Additional Problems for Self Practice (APSP)

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

PART - I : PRACTICE TEST-1 (IIT-JEE (MAIN Pattern))

Max. Time : 1 Hr. **Max. Marks : 120**

Important Instructions

1. The test is of **1 hour** duration.
2. The Test Booklet consists of **30** questions. The maximum marks are **120.**
3. Each question is allotted **4 (four)** marks for correct response.
4. Candidates will be awarded marks as stated above in Instructions No. 3 for correct response of each question. **¼ (one fourth)** marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.
5. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 4 above.

1. Glucose on reduction with Na/Hg and water gives ?
(1) Sorbitol (2) Fructose (3) Saccharic acid (4) Gluconic acid

2. Glucose or fructose is converted into C_2H_5OH in the presence of ?
(1) Diastage (2) Maltase (3) Invertase (4) Zymase

3. Glucose cannot be classified as ?
(1) Hexose (2) Carbohydrate (3) Aldose (4) Oligosaccharide

4. The common disaccharide has the molecular formula :
(1) $C_{10}H_{18}O_9$ (2) $C_{10}H_{20}O_{11}$ (3) $C_{18}H_{22}O_{11}$ (4) $C_{12}H_{22}O_{11}$

5. Strach is changed into disaccharide in presence of ?
(1) Diastase (2) Maltase (3) Lactase (4) Zymase

6. First member of aldose sugar is :
(1) aldotriose (2) aldotetrose (3) aldopentose (4) aldohexose

7. How many optically active molecules are possible with structural formula $CH_2OHCHOHCHOHCHOHCHOHCHO$?
(1) 16 (2) 8 (3) 32 (4) 4

8. Which carbohydrate is used in silvering of mirror ?
(1) Sucrose (2) Fructose (3) Glucose (4) Starch

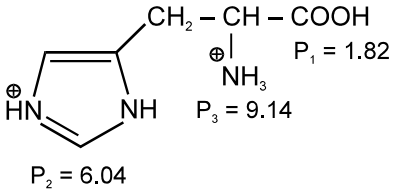
9. The charring process when $C_6H_{12}O_6$ is heated with conc. H_2SO_4 is due to ?
(1) Oxidation (2) Reduction (3) Dehydration (4) Dehydrogenation

10. Which one of the following kinds of bonds are not broken during denaturation of a protein ?
(1) Peptide bond (2) Hydrogen bond (3) Disulphide bond (4) Ionic bond

11. A hexapeptide with the composition Arg, Gly, leu, Pro has proline at both C-terminal and N-terminal position. The partial hydrolysis of the hexapeptide gives
Gly–Pro–Arg, Arg–Pro, Pro–Leu–Gly.
(1) Pro–Gly–Leu–Pro–Arg–Pro (2) Pro–Leu–Gly–Pro–Arg–Pro
(3) Pro–Leu–Gly–Arg–Pro–Pro (4) Pro–Arg–Pro–Leu–Gly–Pro

12. The function of proteins is to act as
(1) Structural materials of animal tissues (2) Enzymes and antibodies
(3) Metabolic regulators (4) All the three above

13. Observe the pKa values (P_1-P_3) of the given amino acid.



Which form of this amino acid will exist in aqueous solution at pH = 8

(1) as dication (2) as monocation (3) as zwitter ion (4) as monoanion

14. Carbohydrates have not been classified on the basis of :

(1) sugars and non-sugars (2) reducing character
(3) optical activity (4) hyrolysis (complexity of structure)

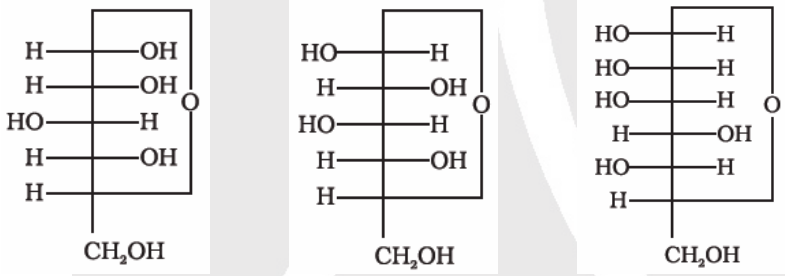
15. Which of the following statements about β-pleated sheet secondary structure of proteins is correct ?

(1) Parallell β-pleated sheet structure is more stable than the antiparallel sheet structure.
(2) Antiparallel β-pleated sheet structure is more stable than the parallel sheet structure.
(3) Both parallel and antiparallel sheet structures have equal stability.
(4) there is no clear relationship between the two in terms of stability.

16. The two forms of D-Glucopyranose obtained from solution of D-Glucose are known as

(1) Epimers (2) Anomers (3) Enantiomers (4) Geometrical Isomers

17. Three cyclic structures of monosaccharides are given below which of these are anomers.



(1) I and II (2) II and III (3) I and III (4) III is anomer of I and II

18. Glucose and fructose give same type of reactions :

(1) with bromine water (2) on reduction with Na-Hg/H_2O
(3) with Fehling's solution (4) All are correct

19. The protein responsible for blood clotting is :

(1) Albumins (2) Globulins (3) Fibroin (4) Fibrinogen

20. Hydrolysis of sucrose into (+) glucose and (-) fructose is known as

(1) Mutarotation (2) Inversion (3) Pyrolysis (4) None of these

21. The term inverted sugar refers to an equimolar mixture of :

(1) D-Glucose and D-galactose (2) D-Glucose and D-fructose
(3) D-Glucose and D-mannose (4) D-Glucose and D-ribose

22. Glycoside linkage is

(1) an acetal linkage (2) an ether linkage
(3) an ester linkage (4) an amide linkage

23. Sucrose on hydrolysis yields a mixture which is

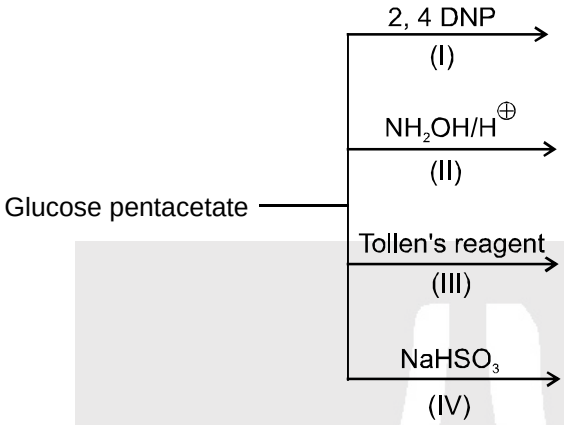
(1) optically inactive (2) dextrorotatory (3) laevorotatory (4) racemic

