MAINS+ADVANCED

TOPIC

BIOMOLECULES & POLYMER

SOLUTIONS

BIOMOLECULES & POLYMER

Exercise-I

1. **(C)** - Ribose

2. **(A)** - C_1 and C_5

3. **(A)** - Monosaccharide

4. **(C)** - Inversion

5. **(A)** - Amylase

6. **(C)** - Lactose

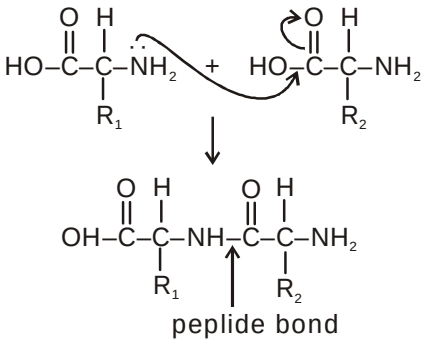
7. **(C)** - Isoelectric point

8. **(D)** - 8

9. **(D)**
Regular folding patterns of continuous portion of the polypeptide chain

10. **(D)**
Haemoglobin

11. **(C)**
The peptide linkage



12. **(B)**
Secondary structure of protein

13. **(B)**
Glycine

14. **(D)**
Essential amino acids

15. **(C)**
Proteins

16. **(B)**
Myoglobin or Haemoglobin

17. **(D)**
α-Amino acids

18. **(A)**
Proteins to peptides

19. **(D)**
Thymine

20. **(B)**
Uracil

21. **(C)**
Fats > Carbohydrates > Protein

22. **(A)**
Slightly acidic medium

23. **(B)**
Night blindness

24. **(D)**
Cheilosis

25. **(C)**
D

26. **(B)**
Cod liver oil

27. **(D)**
maturation of RBC's

28. (A)
Vit. C

29. (D)
Vitamin B12

30. (D)
Vitamin K

31. (C)
Casein

32. (D)
Vitamin B_{12}

33. (D)
Phenylalanine

34. (C) K

35. (C)
deficiency of ascorbic acid

36. (A)
Adenine with thymine

37. (D)
phosphoric group

38. (D)

$$\frac{A+G}{C+T}=1$$

39. (B)
Essential

40. (B)
Pentose sugar: Phosphoric acid, pyrimidines and purines

41. (C)
40%

42. (B)
Glycogen in liver and muscles

43. (A)
Sucrose

44. (D)
Proteins

45. (B)
Casein of milk

46. (A)
GUA

47. (C)
3-7

48. (C)
Phospho-diester bonds

49. (D)
Both (B) and (C) are correct

50. (A)
Necleotides of DNA

51. (B)
Phosphate

52. (D)
Data not sufficient

53. (B)
nucleotides

54. (A)
base + sugar

55. (B)
DNA

56. (A)
Leucine, methionine, lysine & valine

57. (A)
Uracil

58. (A)
Are polymers of nucleotides

59. (B)
Newly synthesized DNA molecules have one strand from the parent DNA molecule

60. (A)
Cytosine

61. (A)
Plexiglass

62. (B)
Copolymerisation

63. (C)
2,4,6 -Triamino-1,3,5-triazine

64. (C)
Nylon – 6

65. (B)
Nylon 66

66. (A)
Bakelite

67. (D)
Thermosett

68. (B)
Nylon

69. (A)
Adipic acid + Hexamethylene diamine

70. (D)
DNA

71. (A)
Polypeptide

72. (B)
Proteins

73. (C)
2- Chloro -1, 3 butadiene

74. (C)
Glyptal

75. (A)
Polyisoprene

76. (B)
Bakelite, polystyrene

77. (C)
SBR is called natural rubber

78. (D)
P.M.M.A.

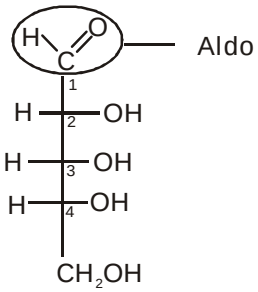
79. (A)

A	B	C	D
d	c	b	a

80. (A)
SBR

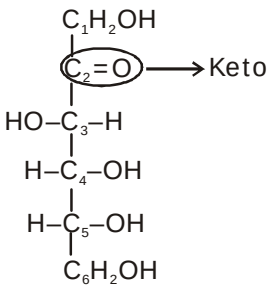
Exercise-II

1. (A)



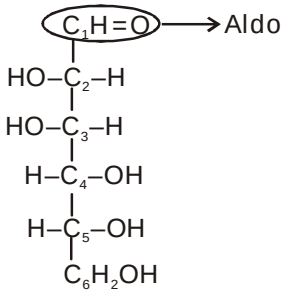
5 C containing so it is Aldopentose

2. (C)



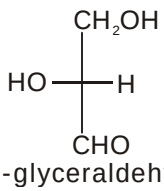
7 C Containing os it is ketoheptose

3. (D)



6 C containing so it is Aldohlxose

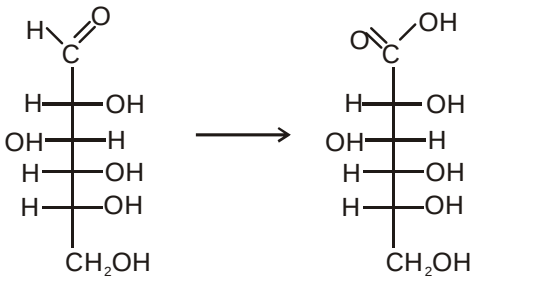
4. (C)



D-glyceraldehyde

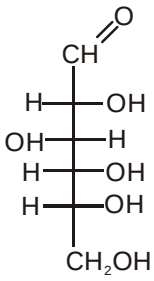
5. (A)

D glucose $\xrightarrow[H_2O]{Br_2}$



D-gluconic acid

6. (D)



Osazone formation result in a loss of stereog enic centre at C_2 but does not offect other stereogenic carbens

7. (C)

D glucose $\longrightarrow$ –CHO group is present

D fructose $\longrightarrow$ –C(=O)– group is present

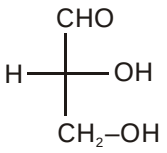
D glucose & D-fructose have same molecular formula so they both are functional isomer.

