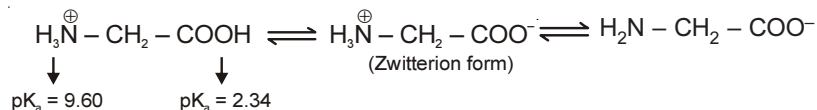
So option (1) should be the correct option.

4. Which of the following compounds can form a zwitterion?

[NEET-2018]

- (1) Aniline (2) Acetanilide  
(3) Glycine (4) Benzoic acid

**Sol.** Answer (3)



5. Which of the following statements is not correct?

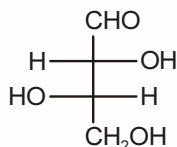
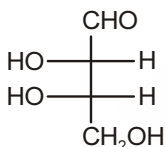
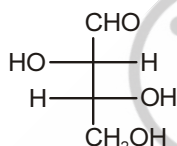
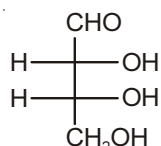
[NEET-2017]

- (1) Insulin maintains sugar level in the blood of a human body  
(2) Ovalbumin is a simple food reserve in egg-white  
(3) Blood proteins thrombin and fibrinogen are involved in blood clotting  
(4) Denaturation makes the proteins more active

**Sol.** Answer (4)

Due to denaturation of proteins, globules unfold and helix get uncoiled and protein loses its biological activity.

6. The correct corresponding order of names of four aldoses with configuration given below



respectively, is

[NEET(Phase-2)-2016]

- (1) L-erythrose, L-threose, L-erythrose, D-threose (2) D-threose, D-erythrose, L-threose, L-erythrose  
(3) L-erythrose, L-threose, D-erythrose, D-threose (4) D-erythrose, D-threose, L-erythrose, L-threose

**Sol.** Answer (4)

Fact.

7. The central dogma of molecular genetics states that the genetic information flows from

[NEET-(Phase-2)-2016]

- (1) Amino acids  $\rightarrow$  Proteins  $\rightarrow$  DNA (2) DNA  $\rightarrow$  Carbohydrates  $\rightarrow$  Proteins  
(3) DNA  $\rightarrow$  RNA  $\rightarrow$  Proteins (4) DNA  $\rightarrow$  RNA  $\rightarrow$  Carbohydrates

**Sol.** Answer (3)

Fact.

8. In a protein molecule, various amino acids are linked together by

[NEET-2016]

- (1) Dative bond (2)  $\alpha$ -glycosidic bond (3)  $\beta$ -glycosidic bond (4) Peptide bond

**Sol.** Answer (4)

Fact.

9. Which one given below is a non-reducing sugar?

[NEET-2016]

- (1) Sucrose (2) Maltose  
(3) Lactose (4) Glucose

**Sol.** Answer (1)

Sucrose is non-reducing sugar because reducing parts of glucose and fructose are involved in glycosidic linkage.

10. The **correct** statement regarding RNA and DNA, respectively is

[NEET-2016]

- (1) The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose  
(2) The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deoxyribose  
(3) The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose  
(4) The sugar component in RNA is arabinose and the sugar component in DNA is ribose

**Sol.** Answer (3)

Fact.

11. Which of the following hormones is produced under the condition of stress which stimulate : glycogenolysis in the liver of human beings ?

[AIPMT-2014]

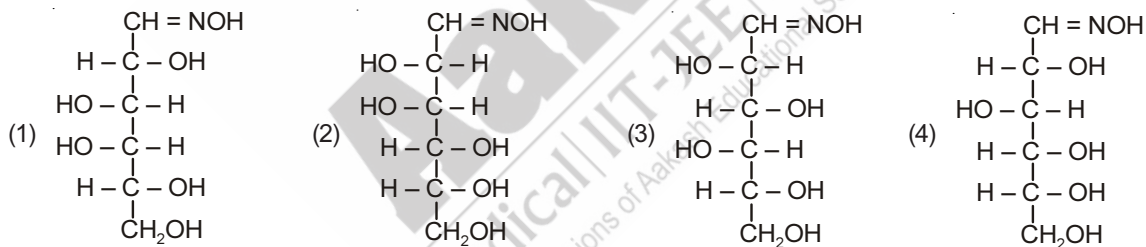
- (1) Thyroxin (2) Insulin  
(3) Adrenaline (4) Estradiol