24. Cellulose on hydrolysis yields

(1) β-D-Fructose (2) α-D-Glucose (3) β-D-Glucose (4) α-D-Fructose

25. Find true and False from the following statements regarding carbohydrates
S_1 : All monosaccharides whether aldoses or ketoses are reducing sugars.
S_2 : Bromine water can be used to differentiate between aldoses and ketoses
S_3 : A pair of diastereomeric aldoses which differ only in configuration at C-2 are anomers.
S_4 : Osazone formation destroys the configuration at C-2 of an aldose, but does not affect the configuration of the rest of the molecule.
(1) TTTT (2) TFTF (3) TTFT (4) FTTT

26. Observe the following laboratory tests for glucose pentacetate and mention +ve or –ve from the code given below.



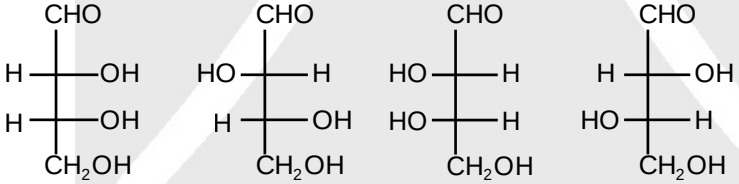
(1) + + + + (2) – – – – (3) + – + – (4) + + – –

27. The non-protein portion of a protein is called :
(1) Functional group (2) Characteristic group (3) Prosthetic group (4) Enolic group

28. Glucose and fructose are :
(1) Optical isomers (2) Tautomers (3) Functional isomers (4) Chain isomers.

29. In a protein molecule various amino acids are linked together by :
(1) dative bond (2) α-glycosidic bond (3) β-glycosidic bond (4) peptide bond

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



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

Practice Test-1 (IIT-JEE (Main Pattern))

OBJECTIVE RESPONSE SHEET (ORS)

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

PART - II : NATIONAL STANDARD EXAMINATION IN CHEMISTRY (NSEC) STAGE-I

1. Prosthetic group in Glycoprotein is : **[NSEC-2001]**
(A) vitamins (B) fats (C) carbohydrates (D) nucleic acid

2. The chemical in DNA molecule that could lead to synthesis of protein with an altered amino acid sequence is called **[NSEC-2001]**
(A) cellular membrane (B) lipid formation (C) replication (D) mutaion

3. Formation of peptide bond is accompanied by release of one molecule of **[NSEC-2002]**
(A) oxygen (B) hydrogen (C) water (D) none of these

4. Amino acid at its isoelectric point when placed in an electric field exhibits which of these properties ? **[NSEC-2002]**
(A) moves toward cathode (B) moves toward anode
(C) no movement (stationary) (D) none of these

5. The number of hydrogen bonds present in the sequence of a stretch of a double helical DNA 5`ATGCCTAA3`S is **[NSEC-2003]**
(A) 16 (B) 19 (C) 24 (D) 20.

6. Metal ions are known to interact with amino acid residues of proteins. The amino acid with larger number of metal binding sites are **[NSEC-2003]**
(A) cysteine, alanine (B) methionine, tryptophan
(C) glutamic acid, cysteine (D) arginine, isoleucine.

7. Glycogen, a storage form of carbohydrate, in liver **[NSEC-2003]**
(A) acts as a reservoir or antioxidant activity (B) helps in digestion by secreting enzymes
(C) acts as a source of energy during starvation (D) acts as a reservoir to neutralise acidic food.

8. One among the following classes of compounds is not a biopolymer **[NSEC-2004]**
(A) proteins (B) steroids (C) nucleic acids (D) glycogens.

9. Insulin, a hormone secreted by the pancreas is a **[NSEC-2004]**
(A) carbohydrate (B) steroid (C) protein (D) nucleic acid

10. An enzymatic partial hydrolysis of starch and cellulose give disaccharides maltose and cellobiose respectively. Hence, maltose and cellobiose differ with respect to **[NSEC-2004]**
(A) molecular mass (B) configuration at the glycoside linkage
(C) placement of the glycoside linkage (D) ring sizes of the constituent sugar residues.

11. The structure representing the Zwitter ion form of glycine is **[NSEC-2004]**
(A) $CH_2(NH_2)-COOH$ (B) $CH_2(NH_3^+)-COOH$ (C) $CH_2(NH_3^+)-COO^-$ (D) $CH_2(NH_2)-COO^-$

12. The simplest carbohydrate capable of exhibiting optical isomerism is **[NSEC-2005]**
(A) glucose (B) fructose (C) sucrose (D) glyceraldehyde.

13. Long chain fatty acid esters of glycerol may be converted to soap by **[NSEC-2005]**
(A) trans-esterification (B) reduction (C) acid hydrolysis (D) alkaline hydrolysis

14. Secondary structure of proteins can be destabilized by **[NSEC-2005]**
(A) treating it with β-mercaptoethanol (B) treating it with iodoacetate
(C) treating it with 0.001 M KCl (D) heat.

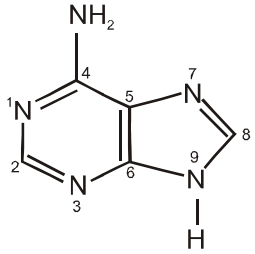
15. Tertiary structure of proteins depends on **[NSEC-2005]**
(A) number and type of amino acids (B) number and sequence of amino acids
(C) type and sequence of amino acids (D) type of amino acids only.

16. The peptide bond in proteins is **[NSEC-2005]**
(A) planar and usually found in a trans conformation.
(B) planar, but rotates to three preferred dihedral angles.
(C) non-polar and fixed in a trans conformation.
(D) non-polar, but rotates to three preferred dihedral angles.

17. The property of replication is associated with **[NSEC-2005]**
(A) RNA and DNA (B) DNA and protein (C) only DNA (D) only RAN.

18. Identify the biomolecules which is not a polymer. **[NSEC-2005]**
(A) glycogen (B) sucrose (C) haemoglobin (D) DNA.

19. Structure of adenine is shown below,



Nitrogen atoms involved in Watson-Crick base pairing with thymine are **[NSEC-2006]**
(A) N1 and nitrogen of NH_2 (B) N1 and N3
(C) N7 and nitrogen of NH_2 (D) N1 and N9.

20. Test by which starch and cellulose can be distinguished from each other is **[NSEC-2006]**
(A) reducing sugar test (B) analysis of products of hydrolysis
(C) iodine test (D) Molisch test.

21. A positive Biuret test confirms the presence of **[NSEC-2006]**
(A) ester (B) carboxylic acid (C) amide (D) amine.

22. Bonds responsible for the helical structure of proteins are **[NSEC-2006]**
(A) peptide bonds (B) hydrophobic interactions
(C) intermolecular H bonds (D) intramolecular H bonds

23. Glucose and fructose react with phenylhydrazine to give identical yellow osazones because **[NSEC-2006]**
(A) carbon atoms 3, 4 and 5 in both have same configuration
(B) both are hexoses
(C) both are reducing sugars
(D) all the above.