8. (C)

Sucrose $\Rightarrow$ 2 3accharides units are present. So it is oligosaccharide

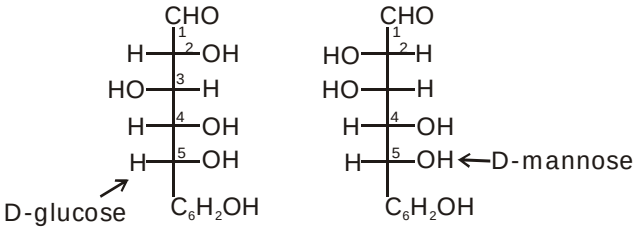
Because oligosaccharide $\Rightarrow$ 2–10 monosaccharide

9. (B)



D-glyceraldehyde

10. (D)



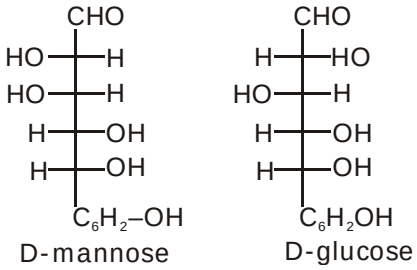
SO C2 epimer of D-glucose is D-mannosl

11. (D)

C_3 Epimer of D glucose is D-Aetrose

12. (D)

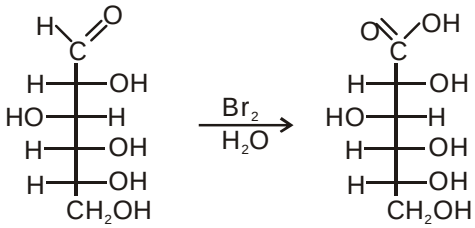
In D-mannose and D-glucose both havw 6 carbens and –CHO group so D-mannose and D-glucose both are aldoesose



D-mannose D-glucose

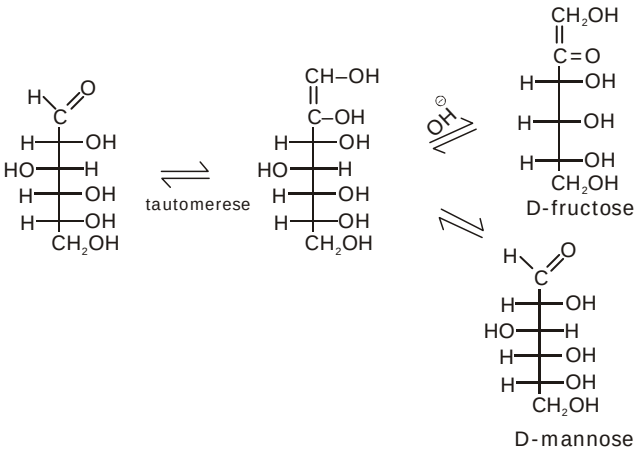
13. (B)

D $\xrightarrow[H_2O]{Br_2}$ D-gluconic acid



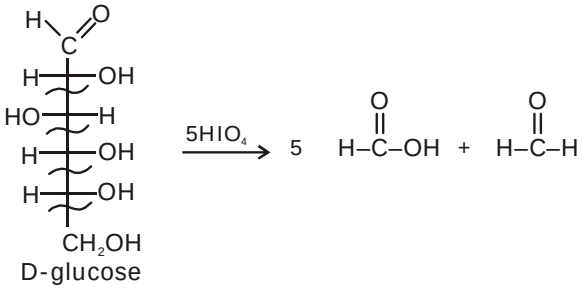
D-glucose

14. (C)

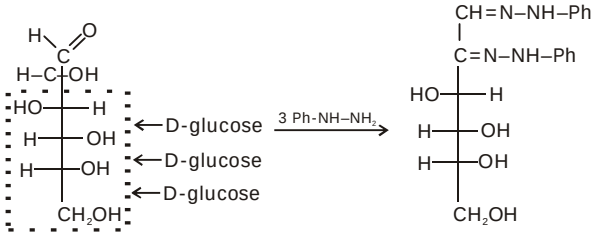


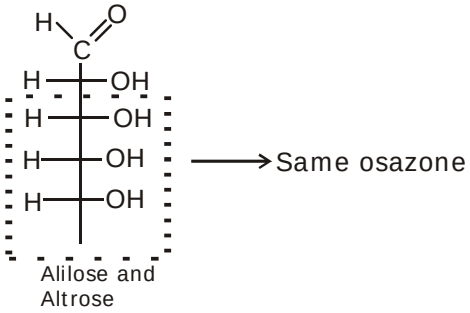
D-mannose

15. (B)

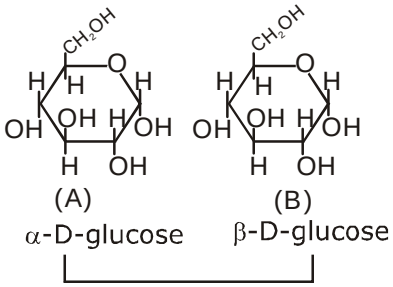


16. (D)





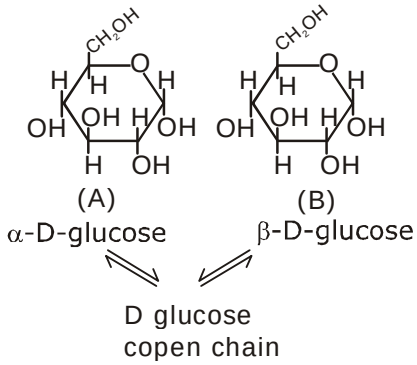
17. (A)



