

EXERCISE - O

SINGLE CORRECT TYPE QUESTIONS

(a) Carbohydrates and their classification

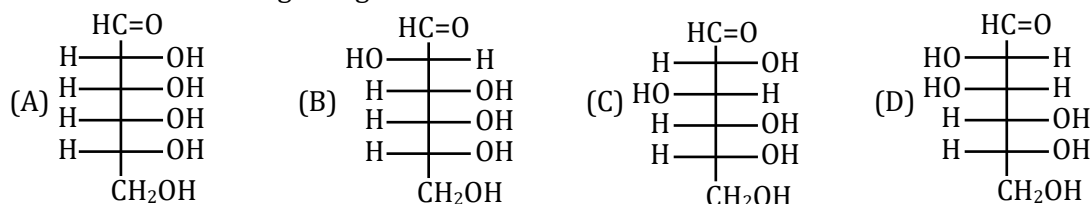
(b) Reactions of glucose, sucrose, maltose, lactose, starch, cellulose.

1. The letter 'D' in carbohydrates represent :

- (A) Its direct synthesis (B) Its dextrorotation
(C) Its mutarotation (D) Its relative configuration

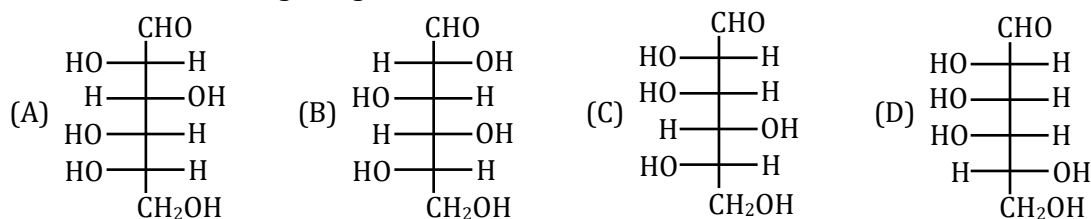
CB0144

2. Which of the following is D-glucose ?



CB0084

3. Which of the following is L-glucose ?

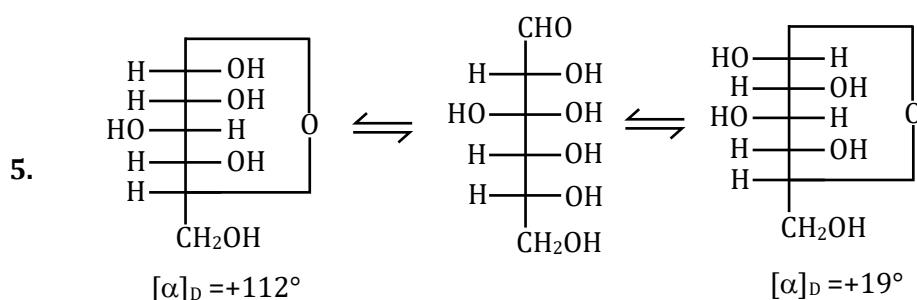


CB0085

4. α -D-(+) glucose and β -D-(+) glucose differ from each other due to the difference in one of the carbon atom, with respect to its :

- (A) Number of -OH groups (B) Configuration
(C) Conformation (D) Size of hemiacetal ring

CB0086



The above process in which α and β form remain in equilibrium with acyclic form and a change in optical rotation is observed which is called as -

- (A) Mutarotation (B) Epimerisation
(C) Condensation (D) Inversion

CB0090

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

- (A) D-(+)Glucose and D-(+)galactose (B) D-(+)Glucose and D-(-)fructose
(C) D-(+)Glucose and D-(+)mannose (D) D-(+)Glucose and D-(+)ribose