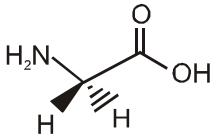
24. In a nucleoside, nitrogen base is linked to pentose sugar by **[NSEC-2006]**
(A) peptide linkage (B) N-glycosidic linkage
(C) phosphodiester bond (D) H-bonds.

25. Which of the following statements is not correct for glycine? **[NSEC-2006]**
(A) It contains amino group. (B) It is a constituent of proteins.
(C) It contains a carboxylate group. (D) It is optically active.

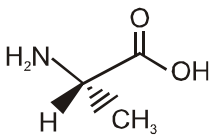
26. Which of the following term is applicable for glucose - galactose pair? **[NSEC-2006]**
(A) isomers (B) epimers (C) anomers (D) none of these.

27. What is true about both DNA and RNA? **[NSEC-2006]**
(A) both are genetic materials (B) both have same nitrogen bases
(C) both have located inside cell
(D) both have hydrogen bonds to stabilize is secondary structure.

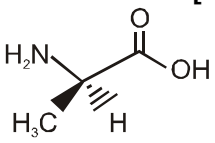
28. When an α-amino acid contains a substituent, there is possibility of optical isomers. For example, L-alanine and D-alanine are two enantiomers. What is the number of all possible linear tripeptides (repetitions of amino acids permitted) that can be formed from the following three amino acids: glycine, L-alanine and D-alanine as the starting materials in the condensation reaction ? **[NSEC-2006]**



glycine(Gly)



L-alanine(L-Ala)



D-alanine(D-Ala)

(A) $3C_2$ (B) 3! (C) 8 (D) 27.

29. Titration of the amino acid lysine has three pKa values viz., pKa_1 (2.18), pKa_2 (8.95) and pKa_3 (10.53). The pH at which this amino acid will show no net migration in an electric field is **[NSEC-2007]**
(A) 5.57 (B) 9.74 (C) 6.35 (D) 7.22

30. Proteins present inside the cell membrane are stabilized by **[NSEC-2007]**
(A) hydrogen bond (B) disulfide bond (C) hydrophobic force (D) phospho-diester bond

31. The amino acid prolin allows bending of a polypeptide in secondary structure of protein. This is possible due to **[NSEC-2008]**
(A) Presence of peptide bond (B) Abence of hydrogen bond
(C) Presence of hydrogen bond (D) Steric hindrance

32. Which of the amino acid stabilizes tertiary structure of protein through formation of covalent bond ? **[NSEC-2008]**
(A) Tyrosine (B) Methionine (C) Cysteine (D) Valine

33. A mixture of three amino acids glycine (Gly), lysine (Lys) and glutamic acid (Glu) was separated by an anion exhchange chromatography process. The order of elution of amino acids from the column is **[NSEC-2008]**
(A) Glu, Lys, Gly (B) Lys, Glu, Gly (C) Gly, Lys, Glu (D) Glu, Gly, Lys

34. Ten DNA molecules undergo replication 2 times. The total number DNA molecules produced are : **[NSEC-2008]**
(A) 10 (B) 20 (C) 30 (D) 40

35. Enzymatic hydrolysis of starch leads to release of **[NSEC-2008]**
(A) Fructose (B) Mannose (C) Glucose (D) Xylose

36. During alcoholic fermentation of sugars, the enzyme which converts glucose (or fructose) into ethanol is: **[NSEC-2009]**
(A) zymase (B) invertase (C) maltase (D) urease

37. The nucleic acid which bears a condon in its structure is – **[NSEC-2009]**
(A) r-RNA (B) t-RNA (C) m-RNA (D) DNA

38. Protein synthesis does not involve – **[NSEC-2009]**
(A) ammino acids (B) t-RNA (C) m-RNA (D) DNA

39. The most likely change occuring in a protein sample when treated with 6 M HCl is – **[NSEC-2009]**
(A) formation of disulphide bond (B) formation of peptide bond
(C) hydrolysis of peptide bond (D) oxidation of disulphide bond

40. The order of the energy released by biological oxidation of equal amounts (moles) of glucose, sucrose and starch is – **[NSEC-2009]**
(A) starch > sucrose > glucose (B) starch > glucose > sucrose
(C) sucrose > glucose > starch (D) glucose > sucrose > starch

41. Enzymatic breakdown of cellulose will yield monomers of – **[NSEC-2009]**
(A) Galactose (B) Glucose (C) Fructose (D) Ribose

42. The trend of isoelectric point (pI) of the amino acids glycine, lysine and aspartic acid is – **[NSEC-2009]**
(A) glycine > lysine > aspartic acid (B) aspartic acid > lysine > glycine
(C) aspartic acid > glycine > lysine (D) lysine > aspartic acid > glycine

43. The chemical substance which can be used to isolate a protein present inside the cell membrance is – **[NSEC-2009]**
(A) Chelating agent (B) Dilute acid (C) Detergent (D) Urea solution

44. The chemical force playing an important role in binding of codon to anticodon is – **[NSEC-2009]**
(A) covalent bond (B) co-ordinate bond (C) hydrogen bond (D) hydrophobic bond

45. In a DNA molecule **[NSEC-2010]**
(A) A = C (B) A + G = C + T (C) T = G (D) A/T = 2

46. When an apple is cut, the exposed part begins to turn brown. Often the browning action can be arrested by adding a few drops of lemon juice to the exposed area. The basis for this treatment is: **[NSEC-2010]**
(A) lemon juice is an antioxident.
(B) denaturation of proteins of the enzymes.
(C) decolourization due to lemon juice.
(D) activation of decolourizing enzymes under acidic medium.