18. (B)

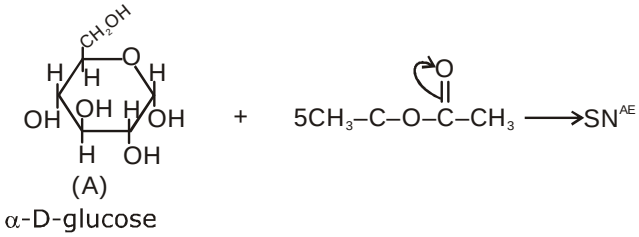
B

19. (C)



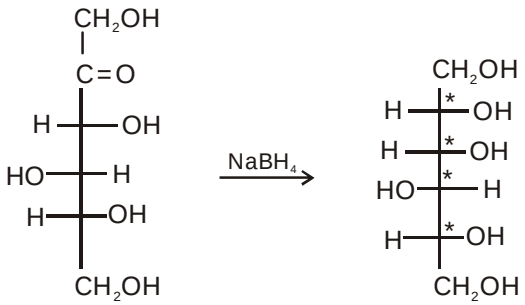
So' c will not undergo mutarotation

20. (C)



No. of –OH gp. present 5 so 5 moles of acetic dnhyride will consumed

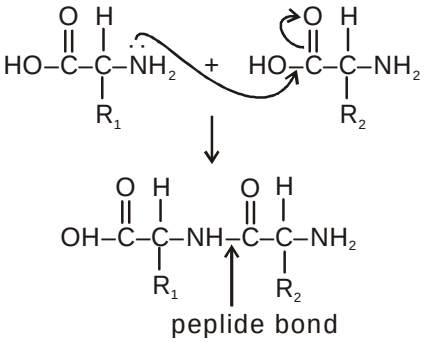
21. (B)



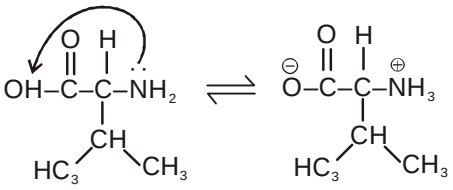
T.S.I. = $2^{n-1} + 2^{P-1}$ n=even $P = \frac{n+1}{2}$

T.S.I. =10 (8+2) mese
optical
active

22. (C)



23. (B)



24. (A)

Nit.C ⟶ Ascorbic acid

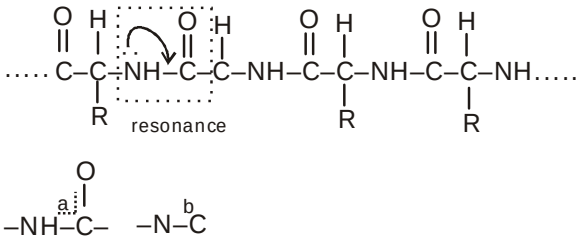
25. (A)

$P^{Ka_1} = 2.34$

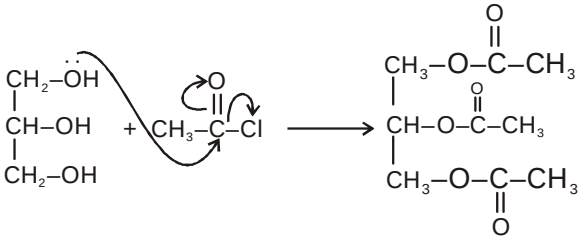
$P^{Ka_2} = 9.60$

$$P^{I} = \frac{P^{Ka} + P^{Ka_2}}{2} = \frac{2.34 + 9.60}{2} = \frac{11.94}{2} = 5.92$$

26.



27. (A)



28. (A)

Starch is natural polymer of D-glucose

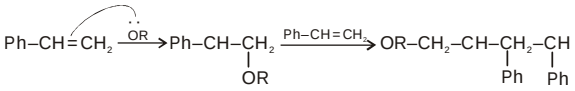
29. (D)

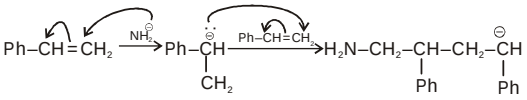
n α–D–glucose ⟶ starch

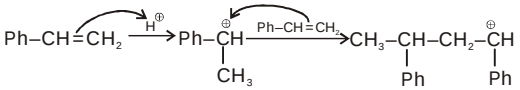
n styrene ⟶ Polystyrene

Acrylonitrile ⟶ orlon

30. (B)

F.R. 

Anionic 

cationic 

31. (C)

$R_3Al + TiCl_4$ is zieglar Natta catalyst

32. (D)

Tetrafluoroethenl is monomer of Teflon.

33. (D)

Acrylonitrile

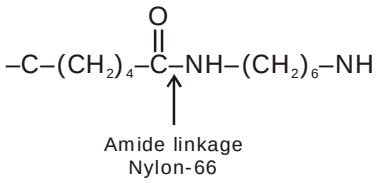
34. (B)

Hydroxn bond is bresent between adipic acid & Hexa methylene diam

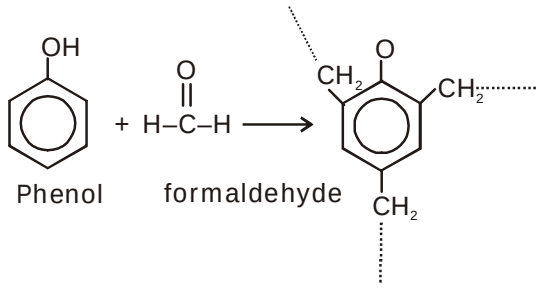
35. (C)

Adipic acid Hexa methylene diammine

36. (A)

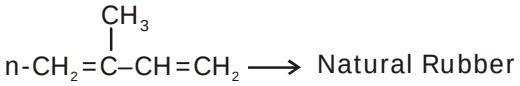


37. (A)