**Sol.** Answer (3)

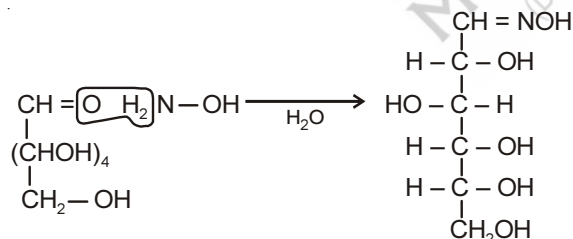
It is also called emergency hormone at the time of stress, it prepares the body for poling.

12. D(+) glucose reacts with hydroxyl amine and yield an oxime. The structure of the oxime would be

[AIPMT-2014]



**Sol.** Answer (4)



13. Deficiency of vitamin B<sub>1</sub> causes the disease

[AIPMT (Prelims)-2012]

- (1) Cheilosis (2) Sterility  
(3) Convulsions (4) Beri-Beri

**Sol.** Answer (4)

Deficiency of vitamin B<sub>1</sub> causes Beri-Beri.

14. Which one of the following sets of monosaccharides forms sucrose ? **[AIPMT (Prelims)-2012]**
- (1)  $\beta$ -D-Glucopyranose and  $\alpha$ -D-fructofuranose      (2)  $\alpha$ -D-Glucopyranose and  $\beta$ -D-fructopyranose  
(3)  $\alpha$ -D-Galactopyranose and  $\alpha$ -D-Glucopyranose      (4)  $\alpha$ -D-Glucopyranose and  $\beta$ -D-fructofuranose

**Sol.** Answer (4)



15. Which one of the following statements is not true regarding (+) Lactose? **[AIPMT (Prelims)-2011]**
- (1) (+) Lactose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$  contains 8-OH groups  
(2) On hydrolysis (+) Lactose gives equal amount of D(+) glucose and D(+) galactose  
(3) (+) Lactose is a  $\beta$ -glycoside formed by the union of a molecule of D(+) glucose and a molecule of D(+) galactose  
(4) (+) Lactose is a reducing sugar and does not exhibit mutarotation

**Sol.** Answer (4)

Fourth option is wrong as (+) Lactose exhibits mutarotation.

16. Which of the statements about "Denaturation" given below are correct? **[AIPMT (Mains)-2011]**
- (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.
- (1) (a) & (b)      (2) (a), (b) & (c)  
(3) (b) & (c)      (4) (a) & (c)

**Sol.** Answer (1)

Denaturation of protein results in

- (a) Loss of secondary and tertiary structure of the protein.  
(b) Conversion of double stranded DNA  $\rightarrow$  Single strand DNA

17. Which of the following is not a fat soluble vitamin ? **[AIPMT (Mains)-2011]**
- (1) Vitamin E      (2) Vitamin A  
(3) Vitamin B complex      (4) Vitamin D