47. A nonapeptide in rat on hydrolysis gave the following identifiable tripeptides: **[NSEC-2010]**
Gly-Ala-Phe, Ala-Leu-Val, Gly-Ala-Leu, Phe-Glu-His, and His-Gly-Ala.
The sequence of the nonapeptide is
(A) Gly-Ala-Leu-Val-Phe-Glu-His-His-Gly (B) Ala-Phe-Leu-Val-Gly-Leu- Phe-Glu-His
(C) Gly-Ala-Phe-Glu-His-Gly-Ala-Leu-Val (D) Phe- Ala-Leu-Val-Gly-Glu-His-Gly-Ala

48. Denaturation of protein due to change in pH could be due to **[NSEC-2011]**
(A) loss of van der Waal's interaction (B) hydrophobic interaction
(C) change in ionic interaction (D) breaking of covalent bonds

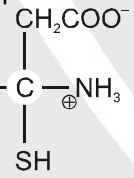
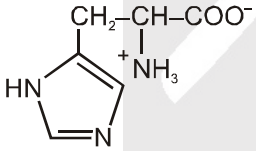
49. If titration of an amino acid present in the solution yielded pI (isoelectric point) value of 10.80, the amino acid present in the solution may be **[NSEC-2011]**
(A) glycine (B) arginine (C) histidine (D) prolin

50. Semipermeable nature of the cell membrane can be attributed to the presence of **[NSEC-2011]**
(A) protein and DNA (B) lipid and protein
(C) polysaccharide and lipid (D) DNA and lipid

51. Secondary structures could be formed in nucleic acid similar to protein due to formation of : **[NSEC-2011]**
(A) covalent bond (B) ionic bond (C) co-ordinate bond (D) hydrogen bond

52. α-D(+) glucose and β-D(+) glucose are **[NSEC-2012]**
(A) Enantiomers (B) Geometrical isomers
(C) Epimers (D) Anomers

53. The genetic material of a cell is made of **[NSEC-2012]**
(A) nucleic acids (B) proteins (C) carbohydrates (D) fats

54. The amino acid that cannot be obtained by hydrolysis of protein is **[NSEC-2012]**
(A) $HOOCCH_2\overset{+}{C}H(NH_3)COO^-$ (B) 
(C)  (D) $\overset{+}{N}H_3\,(CH_2)_4CH(NH_2)COO^-$

55. Protein and DNA being charged molecule, can be separated by **[NSEC-2012]**
(A) Electrophoresis (B) Centrifugation (C) Filtration (D) Spectrophotometry

56. The biomolecule which does not have a secondary structure is **[NSEC-2012]**
(A) Protein (B) Lipid (C) DNA (D) RNA

57. What is NOT true for both cellulose and DNA? **[NSEC-2013]**
(A) Both are long chain polymers (B) Both contains similar monomers
(C) Both have glycosidic Linkages (D) Both can break down by enzymatic hydrolysis

58. How much chemical energy is fixed in the form of ATP upon complete oxidation of one mole of glucose ? (Hydrolysis of ATP yields 7.5 kcal/mole) **[NSEC-2013]**
(A) 360 (B) 300 (C) 270 (D) 200

59. In animals, the stored carbohydrates is **[NSEC-2013]**
(A) Starch (B) Glycogen (C) Sucrose (D) Fructan

60. The isoelectric point of an amino acid is : **[NSEC-2013]**
(A) The pH at which it exists in the acidic form (B) The pH at which exists in the basic form
(C) The pH at which it exists in the Zwitterion form (D) The pH which is equal to its pK_a value

61. The minimum number of H^+ ions that can be released by an amino acid is **[NSEC-2013]**
(A) 1 (B) 2 (C) 3 (D) 4

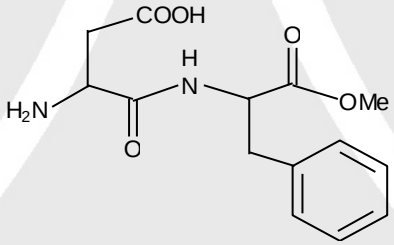
62. Amylose and cellulose are polymers of glucose in which glucose units are joined to each other respectively by linkages of the type **[NSEC-2014]**
(A) α, β (B) β, β (C) β, α (D) $\alpha\beta, \beta$

63. 50 g of sucrose is hydrolysed to a mixture of glucose and fructose. Sucrose is dextrorotatory, however the mixture formed is laevorotatory. This is because **[NSEC-2014]**
(A) more amount of β-D-fructose is formed than that of β-D-glucose
(B) β-D-glucose undergoes inversion of configuration
(C) β-D-fructose and β-D-glucose undergo inversion to their α-anomers
(D) laevorotation of β-D-fructose is more than dextrorotation of β-D-glucose.

64. The sugars that are produced on hydrolysis of DNA and RNA are **[NSEC-2014]**
(A) epimers (B) two different sugars (C) positional isomers (D) diasteromers

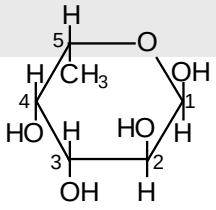
65. Many protein-based biomaterials, such as waste hair and feathers, can absorb heavy metal ions from wastewater. It has been observed that metal uptake by these materials increases in alkaline condition. The enhanced uptake in alkaline conditions is due to **[NSEC-2015]**
(A) generation of many ligand sites in the protein molecules due to removal of H+
(B) availability of a high concentration of OH- ions as ligands
(C) Increased cross – linkages in the protein chains by formation of amide bonds
(D) increase in solubility of the proteins

66. Aspartame (X) is an artificial sweetening agent and is 200 times sweeter than sugar. It is an ester of the dipeptide of : **[NSEC-2016]**

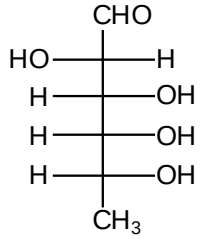


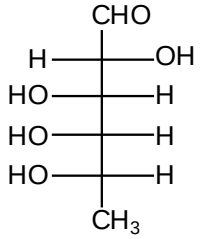
(A) alanine and phyenylalanine (B) aspartic acid and alanine
(C) phenylalanine and glycine (D) aspartic acid and phenylalanine

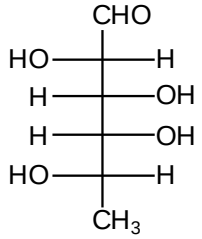
67. L-Fucose with the following planar representation is a sugar component of the determinants of the A, B, O blood group typing **[NSEC-2016]**

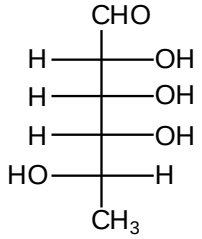


The open chain structure of L-Fucose can be represented as

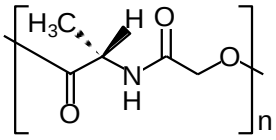
(A) 

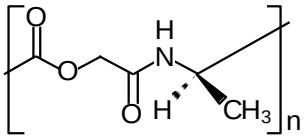
(B) 

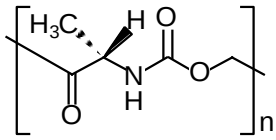
(C) 

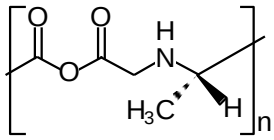
(D) 

68. A biodegradable alternating copolymer of L-alanine and glycolic acid (HO–CH_2–COOH) is : **[NSEC-2016]**

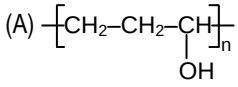
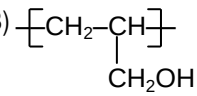
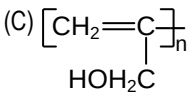
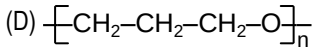
(A) 