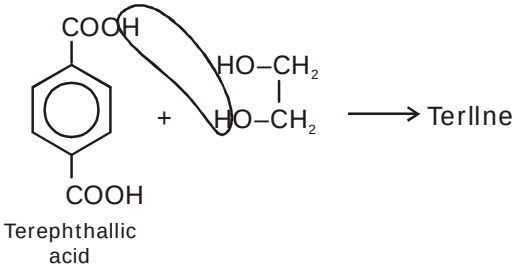


Phenol formaldehyde

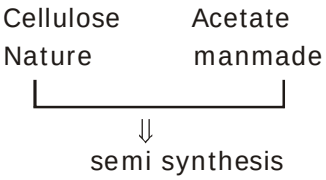
38. (D)



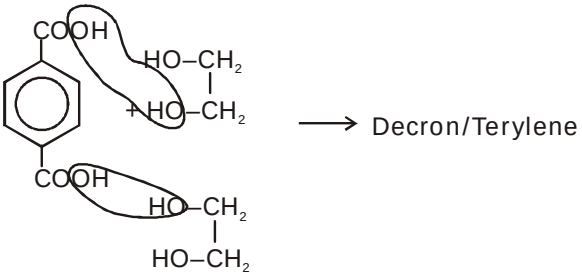
39. (D)



40.



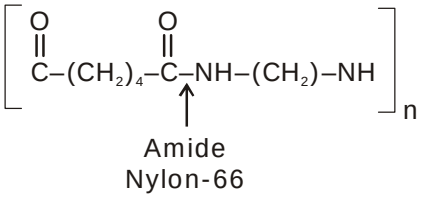
41. (D)



42. (B)

elastomer $\Rightarrow$ it is wesak force.

43. (B)

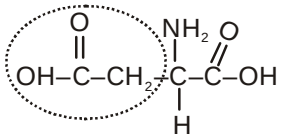


44. (D)

Glycosidic linkage is present in surcose, maltose & lactose.

45. (B)

Aspartic acid $\longleftarrow$ Acidic amino acid

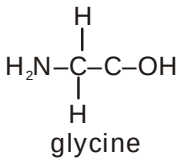


P^{I}=32

46. (A)

Protoin on hydrolysis a-amino acid.

47. (A)



Because in glycine there are no any chiral carbon

48. (D)

Peptiale linkatge is present in protein and Nylonb,b

49. (D)

Lactose $\longrightarrow$ galactose and Glucose

50. (D)

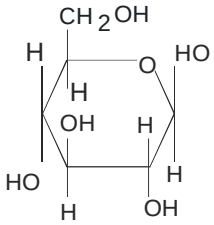
Amino Acid

$\downarrow$ $\downarrow$

NH_2gp COOHgp

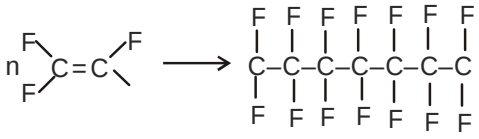
So compound in which $-NH_2$gp & –COOH gp both are present are known as amineacid.

51. (B)

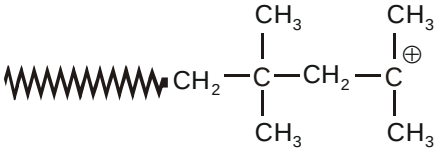


β-D-Glucopyranose

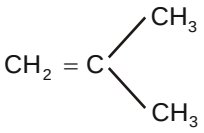
52. (B)



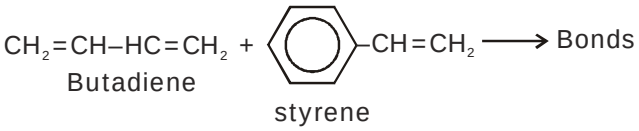
53. (A)



is



54. (B)



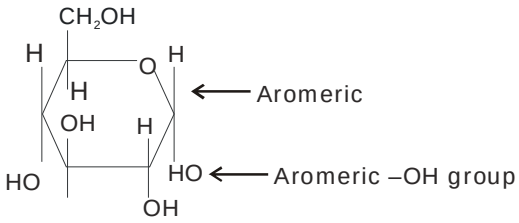
55. (C)
Oligosaccharides ⇒ 2–10 monosaccharide units are present.

56. (C)
non reducing sugar
Sucrose (1,2-glycosidic linkage of α-glucose, β-Dfrutose)

57. (D)
Reducing sugar = fructose

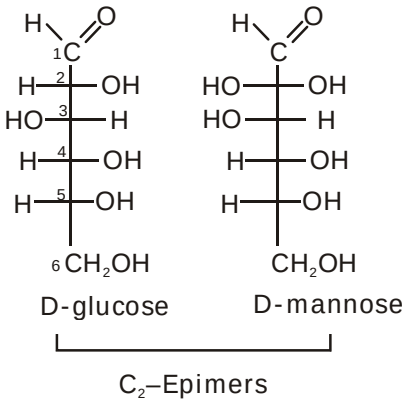
58. (C)
D-fructose ⇌ D glucose ⇌ α-D-glucose exist in 3 forms (Isomeric)

59. (D)



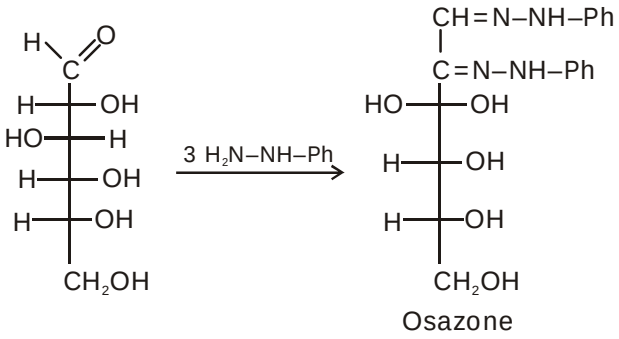
60. (D)
Surcrose – X (Anomeric –OH is absent)
Maltose
Lactose
← Anomeric OH is present

