CHEMISTRY

BOOKS - CENGAGE CHEMISTRY (HINGLISH)

BIOMOLECULES

Illustration

1. Distinguish between $\alpha - D$-gluecop-yranose (I) and methyl $\alpha - D$-gluocopyranoside (II).

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2. Write the structures obtained by the epimerisation of $\alpha - D$-gluocose at $C-2, C-3$, and $C-4(OH)$ groups.

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3. Explain, in neutral or basic aqueous solution, glycosides do not show mutarotation, but in acidic medium they show mutarotation.

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4. Complete the following reactions:

(a). $OCH-(CHOH)_4CH_2Oh \xrightarrow[5HIO_4]{}$

(b). $HOCH_2 - \overset{\overset{O}{||}}{C} - (CHOH)_3 - CH_2Oh \xrightarrow{5HIO_4}$

(c).$O = HC - \underset{\underset{O}{||}}{C} - \underset{(\text{Onsone})}{(CHOH)_3 CH_2OH} \xrightarrow{zn\,/\,ACOH}$

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5. (a). Glucose and fructose form the same osazone, what does it prove?

(b). Why more than $3mol\text{of}PhNHNH_2$ do not react with glucose and fructose and how does $PhNHNH_2$, which is a powerful reducting agent, act as an oxidising agent in this case?

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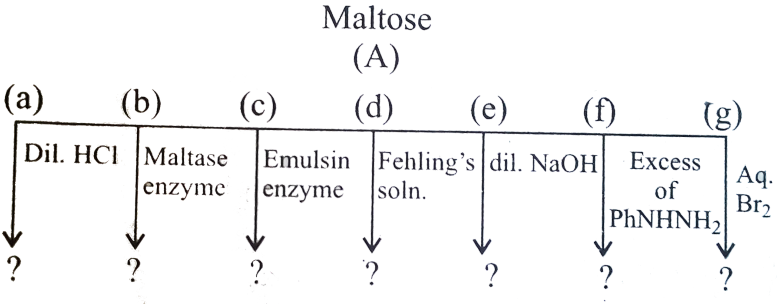
6. Complete the following reactions



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7. (a). Why is $\beta - D -$ gllucopyranose the most abundant of naturally occurring aldohexoses?

(b). Write the most stable chair conformer for $\alpha - D -$ fructopyranose. How does it dirrer from $\beta -$ anomer?

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8. (a). What is the average molecular mass of starch?

(b). What is the approximate average number of glucose units in the sample of starch?

$(Given: 20gmL^{-1}$ of starch has an osmotic pressure $= 10^{-2}atmat25^{\circ}C.)$

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9. The specific rotation of $\alpha -$ glucose is $+112^{\circ}$ and $\beta -$ glucose is $+19^{\circ}$ and the specific rotation of the constant equilibrium mixture is $+52.7^{\circ}$. Calculate the percentage composition of anomers $(\alpha \text{ and } \beta)$ in the equilibrium mixture.

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10. Give the steps for the conversion of $D-$ glucose to $D-$ fructose and vice versa.

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11. Explain why aldoses react with bendict's solution and $PhNHNH_2$, but not with $NaHSO_3$.

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12. A tripeptide oon complete hydrolysis gives glycine, alanine, and phenylanine,using three-letter symbols write down the possible sequences of the tripeptide.

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13. A dipetide on hydrolysis gives two amino acids.

$(A)NH_2\underset{\underset{R}{|}}{C}HCOOH$ and $(B)H_2N\underset{\underset{R'}{|}}{C}HCOOH$

The dipetide is also hydrolyses by leucine amino peptidase enzyme giving amino acid (B). What is the structure of dipeptide?

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14. A tripeptide (X) on hydrolysis gives three amino acids

$(A)\left(NH_2-\underset{\underset{R}{|}}{C}H-COOH\right)$,

$(B)\left(NH_2-\underset{\underset{R'}{|}}{C}H-COOH\right)$, and

$(C)\left(NH_2-\underset{\underset{R'}{|}}{C}H-COOH\right)$. (X) and reaction with

NH_2NH_2 gives a dipeptide (Y) and amino acid (B).

The dipeptide (Y) is hydrolysed by carboxypeptidase enzyme and gives amino acid (A). what is the structure of (X)?

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15. The two samples of DNA, A and B have melting tempreatures $(T_m)340$ and $350K$,respectively. Can you draw any conclusion from this data regarding their base content?

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16. In $E.\ coli DNA$, AT/GC ratio is 0.93. If the nimber of moles of adenine in its DNA sample is $465,000$, calculate the number of moles of guanine present.

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17. One strand of a DNA has the sequence $ATGC \top CA$. What is the sequence of the bases in the complementary strand?

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18. What will be the sequence of bases on $mRNA$ molecule synthesised on the DNA strand, $TATCTACTGGA$?

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19. An unsaturated fatty acid on ozonolysis yields one aldehyde $H_3C(CH_2)_7CHO$ and an aldehyde

monocarboxylic acid $OHC(CH_2)_7COOH$. Write down the structure and name of the acid.

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20. One mole of a naturally occurring fat on hydrolysis with $NaOH$ gave $1mol$ of glycerol together with sodium palmitate and sodium stearate in $1:2$ molar ratio. The molecule of the fat is symmetric. Write down the struceture of the fat.

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Solved Examples

1. Convert D-glucopyranose to $2, 3, 4-$ triethyl gluocopynoside.

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2. Complete the following reactions.

(i)

$$\underset{(A)}{\alpha\text{-D-Glucofuranose}} \xrightarrow[\text{Acetone/}H_2SO_4]{} (B) \xrightarrow[\text{(ii) } H^{\oplus}]{\text{(i) } PhCH_2Cl/\overset{\ominus}{O}H} \underset{\downarrow}{(C)}$$

ii. $$\underset{(D)}{\beta\text{-D-Glucofuranose}} \xrightarrow[\text{Acetone/}H^{\oplus}]{} (E) \xrightarrow[\text{(ii) } H^{\oplus}]{\text{(i) } PhCH_2Cl/\overset{\ominus}{O}H} \underset{\downarrow}{(F)}$$

iii. $$\underset{(G)}{\alpha\text{-D-Glucofuranose}} \xrightarrow[\text{Acetone/}H^{\oplus}]{} (H) \xrightarrow[\text{(ii) } H^{\oplus}]{\text{(i) } PhCH_2Cl/\overset{\ominus}{O}H} \underset{\downarrow}{(I)}$$

(ii)

vi. $$\underset{(J)}{\beta\text{-D-Glucofuranose}} \xrightarrow[\text{Acetone/}H^{\oplus}]{} (K)$$

(ii) 

(vi) $\beta - D - \underset{(J)}{\text{Glucofuranose}} \xrightarrow[\text{Acetone} / H^{\oplus}]{} (K)$

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3. Differentiate between $D-$ erythrose and $D-$ threose by (a) mild oxidation and (b) reduction.

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4. (a). Name the smallest aldose which forms cyclic hemiacetal and the functional groups are involved in its formation.

(b). What is invert sugar ?

(c). Calculate the specific rotation of invert sugar. Given,

$|\alpha|_{D}\text{of}D-glu\cos e=52.7^{\circ}$

$|\alpha|_{D}\text{of}D-uc\to se=-92.4^{\circ}$

(d). Give the mechanism of mutarotaion of $\beta-D-$ gluoco-

pyranose in (i) $aq.\ H^{\oplus}$ and (ii) $\overset{\Theta}{O}H$.

(e). Why is the mutaraotation faster in the presence of $2-$ pyridinol?

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5. Complete the following reactions:

i. D - Glucose (A) $\xrightarrow{\text{Kiliani synthesis}}$ Pair (B) $\xrightarrow{HNO_3}$ Meso-Heptaldaric acid (C)

ii. D - Allose (D) $\xrightarrow{\text{Kiliani synthesis}}$ Pair (E) $\xrightarrow{HNO_3}$ Meso-heptaldaric acid (F)

(i)

(ii)

Explain whether the acids (C) and (F) are same or different.

Which pair out of (B) and (E) gives meso-acids (C) and (F) ?

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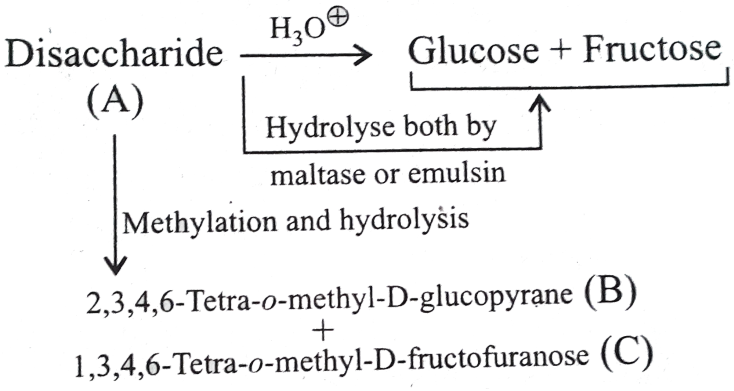
6. Give the structure and $IUPAC$ name of disaccharide, which gives the reactio given below:



Given, (A) does not reduce Fehling's solution and does not mutarotate.

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7. a. Give a chemical test of system with I_2.

b. What is the change in colour, when the test is performed

at high temperature?

c. What structural changes occurs during the change in reaction conditions?

d. Do amylose and amylopectin give the same colour?

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8. a. Write the equilibrium reaction to show the amphoteric behaviour of alanine in H_2O.

b. Calculate the isoelctric pH of alanine, given pK_{a1}, of cation of alanine $= 2.3$ and $'pK_{a_2}$ of anion of alanine=9.7.

c. Write equilibrium reaction for the dissociation of lysine, a basic amino acid and calculate its isoelectric point.

pK_{a_1} of lysine with net $(+2)$ charge=2.18

pK_{a_2} of lysin with net $(+1)$ charge=8.95

pK_{a_3} of lysine with net (-1) charge=10.53

d. Write the equilibrium reaction for the dissociation of aspartic acid, an acidic amino acid and calculate its isoelectric point.

pK_{a_1} of aspartic acid with net $(+1)$ charge=1.88

pK_{a_2} of aspartic acid with net (-1) cahrge =3.65

pK_{a_3} of aspartic acid with net (-2) charge=9.60

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9. a. How is the mixture of aspartic acid (A) histidine (B) and threonine (C) separated by electrophoresis method?

$pI(pH$ at isoelectric point) are given.

pI of (A),(B), and (C)are2.77,7.59, and 5.60` respectively.

b. How are they separated by solubility method?

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10. a. Write the structure of histidine when $pH < 1.82$ and $pH > 1.82$.

b. What is the pH range of neutral AA at the isoelectric point?

c. The pH range in cellular fluid is 6 to 7. In what form (dipolar,cation, or anion) do the amino acids in each class predomiate in the cell?

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11. Define the terms:

a. Gene , b. Genetic code,

c. Transcription, d. Translation

e. Codond

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12. List three functions of nucleotides in a cell.

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13. The two strands of DNA are not identical, but are complementary'. Explain this statement.

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14. Write two functions of carbohydrates in plants.

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15. What type of bonding occurs in globular protein?

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16. What will be the sequence of bases on $mRNA$ molecule synthesised on the DNA strand, $TATCTACTGGA$?

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17. Name one reducing and one nonreducing disaccharide.

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18. Name on fibrous and one globular protein.

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19. What causes sickle cell anaemia?

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20. Give one example of a denatured protein.

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21. Name a polypeptide hormone which maintains the glucose level in the blood.

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22. What is nucleoside?

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23. What is nucleoside?

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24. Which purine and pyrimidine bases are present in DNA and RNA?

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25. What are waxes?

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26. What is mutarotation?

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27. What are nutral amino acids? Give two examples.

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28. What are acidic amino acids?

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29. What are basic amino acids? Give one example.

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30. Name the enzymes that help in the digestion of carbohydrates.

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31. What is deficiency disease of proteins in our body?

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32. Arrange the following sugars in the increasing order of sweetness: glucose, fructose, sucrose.

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33. What are phospholipids?

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34. Give two examples of disaccharides.

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35. Name two important polysaccharides of D-glucose.

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36. What is a peptide bond?

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37. Name the building blocks of proteins.

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38. Write the zwitterion structure for glycine.

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39. Which enzyme dissolves blood clots in the coronary artery?

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40. name three nucleic acids which are used in protein synthesis.

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41. What are biofuels?

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42. What are the monomers constituting proteins?

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43. What is enzyme specificity?

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44. What is the effect of pH on the action of enzyme?

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45. Explain the functions of nucleic acids.

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Exercises (Concept Application)

1. What are monosaccharides?

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2. What are reducing sugars?

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3. Write two functions of carbohydrates in plants.

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4. Classify the following into monosaccharides and disaccharides: Ribose, $2-$ deoxyribose, maltose,galactose, fructose,and lactose.

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5. What do you understand by the term glycosidic linkage?

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6. What is glycogen? How is it different from starch?

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7. What are the hydrolysis products of (i) sucrose and (ii) lactose?

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8. What is the basic structural difference between starch and cellulose?

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9. What happenes when $D-$ glucose is treated with the following reagents?

(i). HI

(ii).Bromine water

(iii). HNO_3

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10. Enumerate the reactions of D-Glucose which cannot be explained by its open-chain structure.

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11. What are the essential and non-essential amino acids?Give two examples of each type.

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12. Define the following as related to proteins:

(i)Peptide linkage (ii)Primary structure

(iii)Denaturation

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13. What are the common types of secondary structures fo proteins?

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14. What are of bonding helps in stabilising the$\alpha - helix$ structure of proteins?

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15. Differentiate between globular and fibrous proteins.

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16. How do you explain the amphoteric behaviour of amino acids?

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17. what are enzymes?

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18. What is the effect of denaturation on the structure of proteins?

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19. How are vitamines classified? Name the vitamin responsible for the coagulation of blood.

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20. Why are vitamin A and vitamin C essential for us? Give their important sources.