(B) 

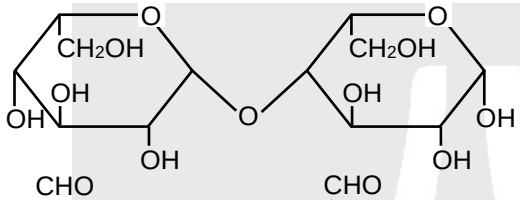
(C) 

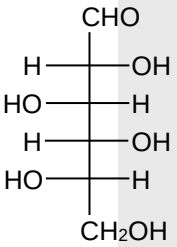
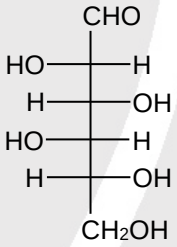
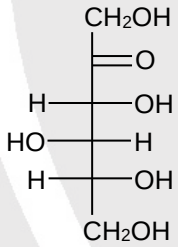
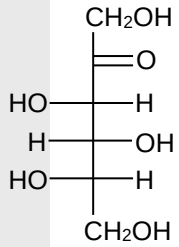
(D) 

69. Which of the following represents a polymer of prop-2-en-l-ol ? **[NSEC-2017]**

(A)  (B)  (C)  (D) 

70. The monosaccharide present in the following disaccharide is **[NSEC-2018]**



(A)  (B)  (C)  (D) 

PART - III : PRACTICE TEST-2 (IIT-JEE (ADVANCED Pattern))

Max. Time : 1 Hr. **Max. Marks : 54**

Important Instructions

A. General :

1. The test is of 1 hour duration.
2. The Test Booklet consists of 18 questions. The maximum marks are 54.

B. Question Paper Format

3. Each part consists of five sections.
4. Section-1 contains 7 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE is correct.
5. Section-2 contains 5 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE OR MORE THAN ONE are correct.
6. Section-3 contains 2 questions. The answer to each of the questions is a single-digit integer, ranging from 0 to 9 (both inclusive).
7. Section-4 contains 1 paragraphs each describing theory, experiment and data etc. 3 questions relate to paragraph. Each question pertaining to a partcular passage should have only one correct answer among the four given choices (A), (B), (C) and (D).
8. Section-5 contains 1 multiple choice questions. Question has two lists (list-1 : P, Q, R and S; List-2 : 1, 2, 3 and 4). The options for the correct match are provided as (A), (B), (C) and (D) out of which ONLY ONE is correct.

C. Marking Scheme

9. For each question in Section 1, 4 and 5 you will be awarded 3 marks if you darken the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (–1) mark will be awarded.

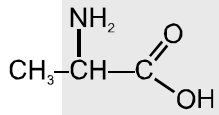
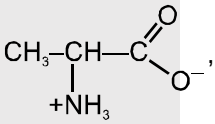
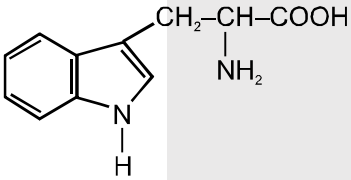
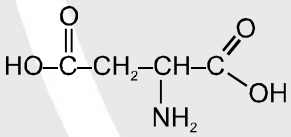
10. For each question in Section 2, you will be awarded 3 marks. If you darken all the bubble(s) corresponding to the correct answer(s) and zero mark. If no bubbles are darkened. No negative marks will be answered for incorrect answer in this section.
11. For each question in Section 3, you will be awarded 3 marks if you darken only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. No negative marks will be awarded for incorrect answer in this section.

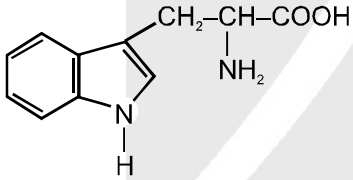
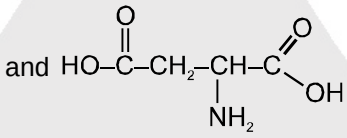
SECTION-1 : (Only One option correct Type)

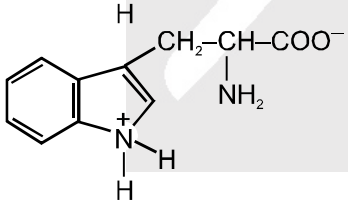
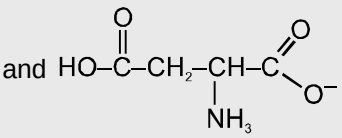
This section contains 7 multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which Only ONE option is correct.

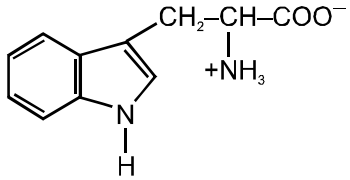
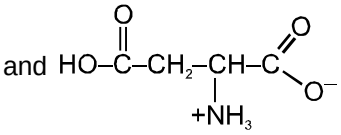
1. Two hexoses form the same osazone. Find the correct statement about these hexoses.
(A) Both of them must be aldoses
(B) They are epimers at C-3
(C) The carbon atoms 1 and 2 in both have the same configuration
(D) The carbon atoms 3, 4 and 5 in both have the same configuration

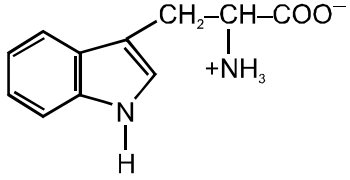
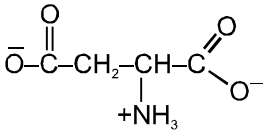
2. Consider following reagent :
I. Br_2 water II. Tollen's reagent III. Fehling's solution
which can be used to make distinction between an aldose and a ketose ?
(A) I, II and III (B) II and III (C) I only (D) II only

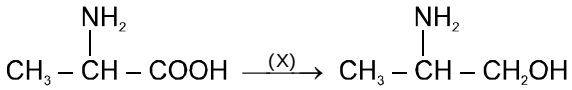
3. Alanine  in aquous solution is found as  , then Tryptophan  and Aspartic acid  is found in neutral aquous solution as

(A)  and 

(B)  and 

(C)  and 

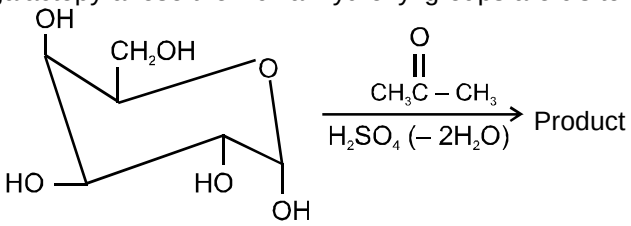
(D)  and 

4. 