61. (D)



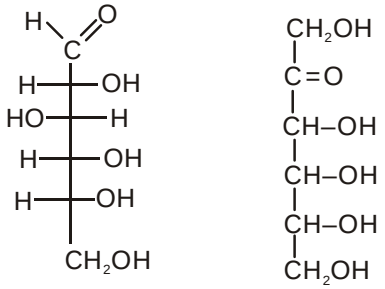
62. (C)
(A) Enantiomers
(B) Functional Isomers
(C) C-3 epimers
(D) Diastereomer not epimers

63. (A)



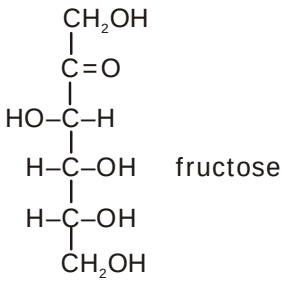
+ $H_2N–Ph$ + NH_3 + H_2O

64. (D)
Glucose and fructose

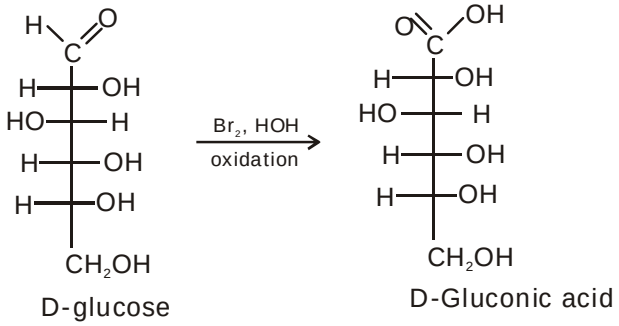


65. (A)
Cellulose ← β-D-glucose

66. (D)

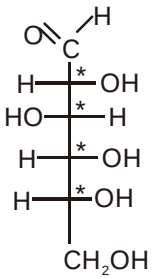


67. (D)

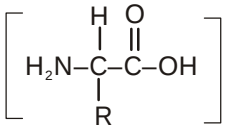


68. (B)
All monosaccharide Reduces Tollens reagent.

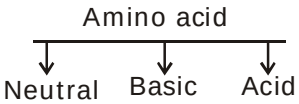
69. (A)


4-chiral centres.

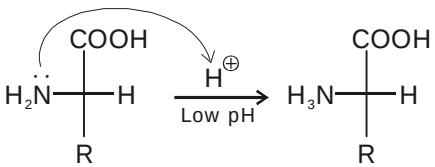
70. (B)
Protein is polymer fo γ-Amino acid


γ-Amino acid

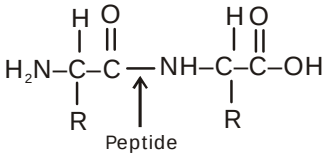
71. (D)



72. (C)

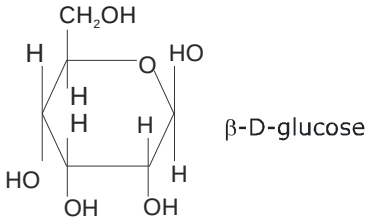


73. (D)



74. (D)
Cellulose is the polymer of D-glucose.

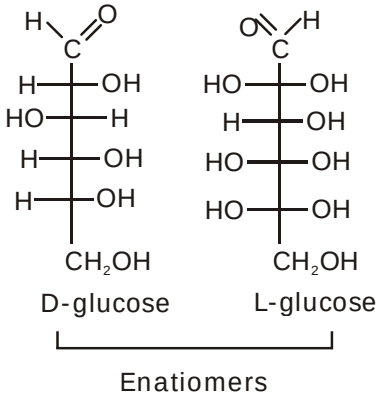
75. (D)



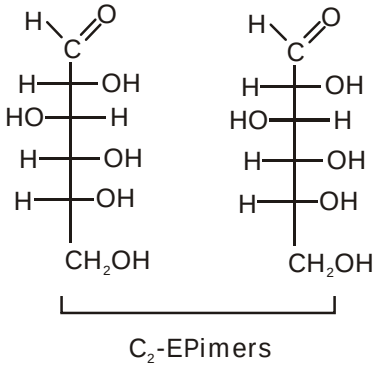
76. (D)
glucose and fructose.

77. (B)
Weakest intermolecular force = Natural Rubber

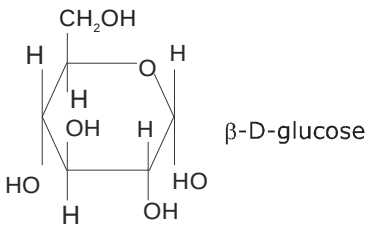
78. (A)



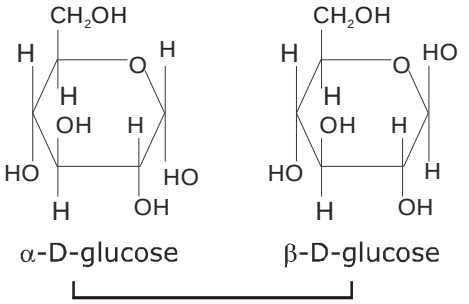
79. (C)



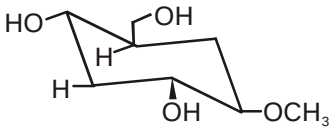
80. (B)



81. (B)



82. (D)



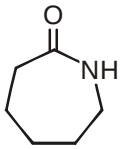
(no - anomeric OH)

(non Reducing suger)

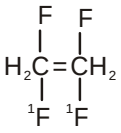
83. (i) $H_2N-(CH_2)-NH_2$ hexa methylene di amine