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21. Why are nucleic acids? Mention their two important functions.

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22. What is the difference between a nucleoside and a complementary. Explain.

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23. The two strands of DNA are not identical, but are complementary'. Explain this statement.

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24. DIFFERENCE BETWEEN DNA & RNA

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25. What are the different types of RNA found in the cell?

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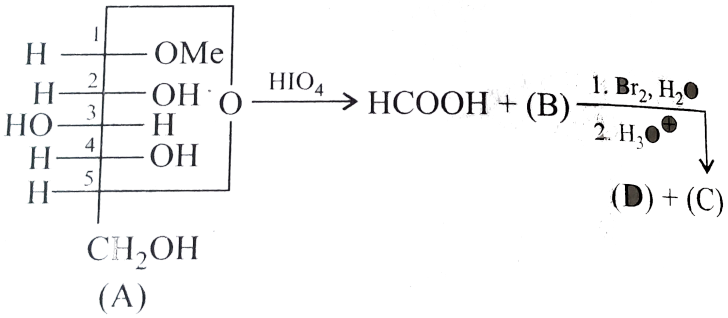
Exercises (Linked Comprehension)



1.

The name of compound (A) is:

A. Methyl$-\alpha-D-$ glucofuranoside

B. Methyl$-\beta-D-$ glucofuranoside

C. Methyl$-\alpha-D-$ glucopyranoside

D. Methyl$-\beta-D-$ glucopyranoside

Answer: C

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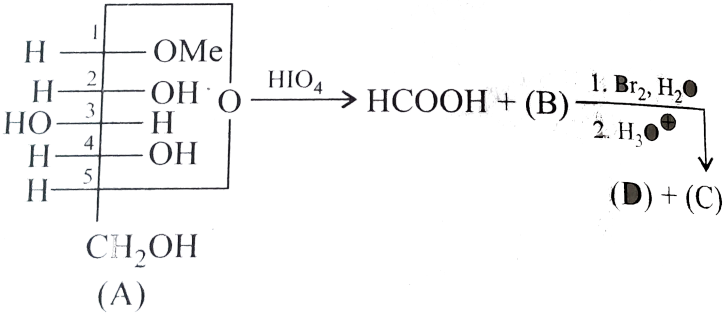
2.



The number of moles of HIO_4 required in the above reaction is:

A. One

B. Two

C. Three

D. Four

Answer: B

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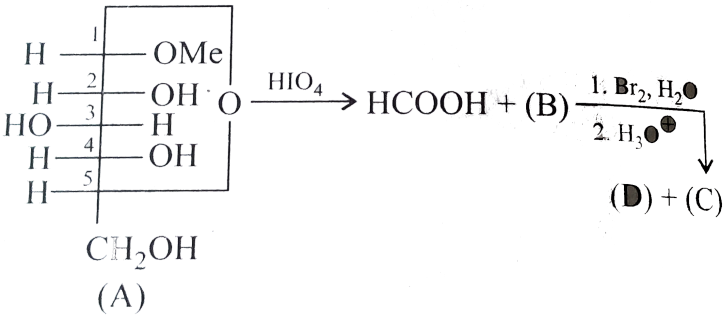
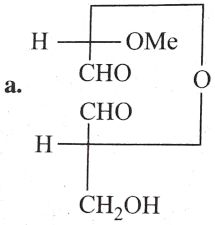


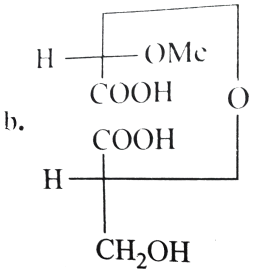
3.

The structure of (B) is:

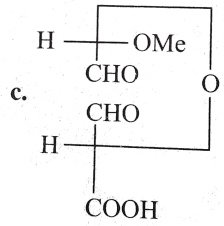


A.

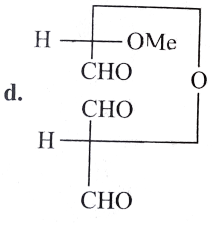
B.



C.



D.



Answer: A

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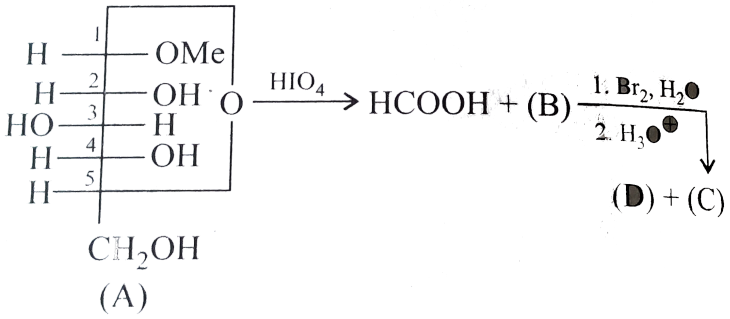
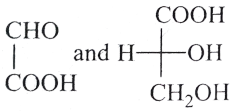
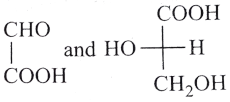
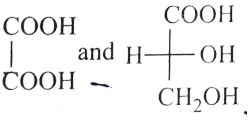


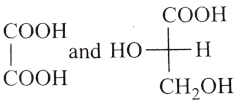
4.

Compound (C) and (D) are:

A. a. 

B. b. 

C. c. 

D. d. 

Answer: A

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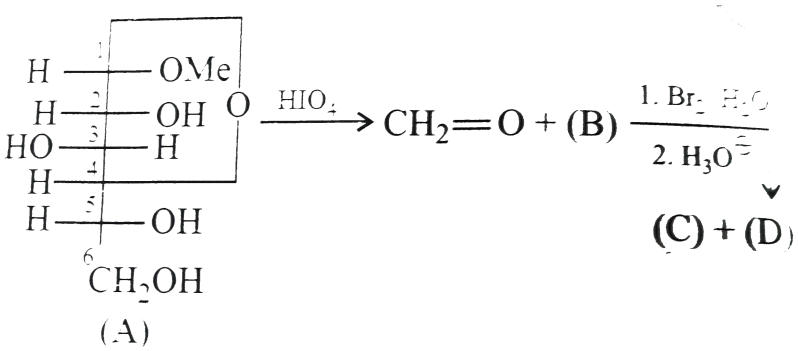

5.

The name of compound (A) is:

A. Methyl-α-D-glucofuranoside

B. Methyl-β-D-glucofuranoside

C. Methyl-α-D-glucopyranoside

D. Methyl$-\beta-D-$ glucopyranoside

Answer: A

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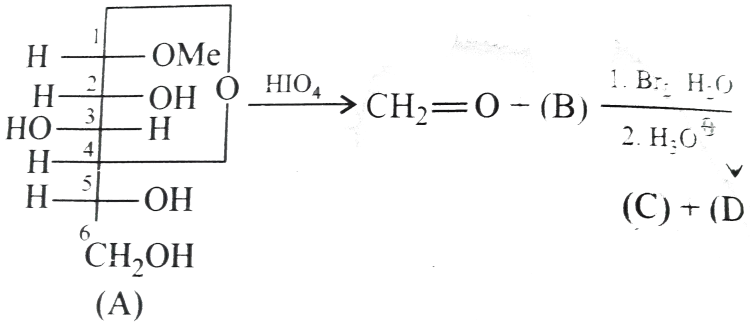

6.

The number of moles of HIO_4 required in the above reaction is:

A. One

B. Two

C. Three

D. Four

Answer: B

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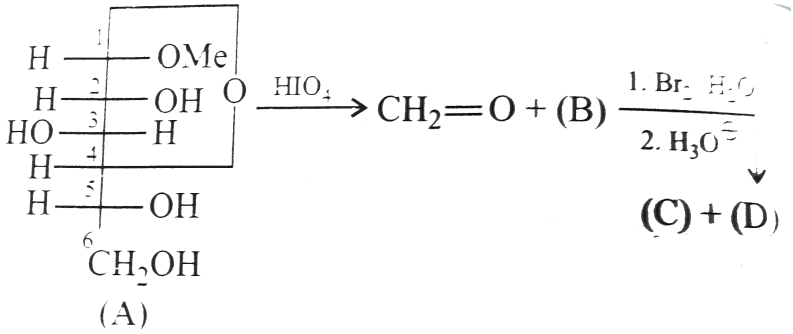
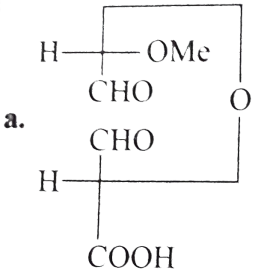


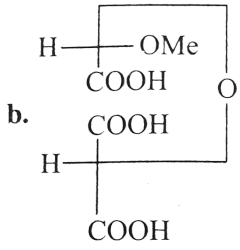
7.

The structure of (B) is?

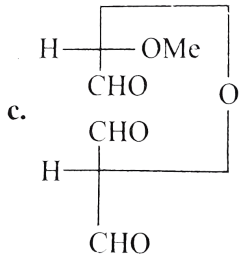
A.



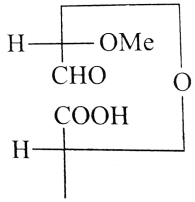
B.



C.



d.



D.

Answer: C

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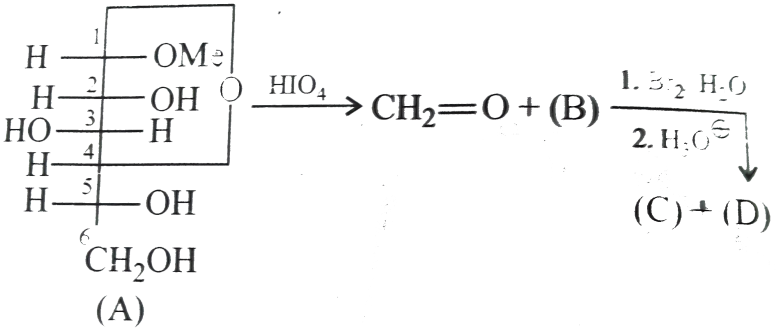
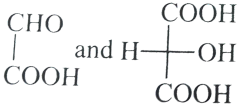
8.

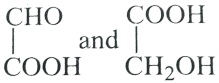


Compound (C) and (D) are:

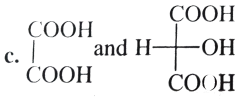
a.



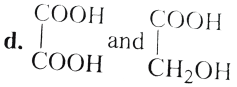
A.

b. 

B.

c. 

C.

d. 

D.

Answer: B

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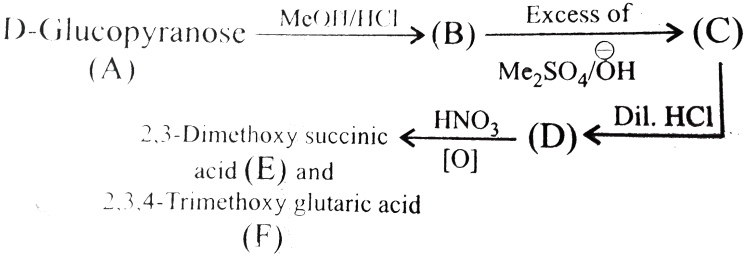

9.

Which sta tement(S) is/are correct about (A)?

A. It contains an acetalic linkage.

B. It contains a hemiacetalic linkage.

C. It has a six-membered cyclic ring.

D. It has a δ-hemiacetalic linkage.

Answer: B::C::D

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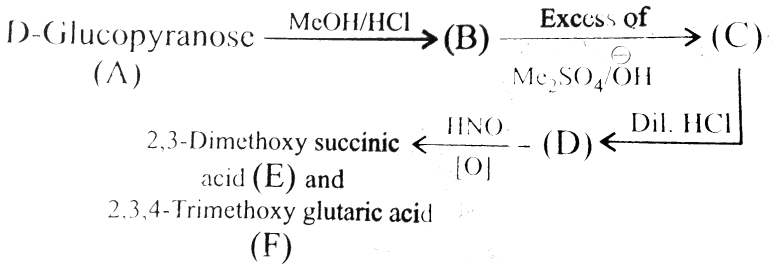
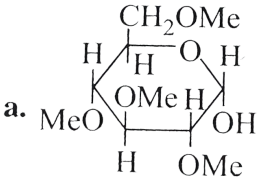
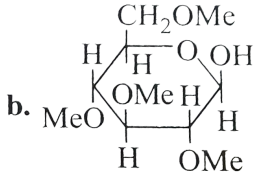
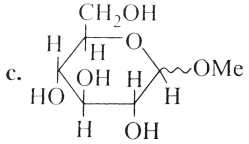


10.

Compound (B) is:

A. a. 

B. b. 

C. c. 

D. Both (a) and (b)

Answer: C

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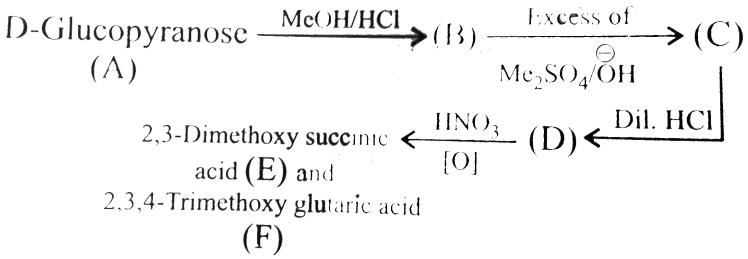
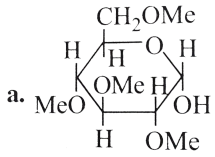


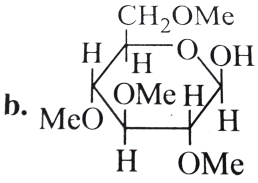
11.

Compound (C) is:

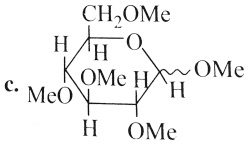
A.



B.



C.