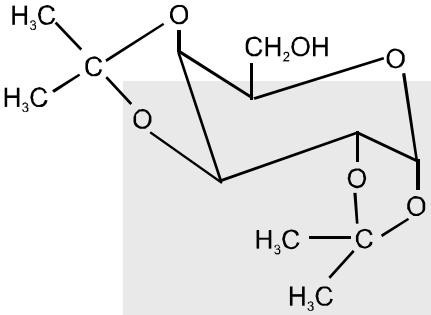
The reagent (X) can be :

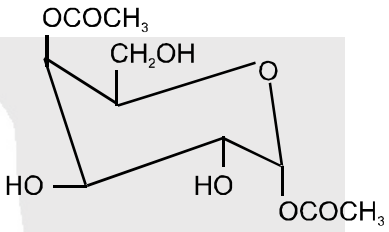
(A) H_2 / Pd/$BaSO_4$/quinoline (B) $NaBH_4$ (C) $LiAlH_4$ (D) CH_3MgI

5. In α-D-galactopyranose the vicinal hydroxyl groups are cis to each other -

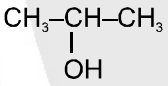


The product may be :

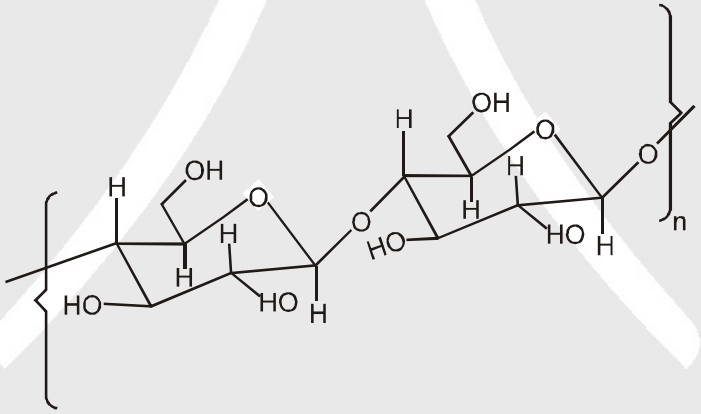
(A) 

(B) 

(C) CH_3COOH

(D) 

6. The structure of the following polymer is :



(A) Starch (B) Sucrose (C) Cellulose (D) Maltose

7. It is best to carry out reaction with sugars in neutral or acidic medium and not is alkaline medium because in alkaline medium sugars undergo ?

(A) Racimisation (B) Decomposition (C) Inversion (D) Rearrangement

Section-2 : (One or More than one options correct Type)

This section contains 5 multipole choice questions. Each questions has four choices (A), (B), (C) and (D) out of which ONE or MORE THAN ONE are correct.

8. The correct statement (s) about starch :

(A) It is a pure single compound.

(B) It is mixture of two polysaccharides of glucose.

(C) It involves the (C_1 – C_4) α - glycosidic linkage between two α - D glucose units.

(D) It involves branching by (C_1 – C_6) glycosidic linkage.

9. Which of the following pairs is (are) correctly matched ?
(A) α-D (+) glucose and β-D(+) glucose $\rightarrow$ C-2 epimers
(B) Glucose and fructose $\rightarrow$ C-3 epimers
(C) Glucose $\rightarrow$ mutarotation
(D) Sucrose $\rightarrow$ Glucose + fructose

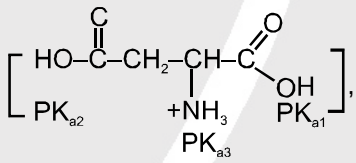
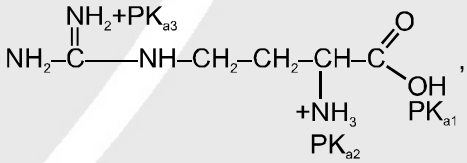
10. D-Glucose and D-Mannose are :
(A) Anomers (B) Enantiomers (C) Geometrical Isomers (D) Epimers

11. The correct structure of glycine at given pH are :
(A) $H_3\overset{\oplus}{N}CH_2-\underset{\underset{O}{\|}}{C}-OH$ at pH = 2.0 (B) $H_3\overset{\oplus}{N}CH_2-\underset{\underset{O}{\|}}{C}-O^{\ominus}$ at pH = 6.0
(C) $H_2NCH_2-\underset{\underset{O}{\|}}{C}-O^{\ominus}$ at pH = 9 (D) $H_2NCH_2-\underset{\underset{O}{\|}}{C}-OH$ at pH = 12

12. The correct statements about anomers are :
(A) Anomers have different stereochemistry at C-1(anomeric carbon).
(B) α-D-glucopyranose and β-D-glucopyranose are anomers.
(C) Both anomers of D-glucopyranose can be crystallised and purified.
(D) When pure α-D-glucopyranose is dissolved in water its optical rotation slowly changes.

Section-3 : (One Integer Value Correct Type.)

This section contains 2 questions. Each question, when worked out will result in one integer from 0 to 9 (both inclusive)

13. For Aspartic acid  , the pK_{a_1}, pK_{a_2} and pK_{a_3} are 2,4 and 10 respectively and for Arginine  , the pK_{a_1}, pK_{a_2} and pK_{a_3} are 2, 9 and 13 respectively. If pI of aspartic acid is x and of arginine is y then x + y is :

14. Allose and Glucose are isomeric structures with similar structural formula but different configurations. If D-Allose and (L)-Glucose differs in configuration along C_i no. of carbons ($C_i = C_1, C_2, C_3,.....$), then $\sum C_i$ is

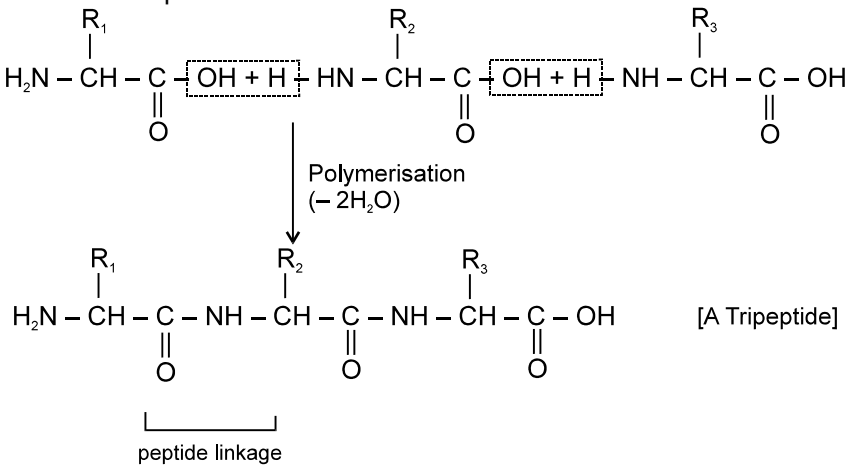
SECTION-4 : Comprehension Type (Only One options correct)

This section contains 1 paragraphs, each describing theory, experiments, data etc. 3 questions relate to the paragraph. Each question has only one correct answer among the four given options (A), (B), (C) and (D)

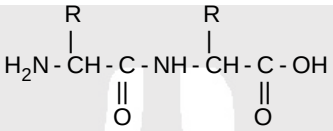
Paragraph For Questions 15 to 17

Proteins are biomolecules composed of α-amino acids. An α-amino acid has a general formula $R-\underset{\underset{NH_2}{|}}{CH}-COOH$. The amino acids polymerise and form an amide linkage (peptide linkage) between two monomeric amino acid units.