**Sol.** Answer (3)

Vitamin B complex  $\rightarrow$  Fat insoluble

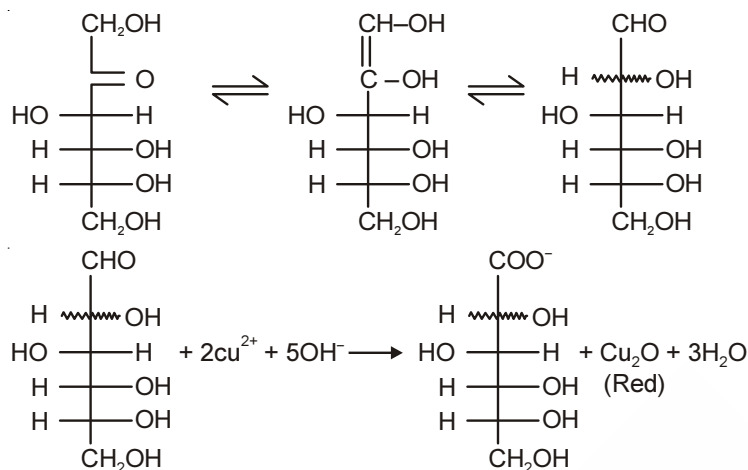
18. Which one of the following does not exhibit the phenomenon of mutarotation ? **[AIPMT (Prelims)-2010]**
- (1) (+) Sucrose      (2) (+) Lactose  
(3) (+) Maltose      (4) (-) Fructose

**Sol.** Answer (1)

(+) sucrose does not show mutarotation.

19. Fructose reduces Tollen's reagent due to **[AIPMT (Mains)-2010]**
- (1) Asymmetric carbons  
(2) Primary alcoholic group  
(3) Secondary alcoholic group  
(4) Enolisation of fructose followed by conversion to aldehyde by base



**Sol.** Answer (4)

The sequence is enolisation followed by oxidation.

20. The segment of DNA which acts as the instrumental manual for the synthesis of the protein is

[AIPMT (Prelims)-2009]

- (1) Ribose  
(3) Nucleoside

- (2) Gene  
(4) Nucleotide

**Sol.** Answer (2)

21. Which of the following hormones contains iodine ?

[AIPMT (Prelims)-2009]

- (1) Testosterone  
(3) Thyroxine

- (2) Adrenaline  
(4) Insulin

**Sol.** Answer (3)

22. In DNA, the complimentary bases are

[AIPMT (Prelims)-2008]

- (1) Uracil and adenine; cytosine and guanine  
(2) Adenine and thymine; guanine and cytosine  
(3) Adenine and thymine; guanine and uracil  
(4) Adenine and guanine; thymine and cytosine

**Sol.** Answer (2)

In DNA,

A = T

C  $\equiv$  G  $\left\{ \begin{array}{l} \text{Complementary} \\ \text{bases} \end{array} \right\}$

23. Which one of the following is an amine hormone ?

[AIPMT (Prelims)-2008]

- (1) Progesterone  
(3) Oxypurin

- (2) Thyroxine  
(4) Insulin

**Sol.** Answer (2)

Thyroxine is amine hormone.

24. Which one of the following vitamins is water-soluble? [AIPMT (Prelims)-2007]

- |               |               |
|---------------|---------------|
| (1) Vitamin A | (2) Vitamin B |
| (3) Vitamin E | (4) Vitamin K |

**Sol.** Answer (2)

Vitamin B is water-soluble.

25. RNA and DNA are chiral molecules, their chirality is due to [AIPMT (Prelims)-2007]

- |                         |                                  |
|-------------------------|----------------------------------|
| (1) D - sugar component | (2) L - sugar component          |
| (3) Chiral bases        | (4) Chiral phosphate ester units |

**Sol.** Answer (1)

RNA & DNA are chiral molecules because of the presence of D-sugar component.

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

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

are respectively

- |                         |                          |
|-------------------------|--------------------------|
| (1) Amylase and maltase | (2) Diastase and lipase  |
| (3) Pepsin and trypsin  | (4) Invertase and zymase |

**Sol.** Answer (3)

Proteins  $\xrightarrow{\text{Pepsin \& Trypsin}}$  Amino acids

27. The human body does not produce [AIPMT (Prelims)-2006]

- |         |              |              |             |
|---------|--------------|--------------|-------------|
| (1) DNA | (2) Vitamins | (3) Hormones | (4) Enzymes |
|---------|--------------|--------------|-------------|

**Sol.** Answer (2)

The human body does not produce vitamins.

28. Which one of the following is a peptide hormone? [AIPMT (Prelims)-2006]

- |              |                  |               |                |
|--------------|------------------|---------------|----------------|
| (1) Glucagon | (2) Testosterone | (3) Thyroxine | (4) Adrenaline |
|--------------|------------------|---------------|----------------|

**Sol.** Answer (1)

Glucagon is a peptide hormone.