D. All

Answer: C

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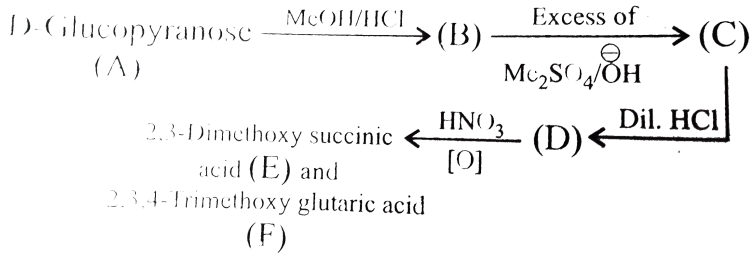
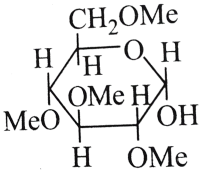


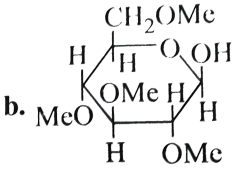
12.

Compound (D) is:

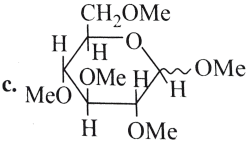
A. a.



B. b.



C. c.



D. Both (a) and (b)

Answer: D

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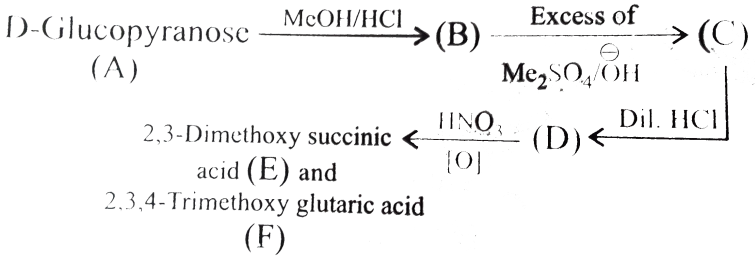
13.



Which statement(S) is/are correct about the products (E) and (F)?

A. The product (E) is ontained by the breakage of $C-4$ and $C-5$ bond of compound (D).

B. The product (E) is obtained by the breakage of $C-5$ and $C-6$ bond of compound (D).

C. The product (F) is obtained by the breakage of $C-4$ and $C-5$ bond of compound (D).

D. The product (F) is obtained by the breakage of $C-5$ and $C-6$ bond of compound (D).

Answer: A::D

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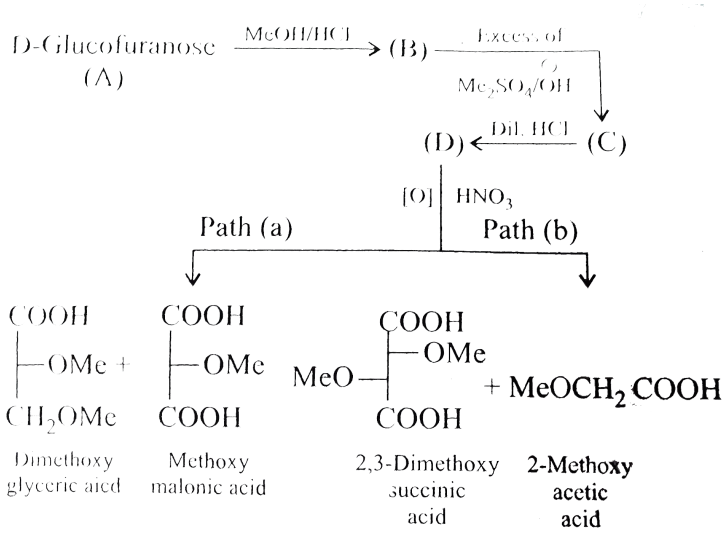

14.

Which statement(S) is/are correct about (A)?

A. It contains an acetalic linkage.

B. It contains a hemiacetalic linkage.

C. It has a six-membered cyclic ring and a δ-hemiacetalic linkage.

D. It has a five-membered cyclic ring and a γ-hemiacetalic linkage.

Answer: B::D

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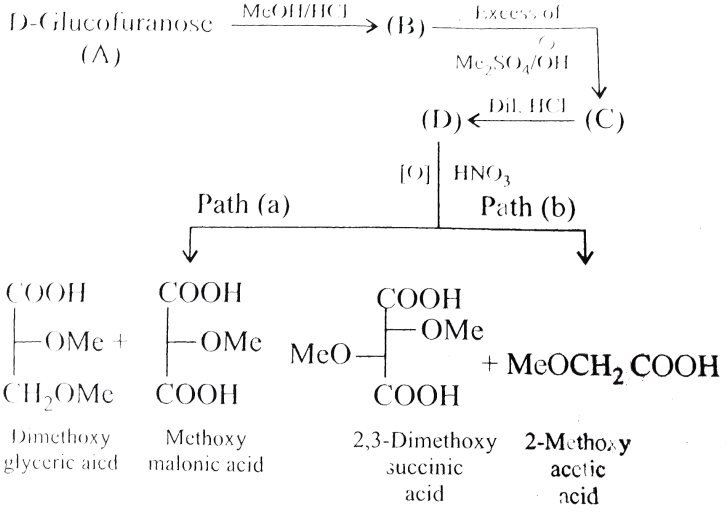
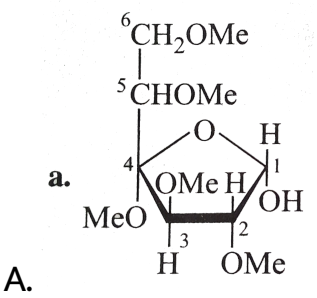


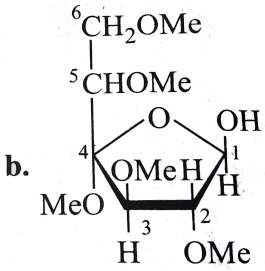
15.

Compound (B) is:

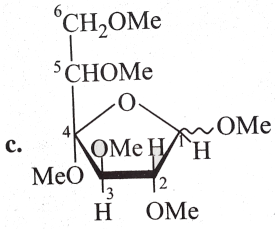
A.



B.



C.



D. Both (a) and (b)

Answer: C

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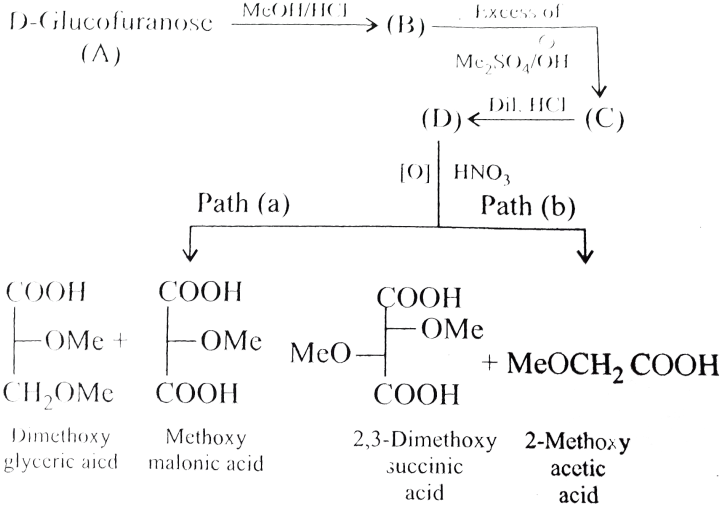
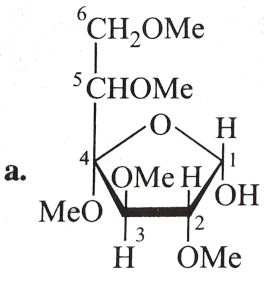


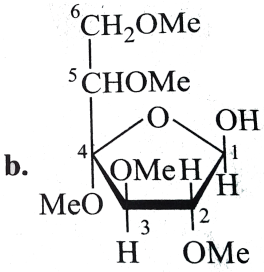
16.

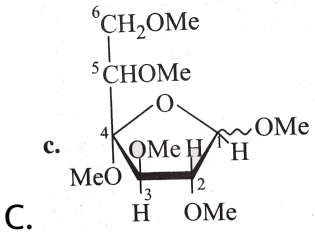
Compound (C) is:

A.



B.



C. 

D. All

Answer: C

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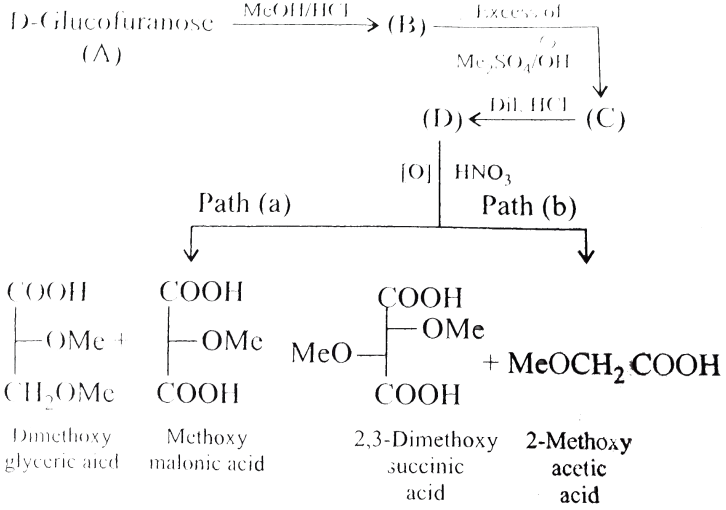
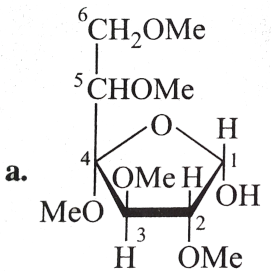
17.

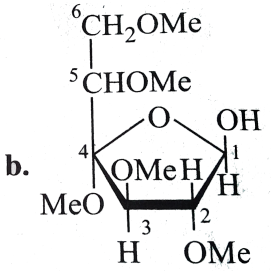


Compound (D) is:

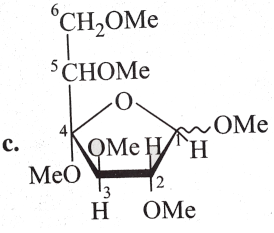
A.



B.



C.



D. Both (a) and (b)

Answer: D

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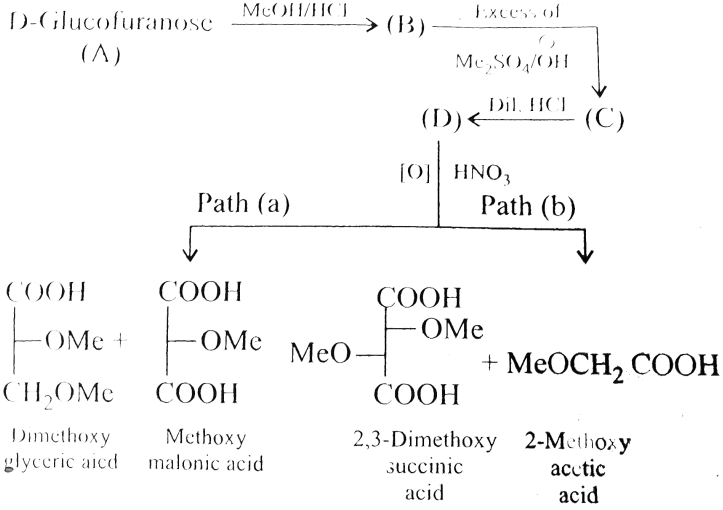

18.

Which statemetn(S) is/are correct about the products from (D) by path (a) and path (b)?

A. The products by path (a) are obtained by the breakage of $C-3$ and $C-4$ bond of compound (D).

B. The products by path (a) are obtained by the breakage of $C-4$ and $C-5$ and bond of compound (D).

C. The products by path (b) are obtained by the breakage of $C-3$ and $C-4$ bond of compound (D).

D. The products by path (b) are obtained by the breakage of $C-4$ and $C-5$ bond of compound (D).

Answer: A::D

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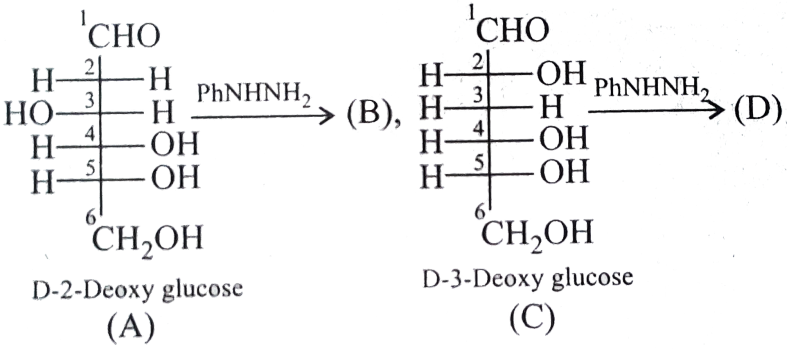
19.



D-2-Deoxy glucose
(A)

D-3-Deoxy glucose
(C)

Compound (B) is:

A. Phenylhydrazone of (A)

B. Osazone (A)

C. Both

D. None

Answer: A

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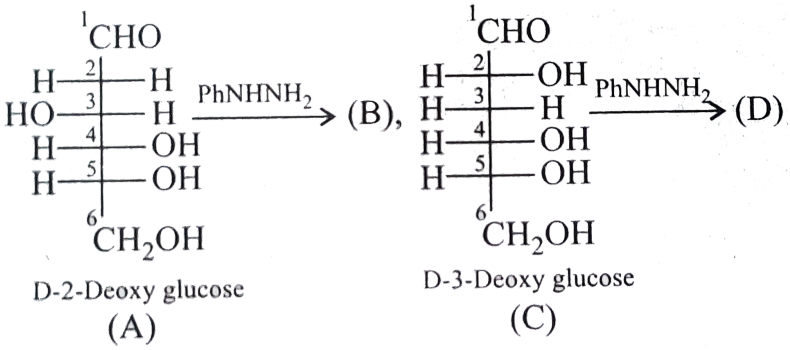
20.