$HO-C(CH_2)_4-C-OH$ Adipic acid

(ii) Caprolactum



(iii) Tetra fluro ethere

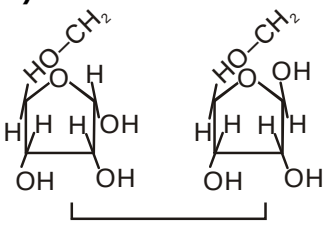


84. Addition polymer PVC (Polyvinylchloride) polethlen

Condensation polymer Terylene Bakelite

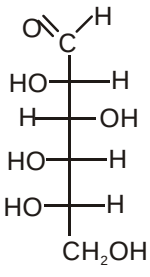
Exercise-III

1. (B)



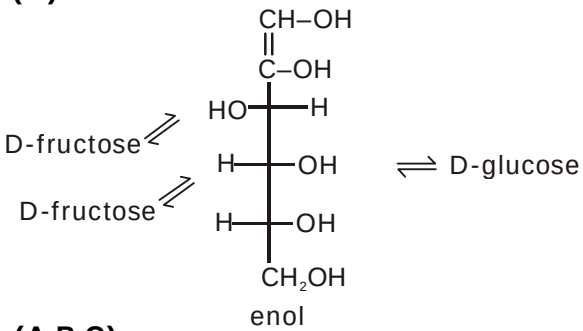
Anomers

2. (A)



L-glucose

3. (D)

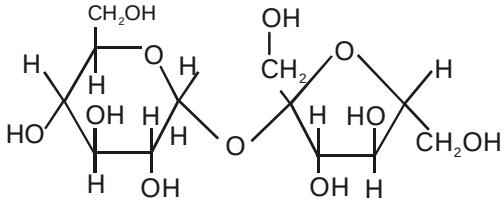


4. (A,B,C)

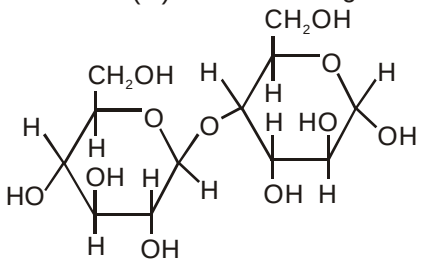
Same Osazone

D-glucose
D-Mannose } same osazone
D-fructose

Sol. 5 B,C



(X) Non Reducing



(Y) Reducing

Sol.6 A,B,D

positive Tollens – Anomeric –OH

Sol.7 Column-I

(A) Nylone 66(P,S) (B) styrene (Q,R)
(C) Baketite (P,S) (D) Teflon (Q,R)

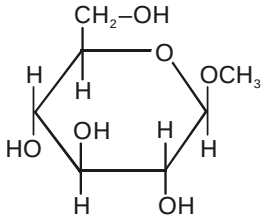
Column-II

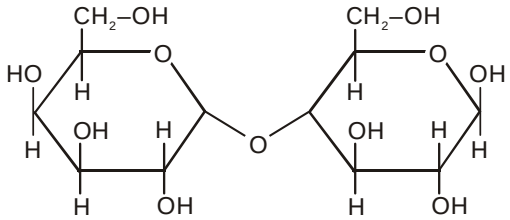
(P) CondInsation polymerisation
(Q) Addition polymerisation
(R) Home polymer
(S) Co-polymer

8. Column-I

(A) α-D-Glucose (P,Q,R,S)

(B) β-D-Glucose (P,Q,R,S)

(C)  (any)

(D) 

Column-II

(P) Undergoes osazone formation

(Q) On acethylation reaction with acetic anhydride weight increase by 210

(R) It is reducing suger

(S) It is known as α-D-Glucopyranose

9.

Column-I

(A) Sucrose $\xrightarrow{H_3O^{\oplus}}$ P,S

(B) Maltose $\xrightarrow{H_3O^{\oplus}}$ Q,S

(C) Lactose $\xrightarrow{H_3O^{\oplus}}$ R,S

Column-II

(P) Product is glucose+ fructose

(Q) Product is 2-glucose

(R) Product is glucose

(S) Oligo saccharide galactose

10.

Column-I

(A) Terylene (P,S) (B) Styrene (Q,R)

(C) Bakellite (P,S) (D) Teflon (Q,R)

Column-II

(P) Condensation polymerisation

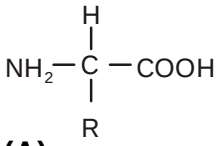
(Q) Addition Polymerisation

(R) Homo Polymer

(S) CO-Polymer

Exercise-IV Level-I

1. (D)



2. (A)

Sugar - Ribose

nitrogen base - adenine, guanine, cytosine uracil

3. (A)

Methylated cellulose on compelete hydrolysis give 2,3, 6 - tri-O methyl D- Glucose

4. (A)

A & T two hydrogen bond. C & G three hydrogen bond A = T, C $\equiv$ G

5. (A)

Chlorphylls are green pigments in plants an contain calcum.

6. (A)

DNA ÷ Adenine, guanine, cytosine thymine

RNA ÷ Adenine Guanine, cytosine, uracil

7. (B)

Insulin is a hormone to decrease level of sugar.

8. (D)

Enzymes are speciflc biological catayst that possess well-defined active sites

9. (D)

Nucleotide are joined by 3'–5' phosphodiester

10. (B)

cytosine and thymine

11. (C)

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

12. (A)

Protein are made up of α- amino acid linked to one another by peptide linkage.

13. (B)

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

14. (C)

> C = O and –OH

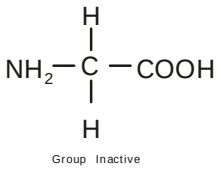
15. (ABCD)

All are chiral because all having chiral carbons.

16. (B)
Biuret test given only peptide linkage.