29. The cell membranes are mainly composed of [AIPMT (Prelims)-2005]

- |                   |              |
|-------------------|--------------|
| (1) Carbohydrates | (2) Proteins |
| (3) Phospholipids | (4) Fats     |

**Sol.** Answer (3)

The cell membranes are composed of phospholipids.

30. Which functional group participates in disulphide bond formation in proteins? [AIPMT (Prelims)-2005]

- |                 |               |
|-----------------|---------------|
| (1) Thiolactone | (2) Thiol     |
| (3) Thioether   | (4) Thioester |

**Sol.** Answer (2)

Thiol because S-S bond is formed.

31. Which is **not** the correct statement about RNA and DNA?

- (1) DNA is active in virus while RNA never appears in virus
- (2) DNA exists as dimer while RNA is usually single stranded
- (3) DNA contains deoxyribose as its sugar and RNA contains ribose
- (4) RNA contains uracil in place of thymine (found in DNA) as a base

**Sol.** Answer (1)

DNA is active in virus while RNA does not appear in virus is wrong statement.

32. What is the nature of glucose-glucose linkage in starch that makes its so susceptible to acid hydrolysis?

- (1) Starch is hemiacetal
- (2) Starch is acetal
- (3) Starch is polymer
- (4) Starch contains only few molecules of glucose

**Sol.** Answer (2)

Because of the presence of actual linkage

Acetal  $\rightleftharpoons$  Aldehyde ( $-\text{CHO}$ )

Free

33.  $\alpha$ -(D) glucose  $\rightleftharpoons$   $\beta$ -(D) glucose, equilibrium constant for this is 1.8. The percentage of  $\alpha$ -(D) glucose at equilibrium is

- |          |          |
|----------|----------|
| (1) 35.7 | (2) 55.6 |
| (3) 44.4 | (4) 64.3 |

**Sol.** Answer (1)

$\alpha$  - D glucose  $\rightleftharpoons$   $\beta$  - D glucose

$$K = \frac{\beta \text{ form}}{\alpha \text{ form}}$$

$$1.8 = \frac{\beta}{\alpha}$$

$$1.8 + 1 = \frac{\beta}{\alpha} + 1$$

$$2.8 = \frac{\alpha + \beta}{\alpha}$$

$$\Rightarrow \frac{\alpha}{\alpha + \beta} = \frac{1}{2.8}$$

$$\frac{\alpha}{\alpha + \beta} \times 100 = \frac{100}{2.8} = 35.7$$

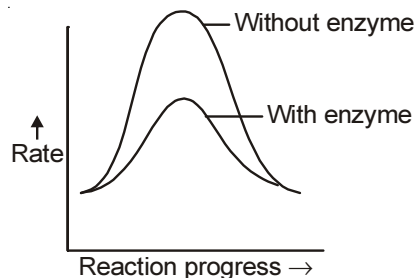
$\therefore$  % of  $\alpha$ -D glucose = 35.7%

34. By the action of enzymes, the rate of biochemical reaction

- (1) Does not change
- (2) Increases
- (3) Decreases
- (4) Either (1) or (3)

**Sol.** Answer (2)

Rate of biochemical reaction increases by using enzymes.



35. The secondary structure of a protein refers to

- (1) Regular folding patterns of contiguous portions of the polypeptide chain
- (2) Three-dimensional structure, specially the bond between amino acid residues that are distant from each other in the polypeptide chain
- (3) Mainly denatured proteins and structures of prosthetic groups
- (4) Linear sequence of amino acid residues in the polypeptide chain

**Sol.** Answer (1)

The secondary structure of protein refers to regular folding patterns of contiguous portions of the polypeptide chain.

36. The 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?

- (1) 28
- (2) 38
- (3) 12
- (4) 18

**Sol.** Answer (2)

From one molecule of glucose 28 ATP molecules are generated in the cell.