D-2-Deoxy glucose
(A)

D-3-Deoxy glucose
(C)

How many moles of $PhNHNH_2$ react with $1mol(A)$?

A. 1

B. 2

C. 3

D. 4

Answer: A

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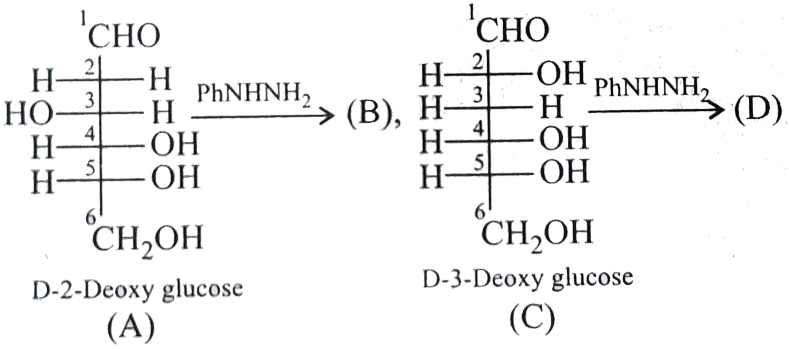
21.



D-2-Deoxy glucose
(A)

D-3-Deoxy glucose
(C)

The compound (D) is:

A. Phenylhydrazone of (C)

B. Osazone of (C)

C. Both

D. None

Answer: B

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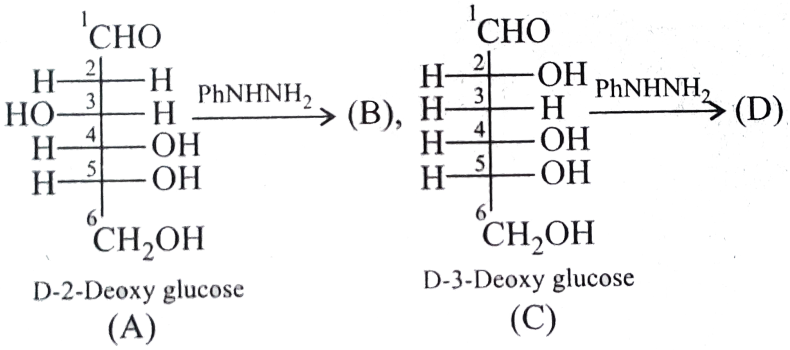
22.



D-2-Deoxy glucose
(A)

D-3-Deoxy glucose
(C)

How manty moles of (C) react with $1 mol PhNHNH_2$

A. 1

B. 3

C. 2

D. $1/3$

Answer: D

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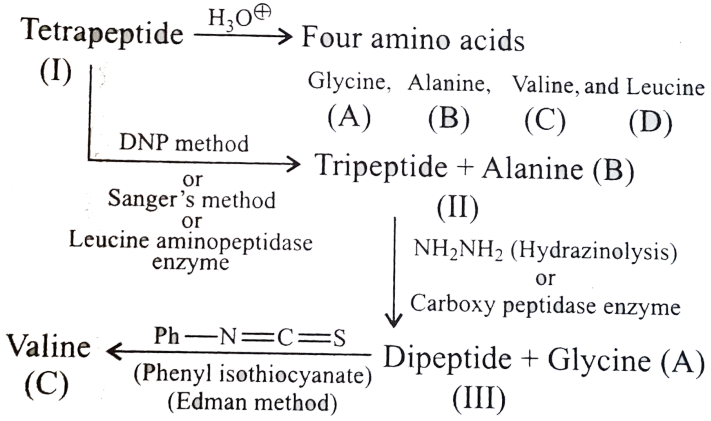

23.

The dipeptide (III) is:

A. Val $\rightarrow$ Leu

B. Leu $\rightarrow$ Val

C. Gly $\rightarrow$ Ala

D. Ala $\rightarrow$ Gly

Answer: A

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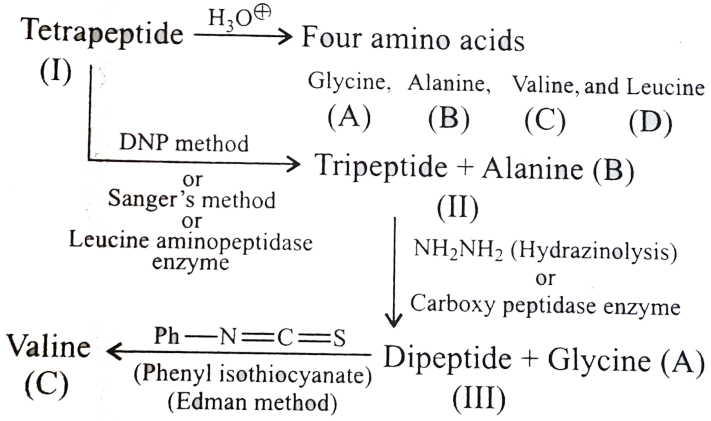

24.

The tripeptide (II) is:

A. Gly $\rightarrow$ Leu $\rightarrow$ Val

B. Val $\rightarrow$ Leu $\rightarrow$ Gly

C. Leu $\rightarrow$ Gly $\rightarrow$ Val

D. Val $\rightarrow$ Gly $\rightarrow$ Leu

Answer: B

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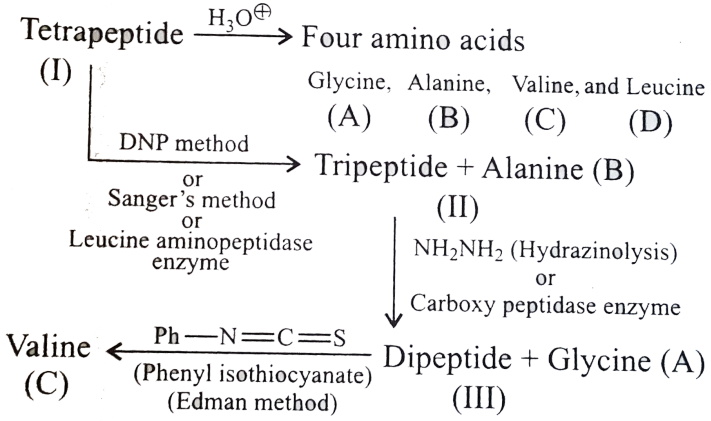
25.



The tetrapeptide (I) is:

A. Gly $\rightarrow$ Leu $\rightarrow$ Val $\rightarrow$ Ala

B. Ala $\rightarrow$ Val $\rightarrow$ Gly $\rightarrow$ Leu

C. Gly $\rightarrow$ Val $\rightarrow$ Leu $\rightarrow$ Ala

D. Ala $\rightarrow$ Val $\rightarrow$ Leu $\rightarrow$ Gly

Answer: D

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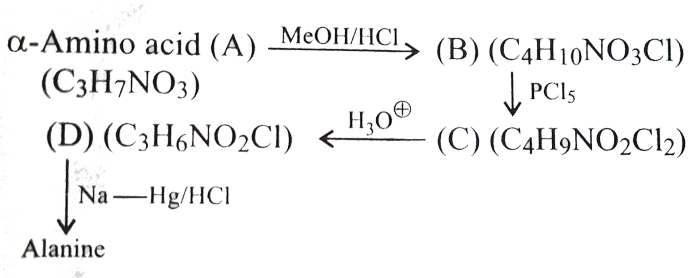
26.



Compound $'A'$ has many functional groups.

A. 1

B. 2

C. 3

D. 4

Answer: C

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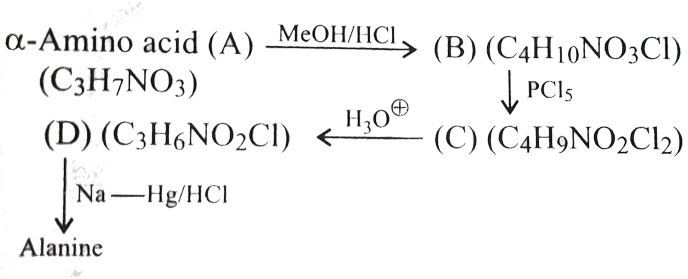
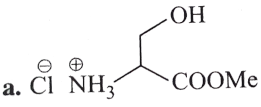
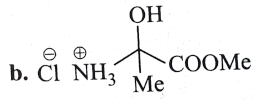
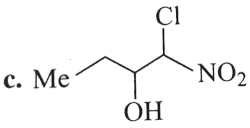
27.

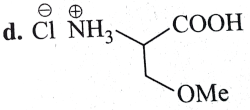


Compound (B) is:

A. 

B. 

C. 

D. 

Answer: A

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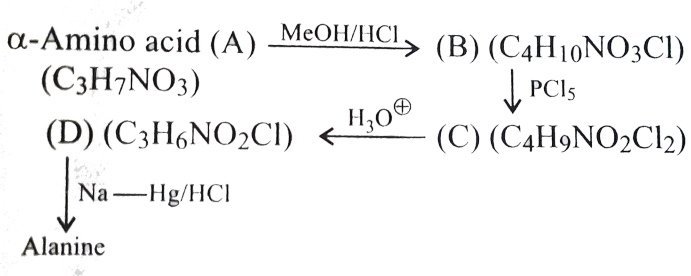
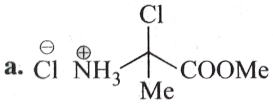
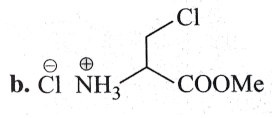
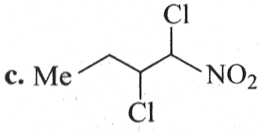
28.

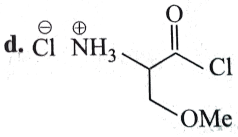


Compound (C) is:

A. 

B. 

C. 

D. 

Answer: B

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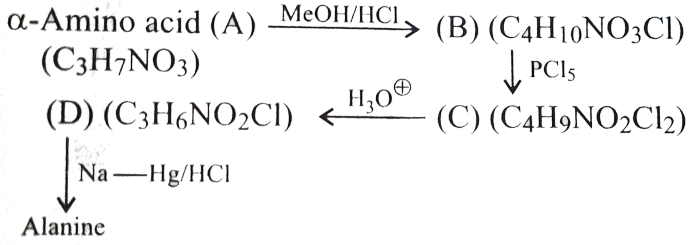
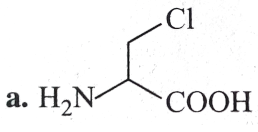
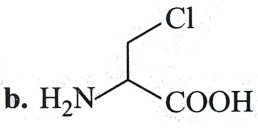
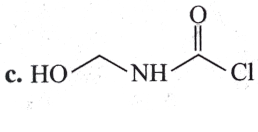


29.

Compound (D) is:

A. 

B. 

C. 

D. Both (b) and (c)

Answer: A

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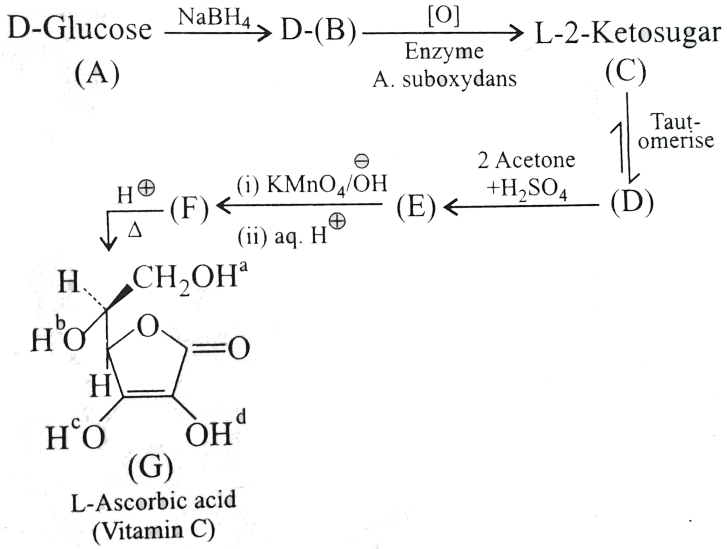

30.

Account for the acidity of $L-$ ascorbic acid $(pK_a = 4.21)$. Which of the following is most acidic H? (Marked in the structure as H^a, H^b, $H^c \text{and} H^d$)

A. H^a

B. H^b

C. H^c

D. H^d

Answer: C

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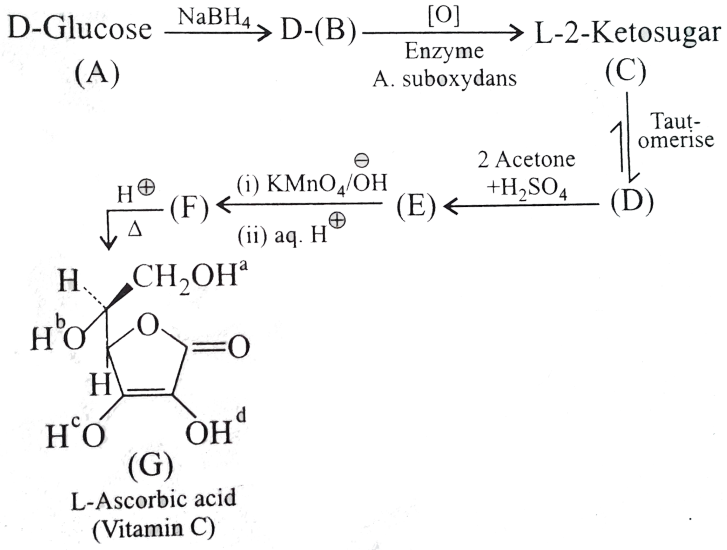

31.

How many chrial centres are in (G) (L-ascorbic acid) ?