The polymerisation takes place as follows



Two or more similar amino acids can also polymerise, for example a dimer will be like



15. In the above trimer, if $R_1 = H$; $R_2 = CH_3$ & $R_3 = Ph$
then total number of optically active stereoisomers will be :
(A) 8 (B) 6 (C) 4 (D) 2

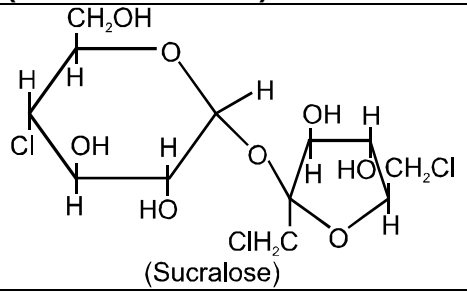
16. In the given trimer if $R_1 = H$; $R_2 = CH_3$ and $R_3 = CH_2Ph$
then the amino acids present in the trimer are :
(A) Glycine, Alanine & Phenyl Alanine
(B) Glycine, Leucine & Phenyl Alanine
(C) Alanine, Valine & Phenyl Alanine
(D) Alanine, Leucine & Lysine

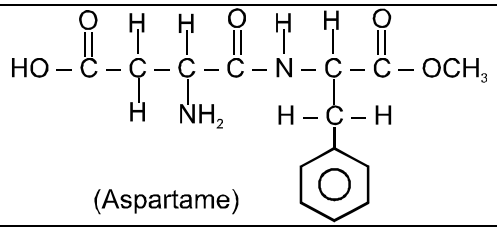
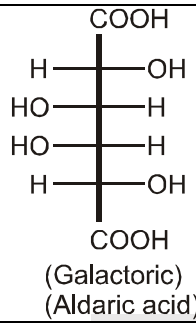
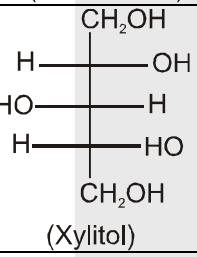
17. Which statement is incorrect about the given trimer.
(A) it will liberate CO_2 with $NaHCO_3$.
(B) It will liberate N_2 with $NaNO_2$ / HCl
(C) It will give yellow precipitate with 2, 4-Dinitrophenylhydrazine
(D) It will rotate plane polarized light.

SECTION-5 : Matching List Type (Only One options correct)

This section contains 1 questions, each having two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (A), (B), (C) and (D) out of which one is correct

18. Match the Following :

	Column I (Artificial sweetners)		**Column II (Characteristics)**
(P)	 (Sucralose)	**(1)**	A derivative of dipeptide

(Q)	 (Aspartame)	**(2)**	A derivative of disaccharide
(R)	 (Galactoric) (Aldaric acid)	**(3)**	Reduction product of an aldopentose
(S)	 (Xylitol)	**(4)**	Oxidation product of aldohexose

Code :

	P	Q	R	S		P	Q	R	S
(A)	2	1	4	3	(B)	1	2	4	3
(C)	3	1	2	4	(D)	2	3	1	4

Practice Test-2 ((IIT-JEE (ADVANCED Pattern))

OBJECTIVE RESPONSE SHEET (ORS)

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.										
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**		
Ans.										

APSP Answers

PART - I

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

PART - II

1.	(C)	**2.**	(D)	**3.**	(C)	**4.**	(C)	**5.**	(B)
6.	(C)	**7.**	(C)	**8.**	(B)	**9.**	(C)	**10.**	(B)
11.	(C)	**12.**	(D)	**13.**	(D)	**14.**	(D)	**15.**	(C)
16.	(A)	**17.**	(C)	**18.**	(B)	**19.**	(C)	**20.**	(C)
21.	(C)	**22.**	(D)	**23.**	(A)	**24.**	(D)	**25.**	(D)
26.	(B)	**27.**	(A)	**28.**	(D)	**29.**	(B)	**30.**	(D)
31.	(B)	**32.**	(C)	**33.**	(D)	**34.**	(D)	**35.**	(C)
36.	(A)	**37.**	(C)	**38.**	(D)	**39.**	(C)	**40.**	(A)
41.	(B)	**42.**	(D)	**43.**	(C)	**44.**	(C)	**45.**	(B)
46.	(B)	**47.**	(C)	**48.**	(C)	**49.**	(B)	**50.**	(B)
51.	(D)	**52.**	(D)	**53.**	(A)	**54.**	(B)	**55.**	(A)
56.	(B)	**57.**	(B)	**58.**	(C)	**59.**	(B)	**60.**	(C)
61.	(A)	**62.**	(A)	**63.**	(D)	**64.**	(B)	**65.**	(A)
66.	(D)	**67.**	(C)	**68.**	(A)	**69.**	(B)	**70.**	(A)

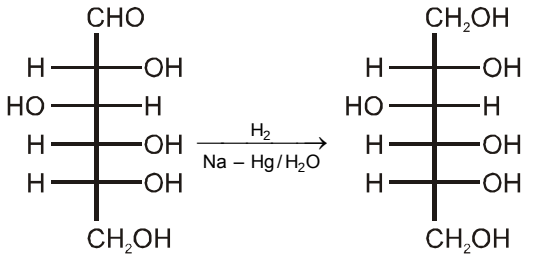
PART - III

1.	(D)	**2.**	(C)	**3.**	(D)	**4.**	(C)	**5.**	(A)
6.	(C)	**7.**	(D)	**8.**	(BCD)	**9.**	(CD)	**10.**	(D)
11.	(ABC)	**12.**	(ABCD)	**13.**	14	**14.**	11	**15.**	(C)
16.	(A)	**17.**	(C)	**18.**	(A)				

APSP Solutions

PART - I

1.