37. Which of the following statements about enzymes are true?

- (1) Enzyme catalyse chemical reactions by lowering the activation energy
- (2) Enzymes are highly specific both in binding chiral substrates and in catalysing their reactions
- (3) Enzymes lack in nucleophilic groups
- (4) Pepsin is proteolytic enzyme

**Sol.** Answer (2)

Enzymes are highly specific both in binding chiral substrate and in catalysing their reactions.

38. The  $\alpha$ -D glucose and  $\beta$ -D glucose differ from each other due to difference in carbon atom with respect to its

- (1) Number of OH groups
- (2) Size of hemiacetal ring
- (3) Conformation
- (4) Configuration

**Sol.** Answer (4)

$\alpha$ -D glucose &  $\beta$ -D glucose has different configuration at chiral centre.

39. Haemoglobin is

- |               |                        |
|---------------|------------------------|
| (1) A vitamin | (2) A carbohydrate     |
| (3) An enzyme | (4) A globular protein |

**Sol.** Answer (4)

Haemoglobin is a globular protein.

40. The function of enzymes in the living system is to

- |                                    |                      |
|------------------------------------|----------------------|
| (1) Catalyse biochemical reactions | (2) Provide energy   |
| (3) Transport oxygen               | (4) Provide immunity |

**Sol.** Answer (1)

41. Glucose molecule reacts with X number of molecules of phenyl-hydrazine to yield osazone. The value of X is

- |          |           |
|----------|-----------|
| (1) Two  | (2) One   |
| (3) Four | (4) Three |

**Sol.** Answer (4)

Glucose + 3 phenyl hydrazine  $\Rightarrow$  Osazone

42. Which of the following is the sweetest sugar?

- |              |             |
|--------------|-------------|
| (1) Fructose | (2) Glucose |
| (3) Sucrose  | (4) Maltose |

**Sol.** Answer (1)

Fructose is the sweetest sugar.

43.  $\alpha$ -D-glucose and  $\beta$ -D glucose are

- |                 |                   |
|-----------------|-------------------|
| (1) Epimers     | (2) Anomer        |
| (3) Enantiomers | (4) Diastereomers |

**Sol.** Answer (2)

$\alpha$ -D glucose &  $\beta$ -D glucose  
Anomers

44. Which one is responsible for production of energy in bio reaction?

- |               |                  |
|---------------|------------------|
| (1) Thyroxine | (2) Adrenaline   |
| (3) Oestrogen | (4) Progesterone |

**Sol.** Answer (1)

Thyroxine is responsible for the production of energy in bio reaction.

45. Mg is present in

- |                 |                 |
|-----------------|-----------------|
| (1) Chlorophyll | (2) Haemoglobin |
| (3) Vitamin-D   | (4) Vitamin-B   |

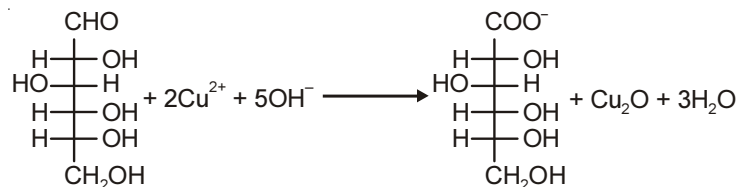
**Sol.** Answer (1)

Mg is present in chlorophyll .

46. Which of the following give positive Fehling solution test?

- (1) Sucrose (2) Glucose  
(3) Fats (4) Protein

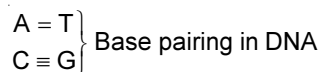
**Sol.** Answer (2)



47. Which of the following is correct about H-bonding in nucleotide?

- (1) A – T G – C (2) A – G T – C  
(3) G – T A – C (4) A – A T – T

**Sol.** Answer (1)



48.  $\text{—}\overset{\text{O}}{\parallel}\text{C—}\ddot{\text{N}}\text{H—}$  (peptide bond). Which statement is incorrect about peptide bond?