A. 1

B. 2

C. 3

D. 4

Answer: B

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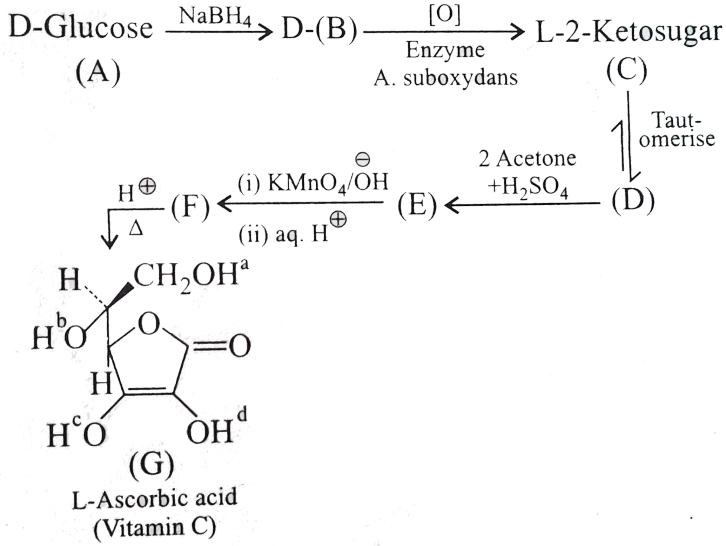
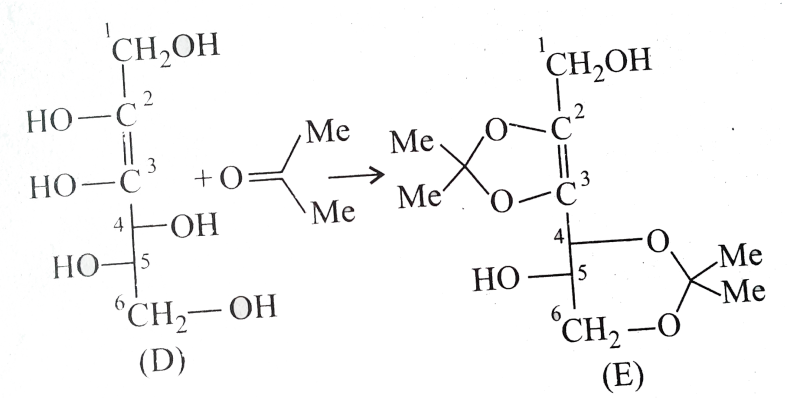


32.

Aldohexose reacts with acetone in H_2SO_4 to form cyclic ketal. Necessary condition to form cyclic ketal is that two OH

groups must be in cis (syn) position. Compound (D) reacts with $2mol$ fo acetone to form cyclic diketal, as shown below.



Which statement$(s)is/are$ correct about (E)?

A. Both cyclic ketals have five-membered ring.

B. Both cyclic ketals have six-membered ring.

C. Cyclic ketals formed between $C-2$ and $C-3$ have five-membered ring.

D. Cyclic ketals formed between $C-4$ and $C-6$ have six-membered ring.

Answer: C::D

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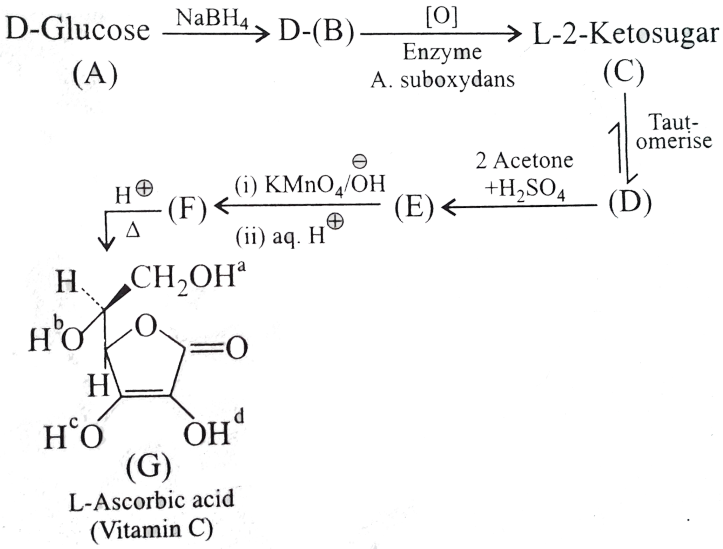
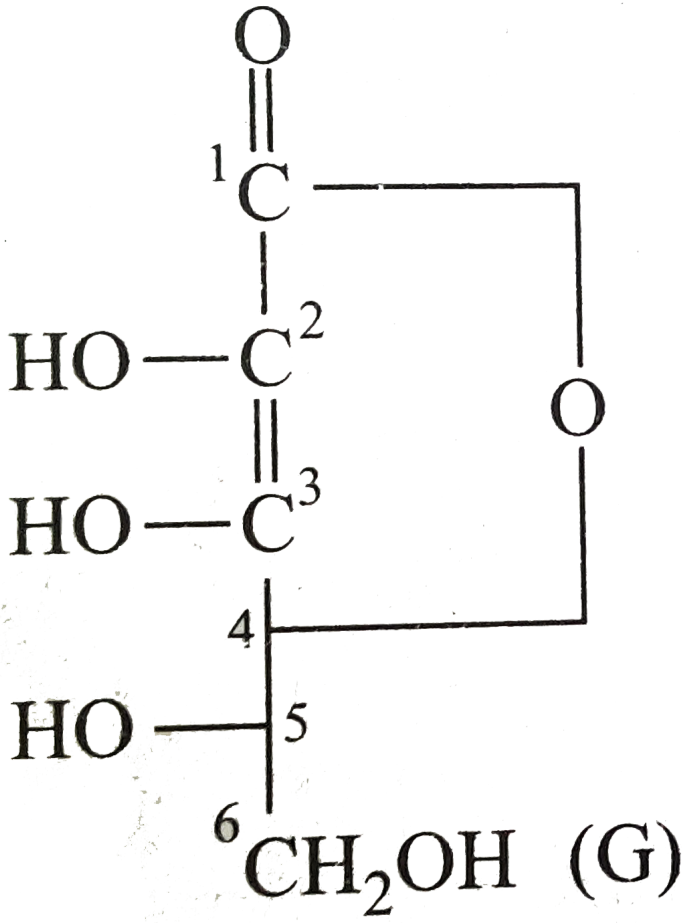


33.

The structure of (G) is shown below:



Which of the statement$(s) is/are$ correct about (G)?

A. It is a γ-lactone.

B. It is a δ-lactone

C. It has furanose structure.

D. It has pyranose structure.

Answer: A::C

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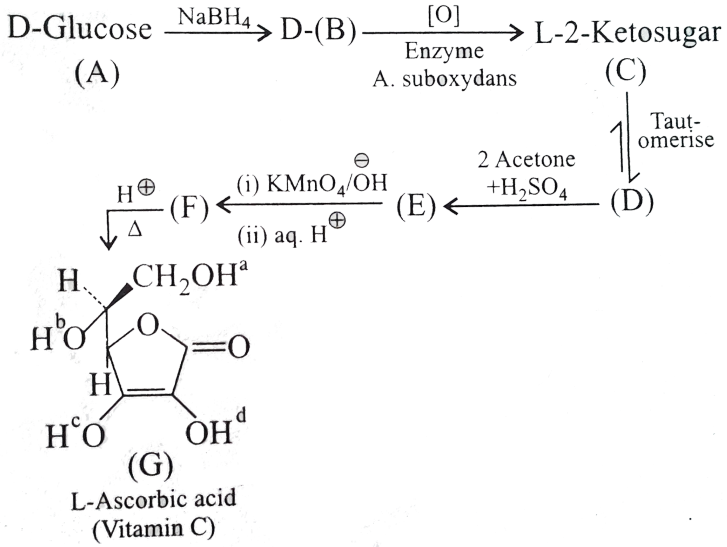
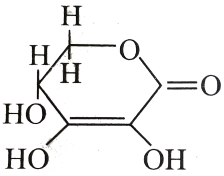
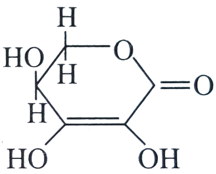
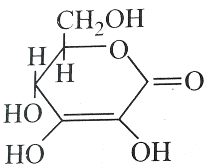


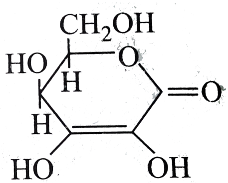
34.

If the lacetone formation in compound (G) takes place between $C-1$ and $C-5$, then the structure of (G) can be represented as:

A. a. 

B. b. 

C. c. 

D. d. 

Answer: C

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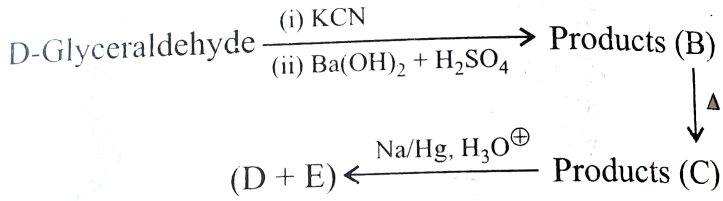

$(D) \xrightarrow[HNO_3]{[O]}$ Dibasic acid (optically active) (F)

$(E) \xrightarrow[HNO_3]{[O]}$ Dibasic acid (optically inactive) (G)

35.

Two isomeric products are obtained in (B). They are:

A. Diastereomers

B. Anomers

C. $C-2$ epimer

D. $C-3$ epimer

Answer: A::C

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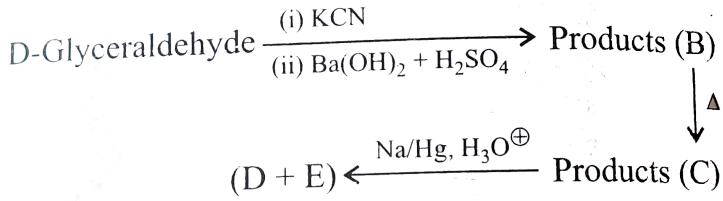

$(D) \xrightarrow[HNO_3]{[O]}$ Dibasic acid (optically active) (F)

$(E) \xrightarrow[HNO_3]{[O]}$ Dibasic acid (optically inactive) (G)

36.

The sequence from (A) to $(D + E)$ is called:

A. Wohl's method

B. Ruff method

C. Kilian's method

D. Ekenstein method

Answer: C

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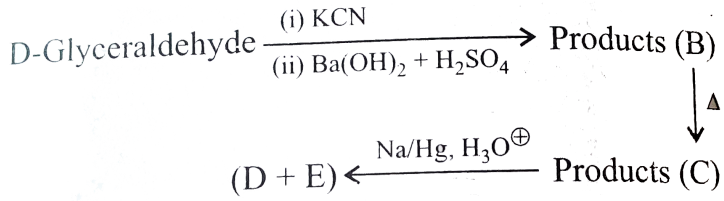

$(D) \xrightarrow[HNO_3]{[O]}$ Dibasic acid (optically active) (F)

$(E) \xrightarrow[HNO_3]{[O]}$ Dibasic acid (optically inactive) (G)

37.

Two isomeric products are obtained in (C) they are:

A. Both γ-lactones

B. Both δ-lactones

C. One is γ-lactone and another is δ-lactone

D. None

Answer: A

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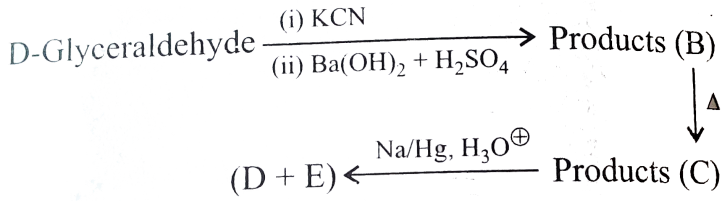
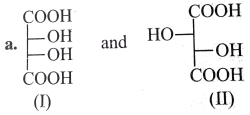


$$(D) \xrightarrow[HNO_3]{[O]} \text{Dibasic acid (optically active) (F)}$$

$$(E) \xrightarrow[HNO_3]{[O]} \text{Dibasic acid (optically inactive) (G)}$$

38.

The compounds (F) and (G), respectively, are:

A. 

B. (II) and (I)

C. 

D. (IV) and (III)

Answer: A

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Exercises (Multiple Correcttype)

1. D-Glucose and D-fructose both form the same osazone, Which statements are correct about the above reaciton?

A. Glucose and fructose are epimers.

B. Glucose and fruc tose are anomers.

C. The c onfigurations of the OH group at C-3 and c-4 in glucose and fruc tose are same.

D. The configurations of the OH group at C -4 and C-5 in glucose and fructose are same.

Answer: C::D

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2. Which of the following statements are correct?

A. D-Mannose is a C-2 epmier of D-glucose.

B. D-Allose is a C-3 epimer of D-glucose.

C. D-Gallactose is a C-4 epmier of D-glucose.

D. $\alpha - D(+)$ glucopyranose and $\beta - D(+)$ glucoforanose are anomers.

Answer: A::B::C

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3. Which of the following statements are correct?

A. One mole of $PhNHNH_2$ reacts with 3 mol glucose to form osazone.

B. One mole of D-fructose reacts with 3 mol $PhNHNH_2$ to form osazone.

C. One mole of D-2 deoxy glucose reacts with 1 mol $PhNHNH_2$ to form phenylhydeazone.

D. One mole of D-3 deoxy glucose reacts with 3 mol of $PhNHNH_2$ to form osazone.

Answer: B::C::D

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4. Which of the following statements are correct about α-amino acids.

A. All the amino acids which constitute proteins have D-configuration.

B. Isoelectric point of glycine is 6.1.

C. Valine is an essential amino acid

D. In α-amino acids, the basic group is $\left(-COO^{\Theta} \right)$ and acidic groups is $\left(-\overset{\oplus}{N}H_3 \right)$.

Answer: B::C::D

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5. Which of the following exhibit mutarotation?

A. Glucose

B. Maltose

C. Frctose

D. Galactose

Answer: A::B::C::D

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6. Which of the following statements are correct?