17. (B)
2nd

18. (B)
All amino acids except glycine are optically active

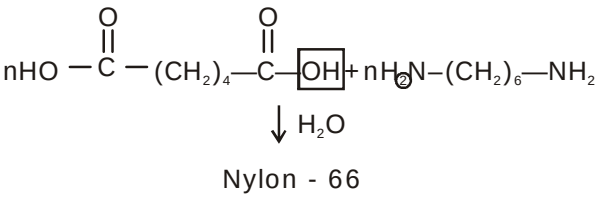


19. (A)
Sugar give +ve test with molish reagent

20. (B)
Formation of polymer by joining of monomer unit

21. (A)
Polyamide polymer

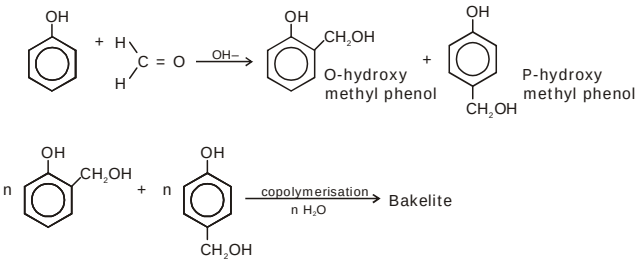
22. (A)



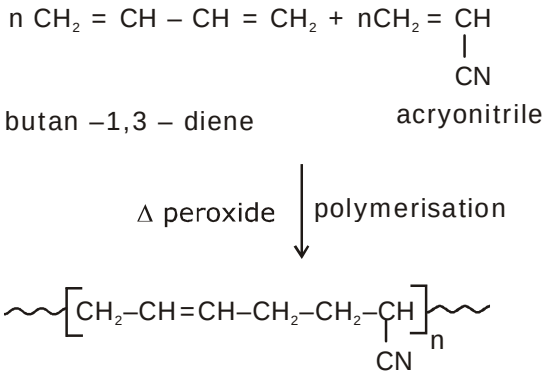
Nylon - 66

23. (A)
Teflon

24. (C)



25. (C)



Buna-N synthetic rubber

26. (B)
Because it is an electrophile which initiate the reaction.

27. (B)
1 molecules CO_2 require = 3 ATP
6 molecules of CO_2 require = 3 × 6 = 18 ATP

Exercise-IV Level-II

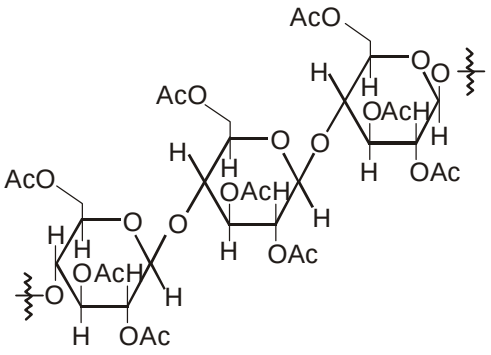
1. (B)
Sucrose is not reducing sugar does not give +ve tollen or benedict test.

2. (B)
Isomer of glucose that differ in configuration at carbon one (C–1)

3. A→P,S; B→Q,R; C→P,R; D→S

4. (A)

(A)



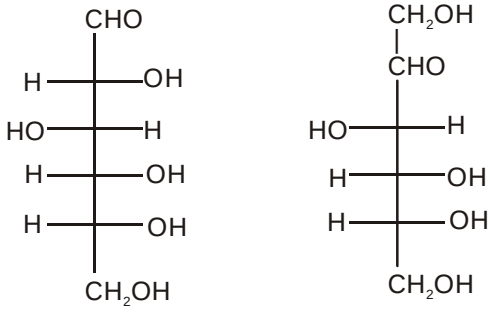
5. (D)
natural rubber weak intermolecular force of attraction

6. **(BC)**
(B) X is a non-reducing sugar and Y is a reducing sugar
(C) The glucosidic linkages in X and Y are α and β, respectively

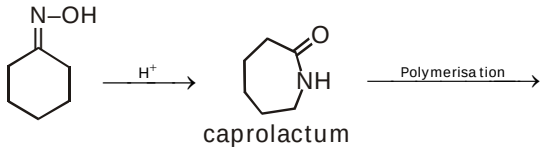
7. **(A)**
(A) Ring (a) is pyranose with α-glycosidic link

8. **(B)**
C-6 & aldehyole group.

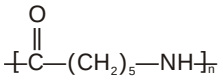
9. Sucrose $\xrightarrow[H_2O]{H^+}$ D-glucose + D-fructose



10.

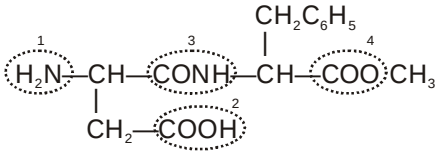


caprolactum
(c)



nylon-6 (D)

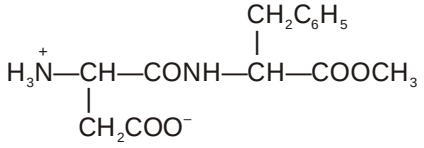
11.



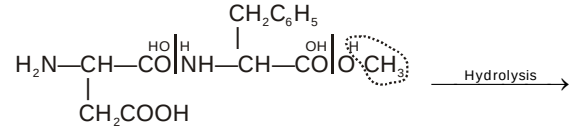
Aspartamine

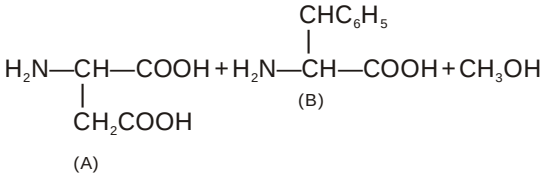
(i) NH_2–gp.(1)–amino gp.
—COOH gp. (2) –carboxyl gp.
—CONH gp. (3) –2°–amide gp.
—COOH gp. (4) –ester gp.

(ii)



(iii)

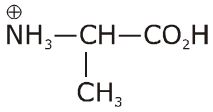




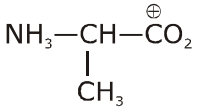
(A)

(iv) B is more hydrophobic due to presence of larger organic gp., benzyl gp. ($C_6H_5CH_2$–).