2. $C_6H_{12}O_6 \xrightarrow[3O_2]{\text{Zymase}} C_2H_5OH + 4CO_2 + 3H_2O$

3. Glucose is a monosaccharide where as oligosaceharides are those which have 2-10 monosaccharide units

4. Commonest disaccharide (sucorse) has molecular fomula $C_{12}H_{22}O_{11}$.

5. Starch is hydrolysed by the enzyme diastase (also called β-amylase) to maltose

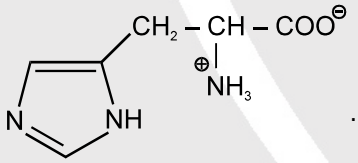
7. Total no. of optical isomers $=2^4=16$

8. Glucose contain – CHO group so used for silvering of mirror.

9. Glucose is a hydrate of carbon $C_6(H_2O)_6$ and dehydration on heating with conc, H_2SO_4

10. Factual

12. Self explainatory.

13. In pH range 6.04 – 9.17 the structure is 

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14. Carbohydrates have been classified on the basis of sugars and non-sugars, reducing character, hyrolysis (complexity of structure).

16. α-D-Glucopyranose and β-D-Glucopyranose are anomers.

18. Glucose and fructose both reduce fehling's solution.

19. Fibrinogen is protein responsible for blood clotting.

20. Hydrolysis of sucrose (dextrorotatory) into (+) glucose and (–) fructose gives overall levorotatory mixture of products, hence the process is known as "inversion of sugar".

21. Inverted sugar is 1 : 1 mixture of glucose and fructose.

22. Glycosidic linkage is an acetal linkage as it connects two (hemiacetal) monosaccharide units.

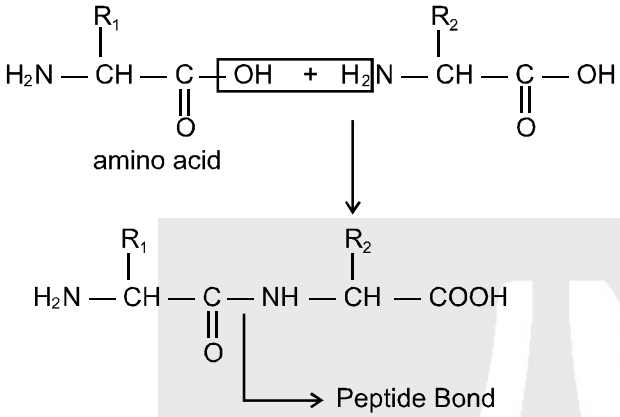
23. Sucrose ⟶ Gulcose + Fructose
+ 65º + 52.5º – 90º
the product mixture is overall leavorotatary.

24. Cellulose on hydrolysis yields β–D–glucose, because β–D–glucose units are polymerised in cellulose.

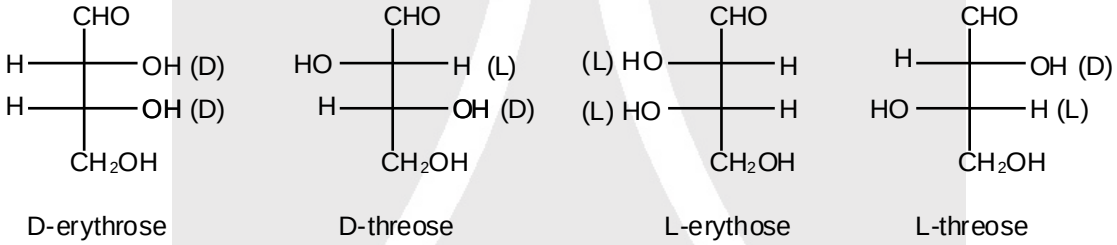
25. S_1, S_2 and S_4 are correct. S_3 is incorrect because anomers are those which have difference in configuration at C-1.

26. Glucose pentacetate → 2, 4 DNP → –; $NH_2OH/H^{\oplus}$ → –; Tollen's reagent → –; $NaHSO_3$ → (–)

29.



30.



PART - III

1. In the formation of osazone C–1 and C–2 react with phenyl hydrazine to form phenyl hydrazone. If C–3, C–4, C–5 have same configuration the carbohydrates will form same osazone even if they differ in configuration at C–1 or C–2.

2. Tollen's reagent and fehling's solution can not be used to distinguish between aldose and ketose

4. $CH_3 - \underset{\displaystyle NH_2}{\underset{|}{CH}} - COOH \xrightarrow{LiAlH_4} CH_3 - \underset{\displaystyle NH_2}{\underset{|}{CH}} - CH_2OH$, hence X is $LiAlH_4$

5. Cyclic acetals are commonly used to protect vicinal cis hydroxyl groups of sugars while reactions are carried out on the other parts of the molecule.

7. In alkaline medium sugar undergo rearrangement

8. Starch is the mixture of two polysaccharides - Amylose and amylopectin

9. Glucose shows mutarotation, sucrose gives glucose and fructose on hydrolysis.

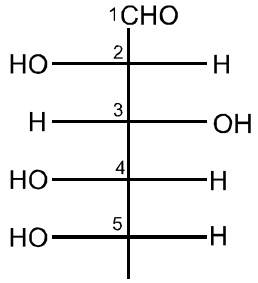
11. At acidic pH, glycine will convert to cation and at basic pH glycine will convert to anion.

12. Cabohydrate having different stereochemistry at C-1 are termed as Anomers, whereas when stereochemistry at any other carbon is different then those carbohydrates are known as epimers.

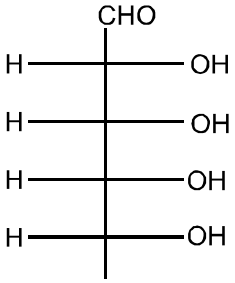
13. $x = \frac{2+4}{2} = 3$; $y = \frac{9+13}{2} = 11$

$x + y = 14$.

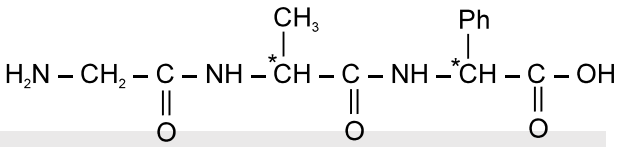
14. D-Allose and L-Glucose differ in configuration along C_2, C_4 and C_5 therefore $\sum C_i = 2 + 4 + 5 = 11$.



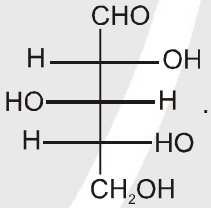
L-Glucose



D-Allose

15. The trimer will have structure  . It has two dissimilar asymmetric atoms, so its total number of stereoisomers will be $2^2 = 4$.

17. The trimer is chiral, it has free COOH group and free primary NH_2 group, so statement A, B, D are correct. It does not have C = O group.

18. (A) has one acetal linkage thus is a disaccharide.
(B) has one amide linkage.
(C) is oxidation product of aldohexose.
(D) is reduction product of 

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