A. $\beta - D(+)$ glucopyranose is more stable than $\alpha - D(+)$ glucopyranose.

B. Invert sugar is laevorotatory.

C. Dextrose is D (+) glucose.

D. Levulose is D (-) fructose.

Answer: A::B::C::D

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7. Which of the following statements are false?

A. Glucose is the only aldose that mutarotates.

B. Ketose also mutarotates.

C. Glycosides mutarotate.

D. There is a relationship between the ability of a sugar to mutarotate and to reduce Tollens of Fehling's regents.

Answer: A::C

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8. The smallest aldose which is able to form cyclic hemiacetal is/are:

A. D-glyceraldehyde

B. D-Erythrose

C. D-Threose

D. D-Ribose

Answer: B::C

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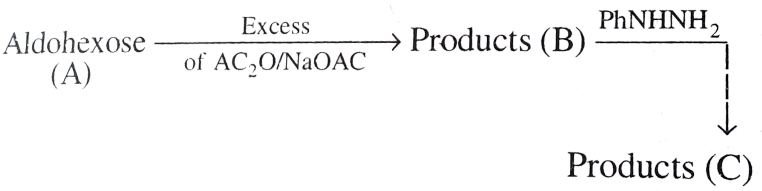
9. Which statements are correct about the reaction?



A. Products (B) are α and β - penta acetates.

B. Products (B) are α and β - tetra acetates.

C. Products (C) are phenyl hydrazones of products (B).

D. Products (B) do not react with $PhNHNH_2$.

Answer: A::D

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10. Which of the statements are correct?

A. Aldoses reacts with Bendict's solution and $PhNHNH_2$

.

B. Aldoses do not react with $NaHSO_3$.

C. Ketoses react with Fehling's solution and $PhNHNH_2$.

D. Ketoses react with $NaHSO_3$.

Answer: A::B::C

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11. Which statements are correct about the reactions?

D-Glucose $\xrightarrow{NaCN\,/\,HCN}$ products.

A. The C chain is increased by one C atom.

B. Two isomeric productsm, cyanohydrin and its C-2 epimeric cyanohydrin are formed.

C. Epimers formed in products are in unequal amounts.

D. The presence of stereocentres in sugars cause their $(C=O)$ groups to have diastereotopic faces that react at different rates, giving different amounts of diasteremers.

Answer: A::B::C::D

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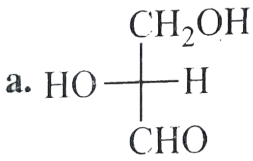
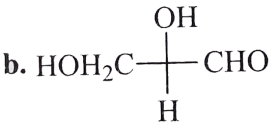
12. Which of the following are D-sugars?

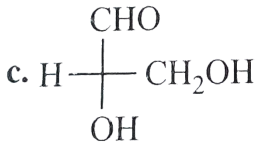
A.



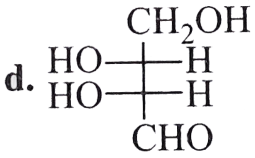
B.



C.



D.



Answer: A::B::D

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13. Which of the following pairs are $C-2$ epimers?

A. Allose, Altrose

B. Glucose, Mannose

C. Glucose, Indose

D. Galactose, Talose

Answer: A::B::C::D

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14. Which of the following pairs form same osazone?

A. Glucose, Fructose

B. Glucose, Mannose

C. Ribose, Arabinose

D. Mannos4e, Fructose

Answer: A::B::C::D

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15. Which of the following pairs are $C-2$ epimers as well as enantiomers?

A. D-Glyceraldehyde and L-Glyceraldehyde

B. D-Erythrose and D-Threose

C. D-Ribose and D-Arabinose

D. D-Xylose and D-Lyxose

Answer: A

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16. Which statements $(s) is / are$ correct about sucrose?

A. $(C_1 - \alpha)(OH)$ of glucopyranose is linked with $(C_{2(-\beta)(OH)}$ of fructofuranose.

B. $(C_1 - \alpha)(OH)$ of glucopyranose is linked with $(C_2 - \beta)(OH)$ of fructopyranose.

C. It reduces Fehling's solution.

D. It exhibits mutarotation.

Answer: A

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17. Which statements are correct about sucrose?

A. IUPAC name of sucrose is α-D-glucopyranosyl-β-D-fructofuranside.

B. IUPAC name of sucrose is β-D-fructofuranosyl-α-D-glucopyranoside.

C. It is hydrolysed both by emulsin and amylase.

D. On hydrolysis, the solution is laevorotatory.

Answer: A::B::C::D

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18. Which statements are correct about sucrose?

A. On complete methylation with $Me_2SO_4/NaOH$, it forms an octa-o-methyl product.

B. On complete acetylation with $Ac_2O / NaOAC$, it forms a hexaacetate product.

C. On complete acetylation with $Me_2SO_4 / NaOH$, it forms hexa-o-methyl product.

D. On complete acetylation with $Ac_2O / NaOAC$, it forms octa-acetate product.

Answer: A::D

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19. Which statements are correct about lactose?

A. $(C_1 - \beta)(OH)$ of glucose is linked with $(C_4 - OH)$ of galactose.

B. $(C_1 - \beta) - (OH)$ of galactose is linked with $(C_4 - OH)$ of β-glucose.

C. It is hydrolysed both by amylase and lactase.

D. It exhibits mutarotation.

Answer: B::D

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20. Which statements are correct about lactose?

A. IUPAC name of lactose is $\beta -$ galactopyranosyl-β-D-glucopyranoside.

B. IUPAC name of lactose is $\beta - D$-glucopyranosyl $\beta - D$-galactopyranoside

C. On methylation with $MeOH/HCl$, it gives methyl-β-D-glactopyranosyl- β-D-glucopyranoside.

D. On methylation with $MeOH/HCl$, it gives methyl- β-D-glucopyranosyl-β-D-galactopyranoside.

Answer: A::B::C

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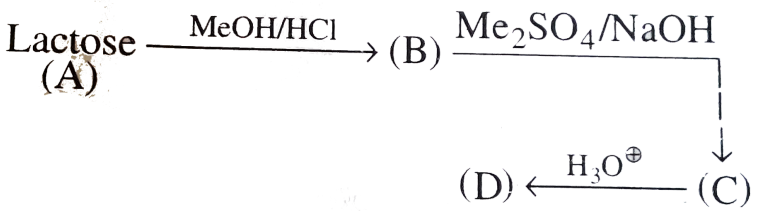
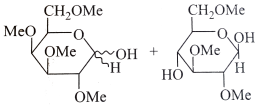
21. Which statements are correct about the reaction of lactose?



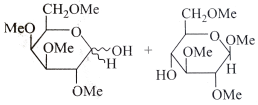
A. The product (C) is methyl-hepta-o-methyl- β-D-galactopyranosyl-β-D-glucopyranoside.

B. The product © is methyl-octa-o-methyl-β-D-galactopyranosyl-β-D-glucopyranoside.

C. Products (D) are :



D. Products (D) are :



Answer: A::C

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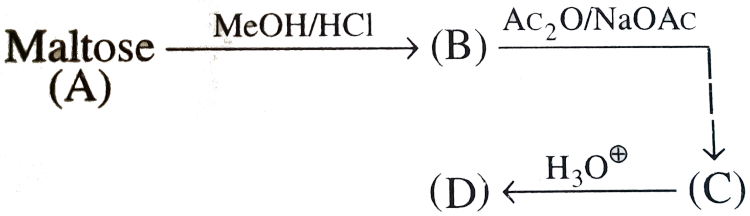
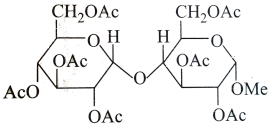
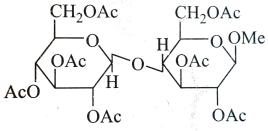
22. Which statements are correct about the reaction of maltose?



A. Product (C) is :

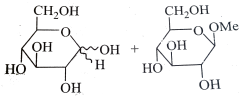


B. Product (C) is :



C. Products (D) are :

c. Products (D) are:



D. Products (D) are 2 mol α- and β-D-glucose.

Answer: A::D

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23. How many base pairs in the gene are needed to code for the enzyme lysozyme, containing 129 amino acids, found in egg white?

A. 3×129

B. $(3 \times 129) + (3 \times 2) = 393$ base pairs

C. $(3 \times 129) + (3 \times 3) = 396$ base pairs

D. 4×129

Answer: B

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24. Which of the following contain disulphide linkages?

A. Oxytocin

B. Vasopressin

C. Insulin

D. Haemoglobin

Answer: A::B::C

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25. Globular proteins are present in:

A. Eggs

B. Muscles

C. Keratin

D. Blood

Answer: A::D

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26. Which of the statements are correct about D, L of sugars and amino acids.

A. In sugars, symbols D and L refer to the relative configuration of the OH groups at the penultimate C atom w.r.t. to glyceraldehyde taken as standard. D

refers to $(-OH)$ group on R.H.S. and L refres to OH group on L.H.S.

B. In amino acids, symbols D and L refer to the relative configuration of the (NH_2) group w.r.t. D (+) serine taken as standard  [D (+) Serine].

C. D refers to NH_2 group on R.H.S. and L refers to $(-NH_2)$ group on L.H.S.

D. In sugars, d refers to dextrorotatory and L refers to laevoratotory.

Answer: A::B

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27. A mixture of three protiens, (A) (pepsin), (B) (haemoglobin), and (C) (lysozyme) was seperated by elctrophoresis method at $pH = 7$. The pH at isoelectric point (pI) of the proteins are pI of (A), (B), and (C) which are 1.1, 6.7, and 11.0, respectively. which of the statement are correct?

A. Pepsin (A) will migrate to the cathode.

B. Lysozyme (C) will migrate to the anode.

C. Haemoglobon will not migrate.

D. At pH=7, (A) and (C) would precipitate out while (B) would remain in the solution.

Answer: A::B::C

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28. Which statements are correct about the mixture of lysine $pI = 9.6)$ and glycine $(pI = 5.97)$, sparated by electrophoresis method or by solubility method?

A. At $pH = 5.97$, glycine does not migrate while lysine moves to the cathode.

B. At $pH = 5.97$, glycine does not migrate while lysine moves to the anode.

C. At $pH = 9.6$, lysine does not migrate while glycine moves to the anode.

D. At $pH = 5.97$ of the mmixture of the solution, glycine precipitates out while lysine remains in the solution.

Answer: A::C::D

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29. The structure of aspartic acid is given below .

$\left(HOOC - \underset{\underset{\overset{\oplus}{.} NH_3}{|}}{CH} - CH_2COOH \right)$ (A)The $pK_{a_1}, pK_{a_2},$ and pK_{a_3} of (A), respectively, are: $1.88, 3.65,$ and 9.60. pK_{a_1} corresponds to the ionisation of the $COOH$ group, of $\left(\underset{\underset{\overset{\oplus}{N} H_3}{|}}{R\,C\,H} - COOH \right)$ pK_{a_2} corresponds to the ionsation of $\left(\overset{+}{N} H_3 \right)$ (ammonium ion). what is the pH at isoelectric points (pI)?

A. $\frac{pK_{a_1} + pK_{a_2}}{2}$

B. $\frac{pK_{a_1} + pK_{a_3}}{2}$

C. $\frac{pK_{a_2} + pK_{a_3}}{2}$

D. $\frac{pK_{a_1} + pK_{a_2} + pK_{a_3}}{3}$

Answer: A

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30. The structure of a basic amino acid, lysine, is given below:

$$\left(HOOC - \underset{\underset{\overset{\oplus}{.} NH_3}{|}}{C} H - (CH_2)_3 - CH_2\overset{\oplus}{N}H_3 \right) (A)$$

The pK_{a_1}, pK_{a_2}, and PK_{a_3} of (A), respectively, are: $2.18, 8.95$, and 10.53.

What is the pH at isoelectric points (pI)?

A. $\frac{pK_{a_1} + pK_{a_2}}{2}$

B. $\frac{pK_{a_1} + pK_{a_3}}{2}$

C. $\frac{pK_{a_2} + pK_{a_3}}{2}$

D. $\frac{pK_{a_1} + pK_{a_2} + pK_{a_3}}{3}$

Answer: C

View Text Solution

31. Which statementsare correct?

A. Lactose is a disaccharide and is a reducing sugar.

B. α-D-glucopyranoside and β - D-glucopyranose are anomers.

C. Methyl $-\alpha$-D-glucopyranoside has an acetal structure and is a non-reducing sugar.

D. α-D-Glucopyranose has a hemiacetal structure ans is a reducing sugar.

Answer: A::B::C::D

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Exercises (Single Correcttype)

1. The main structural feature of proteins is:

A. Ether linkage

B. Ester linkage

C. Peptide llinkage

D. All the three above

Answer: C

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2. Enzymes belong to which class of compounds?

A. Polysaccharides

B. Polypeptides

C. Polypeptides

D. Polynitro hetcrocyclic compounds

Answer: B

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3. Glucose reacts wih acetic anhydride to form:

A. Monoacetate

B. Tetra-acetate

C. Penta-acetate

D. Hexa-acetate

Answer: C

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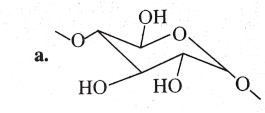
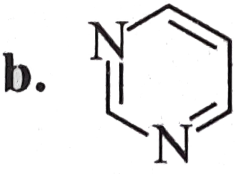
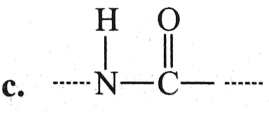
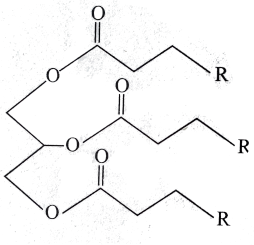
4. Which of the following chemical units is certainly to be found in an enzyme?

A. 

B. 

C. 

D. 