12. At pH = 2

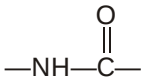


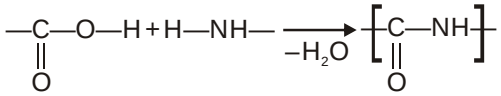
At pH = 12



13. $nCH_2 = CH_2 \xrightarrow[\text{Zieglar Natta Catalyst}]{R_3Al+TiCl_4} -(CH_2-CH_2)-_n$

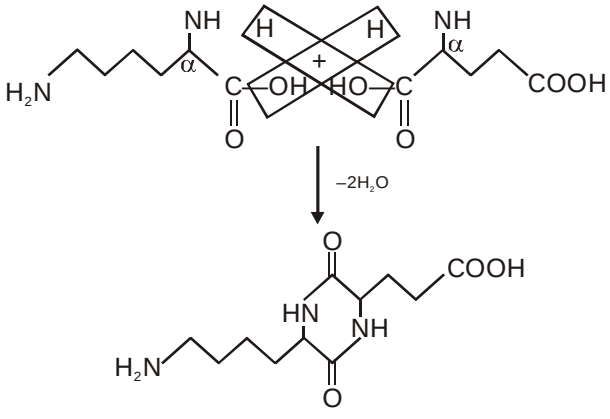
Zieglar Natta catalyst ($R_3Al + TiCl_4$) acts as heterogenous catalyst. While Willikinson's Catalyst ($(Ph_3P)_3$.RhCl) acts as homogenous catalyst.

14. Peptide linkage is  and it is formed by the condensatoin between —NH_2 group and —COOH group as follows

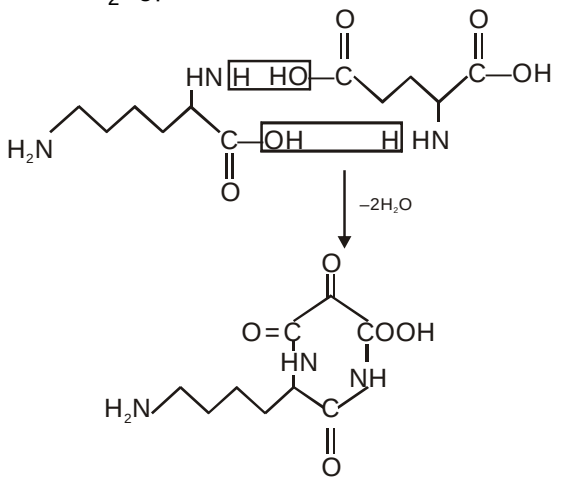


In given amino acids liosine and glutamine the two possible dipeptides are formed as follows:

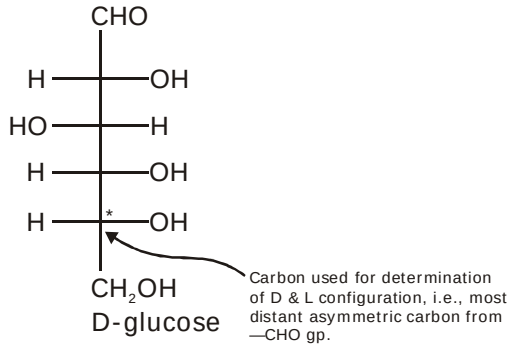
(i) When both NH_2 gp. α to —COOH are condensed



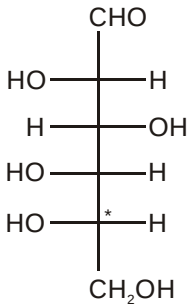
(ii) When α-NH_2 of both amino acids is used but in one terminal —COOH gp. lacking α-NH_2 gp. is used.



15. (a) The structure of L-glucose can be drawn by reversing the position of H and OH at the second last C-atom of D-glucose given i.e.,

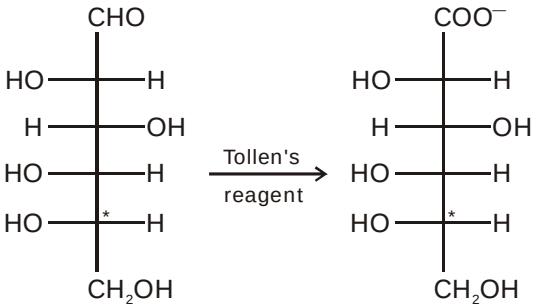


Hence structure of L-glucose will be :

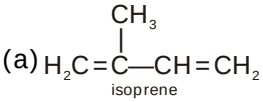


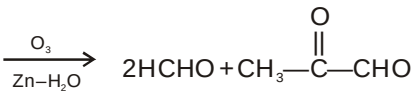
Position of H and OH at C^* is opposite to that in D.

(b) With Tollen's reagent the terminal —CHO group oxidised to —COOH group as :

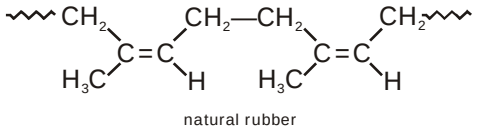


16. In structure (a), one ring has a free hemiacetal group, will hydrolyse into open chain in aqueous solution and therefore will reduce Tollen's reagent. Structure 'b' has only acetal groups, will not hydrolyse in aqueous solution into open chain, will not reduce Tollen's reagent.

17. (a) 



(b) Isopene $\rightarrow$



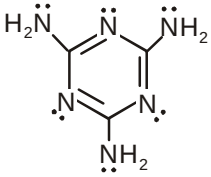
natural rubber

18. (2)

19. (8)

20. (4)

21. **(0006)**



Melamine

Lone pairs of electrons in malamine is 6.

22. **(0004)**

Phe – Gly – Val – Ala
Phe – Val – Gly – Ala
Val – Gly – Phe – Ala
Val – Phe – Gly – Ala
(Glycine has no chiral centre)