- (1) C – N bond length in proteins is longer than usual bond length of N – C bond  
(2) Spectroscopic analysis show planar structure of  $\text{—}\overset{\text{O}}{\parallel}\text{C—}\text{NH—}$  group  
(3) C – N bond length in proteins is smaller than usual bond length of C – N bond  
(4) None of these

**Sol.** Answer (1)



Amide group (peptide) is having shorter C–N bond in comparison with normal C–N bond.

49. Enzymes are made up of

- (1) Monosaccharides (2) Proteins with specific structure  
(3) Nitrogen containing carbohydrates (4) Carbohydrates

**Sol.** Answer (2)

50. Which is not true statement?

- (1)  $\alpha$ -carbon of  $\alpha$ -amino acid is asymmetric  
(2) All amino acids are found in L-form  
(3) Human body can synthesize all amino acids they need  
(4) At pH = 7 both amino and carboxylic groups exist in ionised form

**Sol.** Answer (3)

All amino acids could not be synthesised by human body.

51. Vitamin B<sub>12</sub> contains

- |             |              |
|-------------|--------------|
| (1) Fe (II) | (2) Co (III) |
| (3) Zn (II) | (4) Ca (II)  |

**Sol.** Answer (2)

Vitamin B<sub>12</sub> is having Co (III).

52. Glycolysis is

- (1) Oxidation of glucose to glutamate
- (2) Conversion of pyruvate to citrate
- (3) Oxidation of glucose to pyruvate
- (4) Conversion of glucose to haem

**Sol.** Answer (3)

Glycolysis involves glucose → pyruvate

53. Phospholipids are esters of glycerol with

- (1) Three carboxylic acid residues
- (2) Two carboxylic acid residues and one phosphate group
- (3) One carboxylic acid residue and two phosphate groups
- (4) Three phosphate groups

**Sol.** Answer (2)

Phospholipids are esters of glycerol with two carboxylic acid residues and one phosphate group.

54. Chargaff's rule states that in an organism

- (1) Amount of adenine (A) is equal to that of thymine (T) and the amount of guanine (G) is equal to that of cytosine (C)
- (2) Amount of adenine (A) is equal to that of guanine (G) and the amount of thymine (T) is equal to that of cytosine (C)
- (3) Amount of adenine (A) is equal to that of cytosine (C) and the amount of thymine (T) is equal to that of guanine (G)
- (4) Amounts of all bases are equal

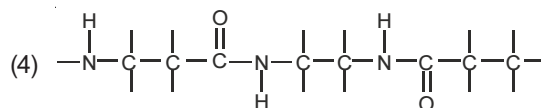
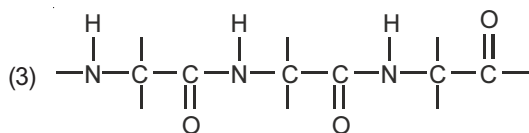
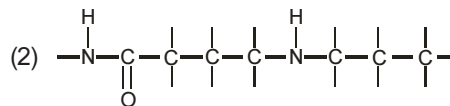
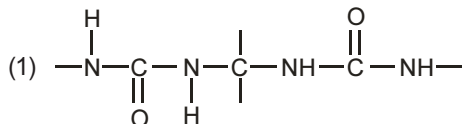
**Sol.** Answer (1)

According to Chargaff's rule

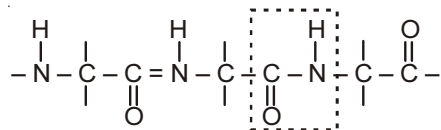
A = T

C = G

55. Which of the following structure represents the peptide chain?



**Sol. Answer (3)**



This is peptide chain.

56. A sequence of how many nucleotides in messenger RNA makes a codon for an amino acid?

- (1) Three (2) Four  
(3) One (4) Two

**Sol. Answer (1)**

Three nucleotides in messenger RNA makes a codon for an amino acid.