Answer: C

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5. The function of enzymes in the living system is to:

A. Transport oxygen

B. Provide immunity

C. Catalyse biochemical reactions

D. Provide energy

Answer: C

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6. In DNA, the complementary bases are:

A. Uracil and adenine: cytosine and guanine

B. Adenine and thymine: guanine and cytosine

C. Adenine and thymine: guanine and uracil

D. Adenine and guanine: thymine and cytosine

Answer: B

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7. Glucose +x phenyl hydrazine $\rightarrow$ osazone 'x' will be :

A. Three

B. Two

C. One

D. Four

Answer: A

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8. Vitamin A is called:

A. Ascorbic acid

B. Retinol

C. Calciferol

D. Tocopherol

Answer: B

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9. Which carbohydrate is an essential contituent of plant cells?

A. Starch

B. Cellulose

C. Sucrose

D. Vitamins

Answer: B

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10. The hormone which controls the process of burning of fats, protiens, and carbohydrates and liberates energy in the body is:

A. Thyroxine

B. Adrenaline

C. Insulin

D. Cortisone

Answer: C

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11. Which of the following has magnesium?

A. Chlorophyll

B. Haemocyanin

C. Carbonic abhydrase

D. Vitamin B_{12}

Answer: A

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12. Vitamin B_1 is:

A. Riboflavin

B. Cobalalmin

C. Thiamine

D. Pyridoxine

Answer: B

Watch Video Solution

13. The deficiency of vitamin C casuse:

A. Scurvy

B. Rickets

C. Pyrrohea

D. Pernicious anaemia

Answer: A

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

A. Enantiomers

B. Geometrical

C. Epimers

D. Anomers

Answer: D

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15. Sanger's reagent is used for the identification of:

A. $N-$ terminal of a peptide chain

B. $C-$ terminal of a peptide chain

C. Slide chain of amino acids

D. Molecular weight of the peptide chain

Answer: A

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16. The number of tripeptides formed by three different amino acids is:

A. Three

B. Four

C. Five

D. Six

Answer: D

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17. Which structural feature distinguishes proline from other natural $\alpha -$ amino acids?

A. It is optically inactive.

B. It contains armatic group.

C. It is a dicarboxylic acid

D. It has a secondary amine.

Answer: D

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18. Which is the correct statement?

A. Starch is a plymer of $\alpha - $ glucose.

B. Amylose is a component of collulose.

C. Proteins are composed of only one type of amino acids.

D. In cyclic structure of furnaose, there are four carbon atoms and one oxygen atom.

Answer: A

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19. Which statement is incorrect about the peptide bond?

A. $(C-N)$ bond length in proteins is longer than the usual bond length of $(C-N)$ bond,

B. Spectroscopic analysis shows planar structure of $(CO-NH)$ group.

C. $(C-N)$ bond length in proteins is smaller than usual bond length of $(C-N)$ bond.

D. None of the above.\

Answer: A

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20. The vitamins absorbed from the intestine along with fats are:

A. A, D

B. A, B

C. A, C

D. D, B

Answer: A

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21. The functional group which is found in amino acid is:

A. $-COOH$

B. $-NH_2$

C. $-CH_3$

D. Both (a) and (b)

Answer: D

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22. Complete hydrolysis of cellulose gives:

A. L-Glucose

B. D-Fructose

C. D-Ribose

D. D-Glucose

Answer: D

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23. The reason for double helical structure of DNA is the operation of:

A. Electrostatic attractions

B. van der Waals forces

C. Dipole-dipole interactions

D. Hydrogen bonding

Answer: D

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24. Chargaff' a rule states that in an organism:

A. The amount of adenine (A) us equal to that of thymine (T) and the amount of guanine (G) is equal to that of cytosine (C).

B. The amount of adenine (A) is equal to that of thymine (T) and the amount of guanine (G) is equal to that of cytosine (C).

C. The amount of adenine (A) is equal to that of cytosine (C) and the amount of thymine (T) is equal to that of guanine (G).

D. The amounts of all bases are equal.

Answer: A

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25. Subunits present in haemoglobin are:

A. 2

B. 3

C. 4

D. 5

Answer: C

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26. Among the following the achiral amino acid is:

A. Ethylalanine

B. Methylglycine

C. 2-Hydroxymethylserine

D. Tryptophan

Answer: C

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27. The hormone that helps in the conversion of glucose into glycogen is:

A. Cortisone

B. Bile acids

C. Adrenaline

D. Insulin

Answer: D

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28. The enzyme which hydrolyses triglycerides to fatty acid and glycerol is called:

A. Maltose

B. Lipase

C. Zymase

D. Pepsin

Answer: B

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

A. Functions as a catalyst for biological reactions.

B. maintains blood sugar level.

C. acts as an oxygen carrier in the blood.

D. forms antibodies and offers resistance to disease.

Answer: C

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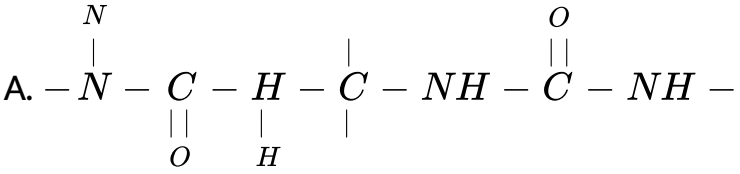
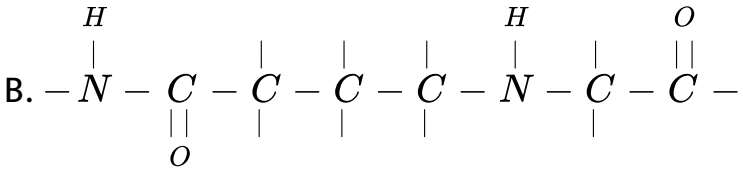
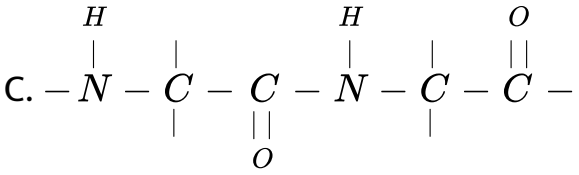
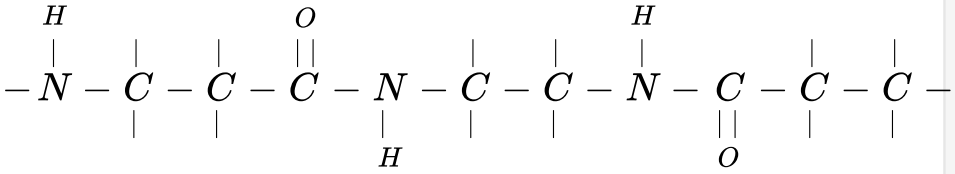
30. Which of the following structures represents the peptide chain?

A. 

B. 

C. 

D.



Answer: C

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31. The number of chiral carbons in $\beta - D(+) -$ glucose is:

A. 5

B. 6

C. 3

D. 4

Answer: A

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32. The helical structure of protein is stabilised by:

A. Dipeptide bonds

B. Hydrogen bonds

C. Ether bonds

D. Peptide bonds

Answer: B

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33. Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following catefories:

A. A coenzyme

B. A hormone

C. An enzyme

D. An antibiotic

Answer: B

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34. Which base is present in RNA but not in DNA?

A. Uracil

B. Cytosine

C. Guanine

D. Thymine

Answer: A

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35. The nucleic acid base having two possible binding sites is:

A. Thymine

B. Cytosine

C. Guanine

D. Thymine

Answer: C

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36. Carbohydrates are stored in human body as the polysaccharide:

A. Starch

B. Glucose

C. Glycogen

D. Galactose

Answer: C

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37. An alteration in the base sequence of nucleic acid molecule is:

A. Relication

B. Mutation

C. Duplication

D. Dislocation

Answer: B

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38. $\alpha -$ and $\beta -$ Glucose differ in the orientation of the $(-OH)$ group around:

A. C_1

B. C_2

C. C_3

D. C_4

Answer: A

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39. Which functional group participates in the disulphide bond formation in proteins?

A. Thioether

B. Thiol

C. Thioester

D. Thiolactone

Answer: B

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40. In both DNA and RNA, the heterocyclic base and phosphate ester linkages are at:

A. C_5 and C_2, respectively, of the sugar molecule.

B. C_2 and C_5, respectively, of the sugar molecule.

C. C_1 and C_5, respectively, of the sugar molecule.

D. C_5 and C_1, respectively, of the sugar molecule.

Answer: C

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41. Which of the following biomolecules is insoluble in water?

A. $\alpha -$ Keratin

B. Hyaemoglobin

C. Ribonuclease

D. Aldenine

Answer: A

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42. Which of the following statements is true for protein synthesis (translation)?

A. Amino acids are directly recognised by $m - RNA$.

B. The third base of the codon is less specific.

C. Only one codon codes for an amino acid.

D. Every $t - RNA$ has more than one amino acid attachment.

Answer: B

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43. The human body does not produce:

A. Enzymes

B. DNA

C. Vitamins

D. Hormones

Answer: C

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

$\xrightarrow[\text{Enzyme (A)}]{}$ Polypeptides

$\xrightarrow[\text{Enzyme (B)}]{}$ Amino acids

A. Invertase and zymase

B. Amylase and maltase

C. Diastase and lipase

D. Pepsin and trypsin

Answer: D

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45. The pair in which both the species have iron is:

A. Nitrogenase, cytochromes

B. Carboxypeptidase, haemoglobin

C. Haemoglobin, nitrogenase

D. Haemoglobin, cytochromes

Answer: D

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46. Thymine is:

A. $5-$ Methyluracil

B. $4-$ Methyluracil

C. $3-$ Methyluracil

D. $1-$ Methyluracil

Answer: A

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47. Lysine is least soluble in water in the pH range:

A. 3 to 4

B. 5 to 6

C. 6 to 7

D. 8 to 9

Answer: D

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48. Methyl$-\alpha-D-$glucoside and methyl$-\beta-D-$glucoside are:

A. Epimers

B. Anomers

C. Enantiomers

D. Conformational diastereomers

Answer: B

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49. In addition to an aldehyde group, glucose contains:

A. One secondary and four primary OH groups.

B. One primary and four secondary OH groups.

C. Two primary OH and three secondary OH groups.

D. Three primary OH and two secondary OH groups.

Answer: B

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50. At $pH = 4$, glycine exists as:

A. $H_3\overset{\oplus}{N} - CH_2COO^{\ominus}$

B. $H_3\overset{\oplus}{N} - CN_2COOH$

C. H_2NCH_2COOH

D. $H_2NCH_2COO^{\ominus}$

Answer: B

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

A. Vitamin H

B. Vitamin B_1

C. Vitamin B_{12}

D. Vitamin D

Answer: A

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52. The efficiency of an enzyme to catalyse a reacrtion is due to its capacity to:

A. Reduced the activation energy of the reaction.

B. Form strong enzyme-substrate complex.

C. Decrease the bond energies of all the substrate molecules.

D. Increase the free energy of the catalyst-substrate reaction.

Answer: A

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53. Glucose reacts with excess of phenylhydrazine and forms

A. Glucosazone

B. Glucose phenylhydrazone

C. Glucose oxime

D. Sorbitol

Answer: A

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54. The term anomer of glucose refers to:

A. Isomers of glucose that differ in configuration at carbons one and four $(C-1 \text{ and } C-4)$.

B. A mixture of $D-$ glucose and $L-$ glucose.

C. Enantiomers of glucose.

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

Answer: D

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55. The pyrimidine bases present in DNA are:

A. Cytosine and adenine

B. Cytosine and gunine

C. Cytosine and thymine

D. Cytosine and uracil

Answer: C

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56. Hydrolysis of lactose with dilute acid yields:

A. Equimolar mixture of $D-$ glucose and $D-$ glucose.

B. Equimolar mixture of $D-$ glucose and $D-$ galactose..

C. Equimolar mixture of $D-$ glucose and $D-$ fructose.

D. Equimolar mixture of $D-$ galactose and $D-$ galactose.

Answer: B

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57. Cellulose is a straight-chain polysaccharide composed of only:

A. $D-$ Glucose units joined by $\alpha-$ glycosidic linkage.

B. $D-$ Glucose units joined by $\beta-$ glycosidic linkage.

C. $D-$ Glucose units joined by $\alpha-$ glycosidic linkage.

D. $D-$ Glucose units joined by $\beta-$ glycosidic linkage.

Answer: B

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58. One of the different amino acids which can be synthesised in the body is:

A. lysine

B. Histidine

C. Valine

D. Alanine

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59. Sucrose on hydrolysis gives:

A. Glucose+Glucose

B. Glucose+Galactose

C. Glucose+Fructose

D. Glucose+Lactose

Answer: C

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60. The α-amino acid which contains the aromatic side chain is:

A. Proline

B. Tyrosine

C. Valine

D. Tryptophan

Answer: D

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61. Which of the following is a female sex hormone?

A. Adrenaline

B. Esterone

C. Cortisone

D. Testosterone

Answer: B

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62. The chemical extracted from the plant Rauwolfia sepentina is:

A. Aspirin

B. Quinine

C. Bithional

D. Reserpine

Answer: D

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63. Which of the following is a plant growth inhibiter?

A. Heteroauxin

B. Gibberellins

C. Cytokinnis

D. Abscisic acid (ABA)

Answer: D

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64. The first sex attractant pheromone identified was that of

A. Cat

B. Dog

C. Gypsy moth

D. Human

Answer: C

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65. To separate a mixture of monosacharides, you would use

A. Centrifuge

B. Chromatograph

C. Mass spectometer

D. Electrolytic cell

Answer: B

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66. Which of the following carbohydrates cannot be directly utilised by the human body as a source of energy?

A. Glucose

B. Sucrose

C. Glycogen

D. Cellulose

Answer: D

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67. The Ruff degradation used to reduce the carbon the carbon chain in an

A. Alcohol

B. Alkene

C. Ketose

D. Aldose

Answer: D

Watch Video Solution

68. The Killani's synthesis is used to increase the carbon chain in:

A. Acid

B. Alcohol

C. Aldose

D. Ketose

Answer: C

Watch Video Solution

69. Which of the following statements is incorrect?

A. $\alpha - D -$ glucose and $\beta - D -$ glucose are enantiomers.

B. $D -$ Glyceraldehyde and $L -$ glyceraldehyde are epimers.

C. The reserve carbohydrate of animals is glycogen.

D. Few aldohexoses which react with phenylhydrazine to give identical osaazones are epimers.

Answer: A

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70. Check the incorrect statement.

A. Protiens, like fats and carbohydrates, are primarily used for supplying heat and energy to the body.

B. Proteins differ from fats and carbohydrates in that they contain nitrogen.

C. Amino acids in proteins have $L-$ configuration.

D. Enzymes are proteins.

Answer: A

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71. Check the incorrect statement.

A. Adenine and guanine are both purine bases and are found both in DNA and RNA.

B. Genetic information is based upon the nucleotide sequence in DNA.

C. The genetic code consist of triplets of nucieotide, each triplet codes an amino acid.

D. Transfer RNA carries the code for the synthesis of proteins.

Answer: D

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72. Which of the following statements is incorrect?

A. Vitamins are included in diet because they are not synthesised in the human body.

B. Most vitamins fuction as coenzymes.

C. A person with diabetes mellituss suffers from hypoglycemia.

D. Hypoglycemia can affect the brain due to low blood sugar level.

Answer: C

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73. Lasctose is made up of:

A. Galactose unit and glucose unit

B. Glucose unit and fructose unit

C. Both glucose units

D. Glucose and arbinose unit

Answer: A

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74. Isoprene units prevail in all the following except

A. Natural rubber

B. Vitamin A

C. Terpenes

D. Vitamin E

Answer: D

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75. The pH value of the solution in which a particular amino acid does not migrate under the influence of electric field is called the:

A. Eutectic point

B. Neutralisation point

C. Effusion point

D. Isoelectric point

Answer: D

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76. During aerobic respiration, one molecule of glucose produces:

A. $2ATP$ molecules

B. $50ATP$ molecules

C. $38ATP$ molecules

D. $36ATP$ molecules

Answer: C

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77. The chemical substance which acts as emulsifier is:

A. Phosphoric acid

B. Fatty acid

C. Bile acids

D. Mineral acids (HCl)

Answer: C

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78. If the sequence of bases in one strand of DNA is $ATGACTGTC$ then the sequence of bases in its complementary strands is:

A. $TACTGACAG$

B. $TUCTGUCCUG$

C. $GUAGTUAUG$

D. None of the above

Answer: A

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79. The RNA which takes part in the synthesis of proteins is:

A. $m - RNA$

B. $r - RNA$

C. $t - RNA$

D. All the above

Answer: D

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80. Mark the incorrect statement about ATP.

A. It is a nucleotide.

B. It contains the purine adenine.

C. The enzyme-catalysed hydrolysis of ATP to ADP and AMP is accompanied by absorption of energy.

D. Energy is stored in the cell in the form of ATP.

Answer: C

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81. The sequence in which amino acids are linked to one another in a protein molecule is called its:

A. Primary structure

B. Secondary structure

C. Tertiary structure

D. Quaternary structure

Answer: A

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Exercises (Assertion-Reasoning)

1. Statement I: Glycosides mutarotate.

Statement II: The anomeric OH is etherified and the equilibrium with the free carbonyl form is destroyed.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: D

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2. Statement I: There is a releatikonship between the ability of a sugar to mutarotate and to reduce Tollens reafent.

Statement II: The reduction of Tollens reafent and mutarotation both depend on the presence of free carbonyl form.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: A

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3. Statement I: Glucose and fructose both reduce Schiff's reagent.

Statement II: Both have free carbonyl group.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: D

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4. Statement I: D-Fructose is used for sweetening cold drinks but not hot ones.

Statement II: the sweet form is fructopyranose, on increasing

termperature causes or shift in the pyranose $\Leftrightarrow$ furanose equilibrium towards the less sweet furanose form.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: A

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5. Statement I: $D-2-$ Deoxyglucose reacts with $3molPhNHNH_2$ and form an osazone.

Statement II: $D-2-$ Deoxyglucose has no $(C-OH)$ group $\alpha-$ to the $(C=O)$ group.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: D

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6. Statement I: $\beta - D -$ Glucophyranose is the most abundant naturally occuring aldohexoses.

Statement II: All the ring substituents in the chair conformation are equatorial.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: A

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7. Statement I: $D-3$ Deoxyglucose has gfour chiral C atoms.

Statement II: It exists in eight stereoisomers.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: D

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8. Statement I: All enzymes are protiens but all proteins are not enzymes.

Statement II: Enzymes are biocatalysts and have stable configuration having an active site.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: A

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9. Statement I: A triester of glycerol with stearic acid on boiling with $Aq.\ NaOH$ gives solid cake with soapy touch.

Statement II: Free glycerol is liberated which is a syrupy reactions.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: C

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10. ATP is the main source of energy of many anaerobic realations.

Statement II: Anaerobic reactions occur in the presence of oxygen.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: C

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11. Statement I: Carboxypeptidase is an exopeptidase

Statement II: It cleaves N-terminal bond.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: C

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12. Statement I: Cellulose is not diagested by human beings.

Statement II: Cellulose is a polymer of `beta-D-flucose.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: C

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13. Statement I: Thymine occures in RNA.

Statement II: RNA controls the synthesis of proteins.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: D

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14. Statement I: Insulin is a globular protein.

Statement II: It has two polypeptide chains with 21 and 30 amino acids joined by sulhur bridges connecting cysteine amino acid on the two chains.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: A

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15. $D-$ Fructose with dil. $NaOH$ undergoes a reversible isomerisation and is converted to a mixure of $D-$ glucose, $D-$ mannose and $S-$ fructose.

Statement II: This reaction is known as Lobryde Bruyn-van Ekenstein rearrangement.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: A

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Exercises Archives (Single Correct)

1. Which of the following pairs give positive Tollens test?

A. Glucose, Sucrose

B. Glucose, fructose

C. Hexanal, acetophenone

D. Fructose,sucrose

Answer: B

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2. The two forms of `D-glucopyranose obtained from solution of D-glucose are known as:

A. Isomer

B. Anomer

C. Epimer

D. Enantiomer

Answer: B

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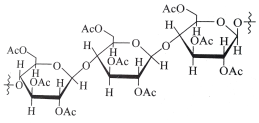
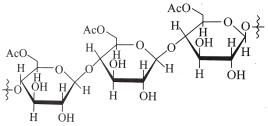
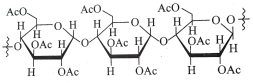
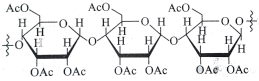
3. Cellulose upon acetylation with excess $anhydride / H_2SO_4$ (catalytic) gives cellulose triacetate whose structure is:

A. 

B. 

C. 

D. 

Answer: A

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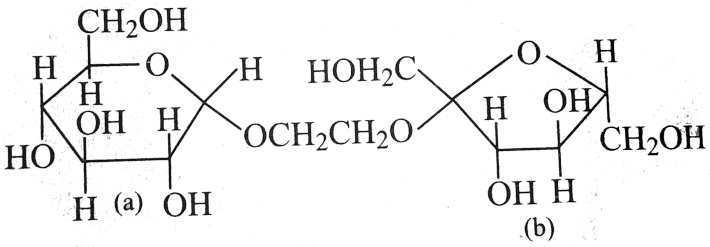
4. The correct statement about the following disaccharide is:



A. Ring (a) is pyranose with $\alpha -$ glycosidic link.

B. Ring (a) is furanose with $\alpha -$ glycosidic link.

C. Ring (b) is furanose with $\alpha -$ glycosidic link.

D. Ring (b) is pyranose with $\beta -$ glycosidic link.

Answer: A

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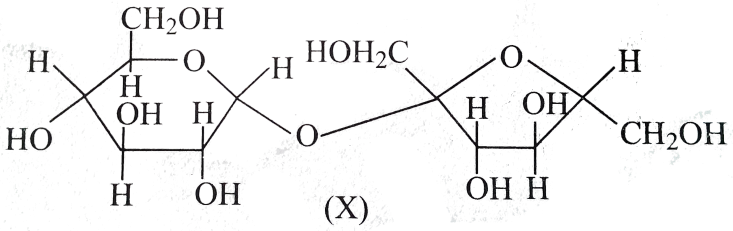
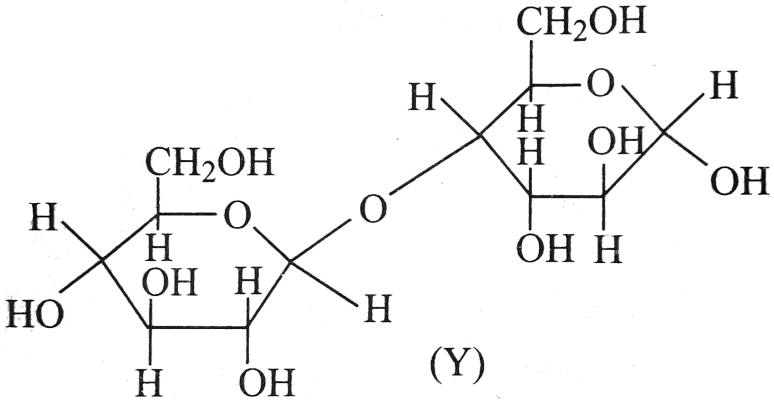
5. The correct statement(s) about the following sugars (X) and $(Y)is/are$:



(X)



(Y)

A. (X) is a reducing sugar and (Y) is a non-reducing sugar.

B. (X) is a non-reducing sugar and (Y) is a reducing sugar.

C. The glucosidic linkage in (X) and (Y) are α and β, respectively.

D. The glucosidic linkages in (X) and (Y) are β and α, respectively.

Answer: B::C

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Exercises Archives (Assertion-Reasoning)

1. Statement I: Glucose gives a reddish-brown precipitate with fehling's solution.

Statement I: Reaction of glucose with fehling's solution gives CuO and gluconic acid.

A. Statement I is true, Statement II is true, Statements II is the correct explanation of Statement I.

B. Statement I is true, Statement II is true, Statement II is not the correct explanation of Statement I.

C. Statement I is true, Statement II is false.

D. Statement I is false, Statement II is true.

Answer: C

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Exercises Archives (Analytical And Descriptive)

1. Write the structure of alanine at $pH = 2$ and $pH = 10$.

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2. Give the structure of each of the products in the following reactions:

(i)

(ii)

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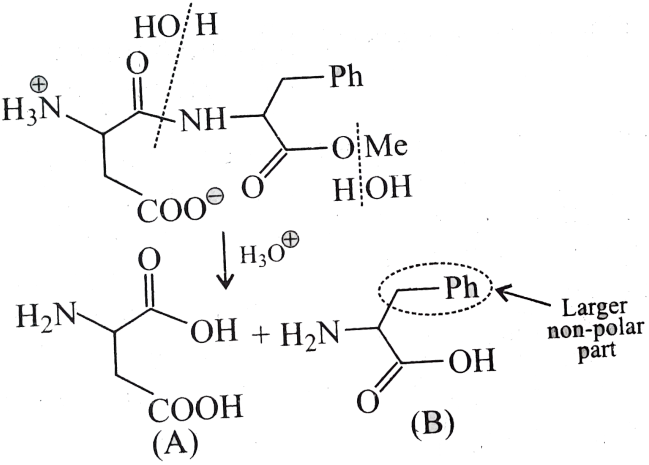
3. As partune, an artifical sweetener, is a peptide and has the following structure:

iii.



(i) Identify the four functional groups.

(ii) Write the zwitterionic structure.

(iii) Write the structure of amino acids obtained from the hydrolysis of aspartame.

(iv) Which of the two amino acids is more hydrophobic?

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4. Write down the heteroheneous catalyst involved in the polymerisation of ethylene.

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5. Following two amino acids liosine and glutamine form dipeptide linkage. What are the two possible dipeptides?

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6. The structure of $D-$ glucose is as follows:

(a) Draw the structure of $L-$ glucose.

(b) Give the reaction of $L-$ glucose with Tollens reagent.

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7. Which of the following disaccharides will not reduce Tollens reagent? 

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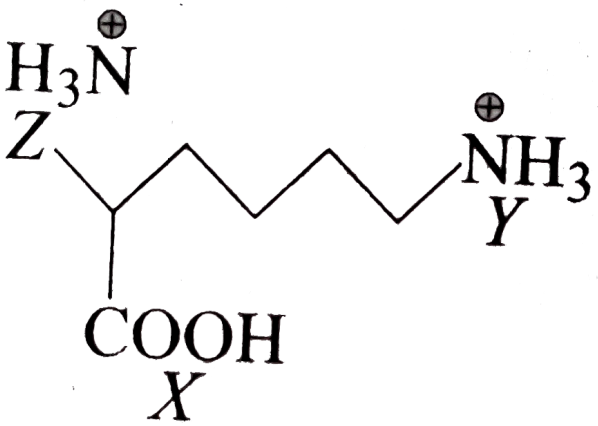
8. Arrange in the order of increasing acidic strengths.



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QUESTION BANK

1. Number of pyrimidine bases present in both in DNA and RNA are

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2. How many of given are essential athino acids?

Glycine, Alanine, Valine, Leucine, Proline, Methionine.

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3. How many of the following carbohydrates are not disaccharides?

Glucose, Fructose, Sucrose, and Starch.

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4. How many moles of HIO_4 corisumed per mole of glucose?

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5. How many of the following are not polyamide fibre?

(I) Nylon- 6,6

(II) Nylon-6

(III) Teffon

(IV) Terylene

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6. How many of the following is formed by condensation polymerisation?

(I) Nylon-6,6

(II) Terylene

(III) Bakelite

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7. How many of the given polymers are homopolymers?

Polyethylene, Dacron, Buna rubber, Nylon-6,6

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8. How many.of the given polymers are co-polymers?

Bakelite, Glyptal, Teflon, Terylene.

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