57. The hormone that helps in the conversion of glucose to glycogen is

- (1) Cortisone (2) Bile acids  
(3) Adrenaline (4) Insulin

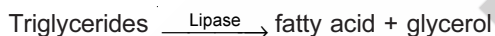
**Sol. Answer (4)**

Insulin helps in the conversion of glucose to glycogen.

58. The enzyme which hydrolyses triglycerides to fatty acids and glycerol is called

- (1) Maltase (2) Lipase  
(3) Zymase (4) Pepsin

**Sol. Answer (2)**



59. The correct statement in respect of protein haemoglobin is that it

- (1) Functions as a catalyst for biological reactions  
(2) Maintains blood sugar level  
(3) Acts as an oxygen carrier in the blood  
(4) Forms antibodies and offers resistance to diseases

**Sol. Answer (3)**

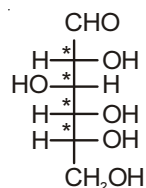
Haemoglobin acts as an oxygen carrier in the blood.

60. Number of chiral carbons in  $\beta$ -D-(+) glucose is

- (1) Five (2) Six  
(3) Three (4) Four

**Sol. Answer (4)**

There are four chiral centres in one glucose molecule.





61. The helical structure of protein is stabilized by

- (1) Dipeptide bonds
- (2) Hydrogen bonds
- (3) Ether bonds
- (4) Peptide bonds

**Sol.** Answer (2)

H-bond formed between C = O one amino acid residue and the –NH of the 4th amino acid to give it  $\alpha$ -Helix structure.

62. During the process of digestion, the proteins present in food materials are hydrolysed to amino acids. The enzymes involved in the process Proteins  $\longrightarrow$  Amino acids, are respectively

- |                          |                         |
|--------------------------|-------------------------|
| (1) Invertase and zymase | (2) Amylase and maltase |
| (3) Diastase and lipase  | (4) Pepsin and trypsin  |

**Sol.** Answer (4)

## SECTION - C

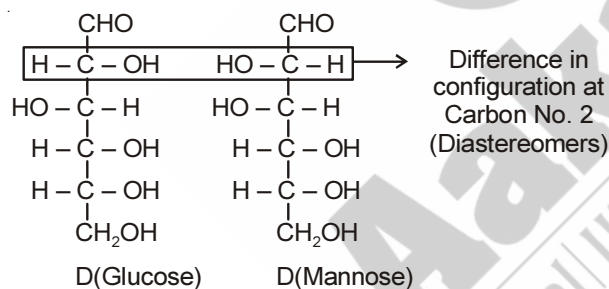
### Assertion - Reason Type Questions

1. A : Glucose and Mannose are Anomers.

R : Configuration at 1st carbon differ in Glucose and Mannose.

**Sol.** Answer (4)

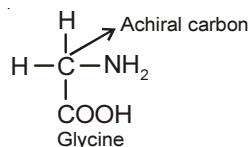
Glucose and Mannose are diastereomers.



2. A : Glycine is the only amino acid which is optically inactive.

R : Glycine has no chiral carbon.

**Sol.** Answer (1)



3. A : Specific rotation of freshly prepared aqueous solution of  $\alpha$ -D(+) glucose and  $\beta$ -D(+) glucose are same.

R :  $\alpha$ -D(+) glucose and  $\beta$ -D(+) glucose are epimers.

**Sol.** Answer (3)

(A) is true.

(R) is false  $\alpha$ -D glucose and  $\beta$ (D) glucose are anomers because they differ in configuration at Carbon No. 1

4. A : Glucose, Mannose and Fructose form identical osazone.

R : Glucose, Mannose and Fructose have identical configuration at 3rd, 4th and 5th carbon atom.

**Sol.** Answer (1)

All the three have same configuration at 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> carbon –OH group is on the left side on 3rd & OH on right side on 4<sup>th</sup> & 5<sup>th</sup> carbon.

5. A : D-fructose is laevorotatory.

R : D-Glucose is dextrorotatory.

**Sol.** Answer (2)

Because D-glucose is dextrorotatory as well as have (D) configuration.