CB0093

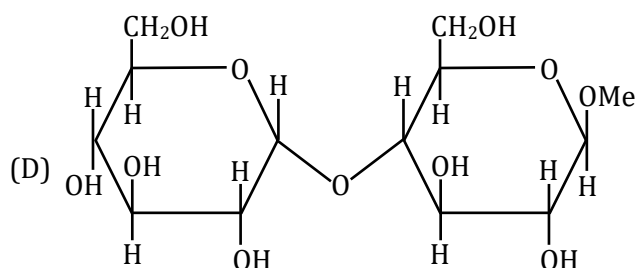
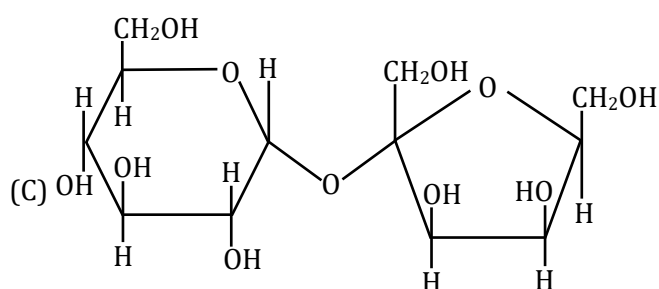
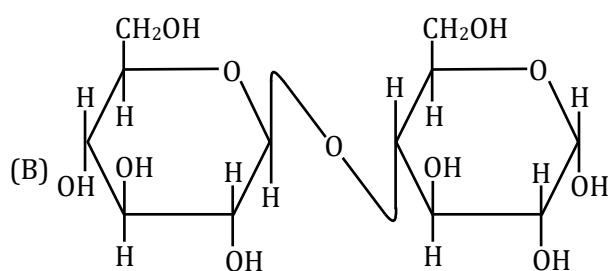
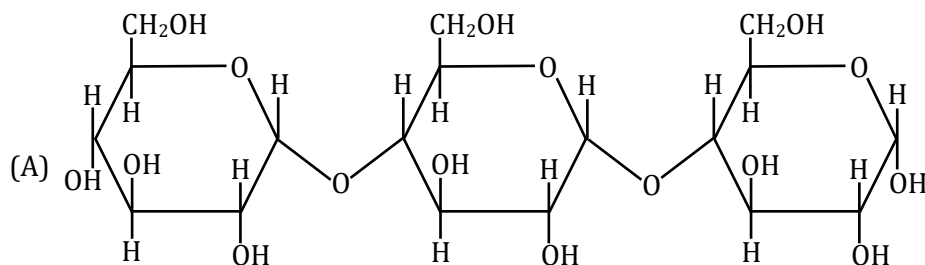
7. Glycosidic linkage is :

- (A) An acetal linkage
(C) An ester linkage

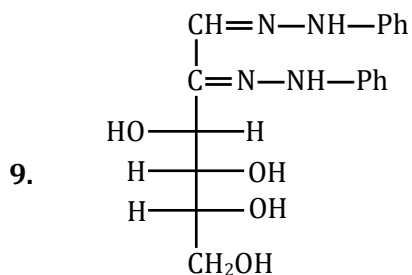
- (B) An ether linkage
(D) An amide linkage

CB0094

8. Which of the following is a reducing disaccharide ?



CB0096



The given osazone can be obtained by :

(A) D-glucose

(B) D-mannose

(C) D-Idose

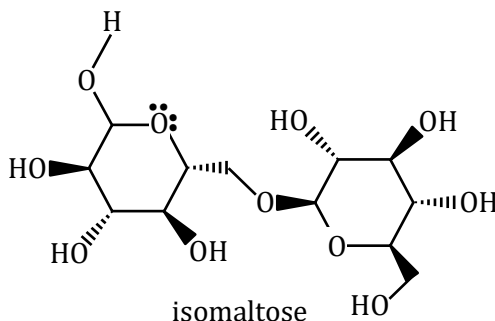
(D) Both (A) & (B)

CB0126

10. D-glucose $\xrightarrow[\Delta]{\text{HNO}_3}$ (A); Product (A) is :
 (A) D-Gluconic acid (B) D-Glucitol (C) D-Fructose (D) D-Glucaric acid

CB0127

11. Choose the answer that has correctly identified the number of acetals and hemiacetals in isomaltose.



	Acetal	Hemiacetal
(A)	0	0
(B)	1	0
(C)	0	1
(D)	1	1

CB0128

(a) Amino acids and their classification zwitter ion, isoelectric point and electrophoresis

(b) Nucleic acids, vitamins, enzymes

12. Which of the following amino acid has aromatic side chain?
 (A) Glycine (B) Lysine (C) Alanine (D) Phenylalanine

CB0102

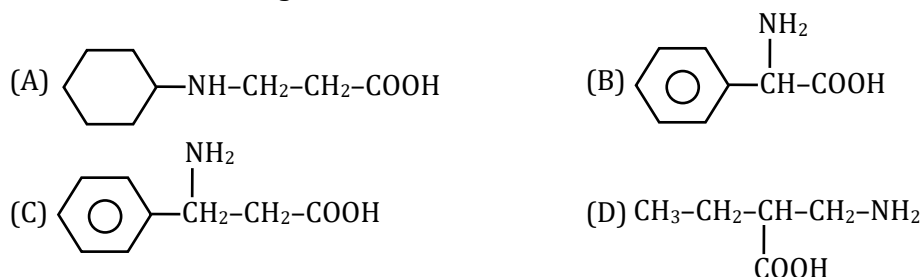
13. Which of the following is acidic amino acid?
 (A) Asparagine (B) Aspartic acid (C) Proline (D) Threonine

CB0103

14. Which of the following amino acid has -OH (alcoholic) group in side chain?
 (A) Glutamine (B) Serine (C) Lysine (D) Histidine

CB0104

15. Which of the following is α - amino acid?



CB0106

16. Which of following amino acid has lowest iso-electric point?
 (A) Glycine (B) Alanine (C) Aspartic acid (D) Lysine

CB0110

17. The force of attraction between the neighbouring peptide chains is :
 (A) Ionic bond (B) Covalent bond (C) Hydrogen bond (D) Peptide linkage

CB0112

18. Sakaguchi test is given by:
 (A) Lysine (B) Glycine (C) Leucine (D) Arginine CB0114

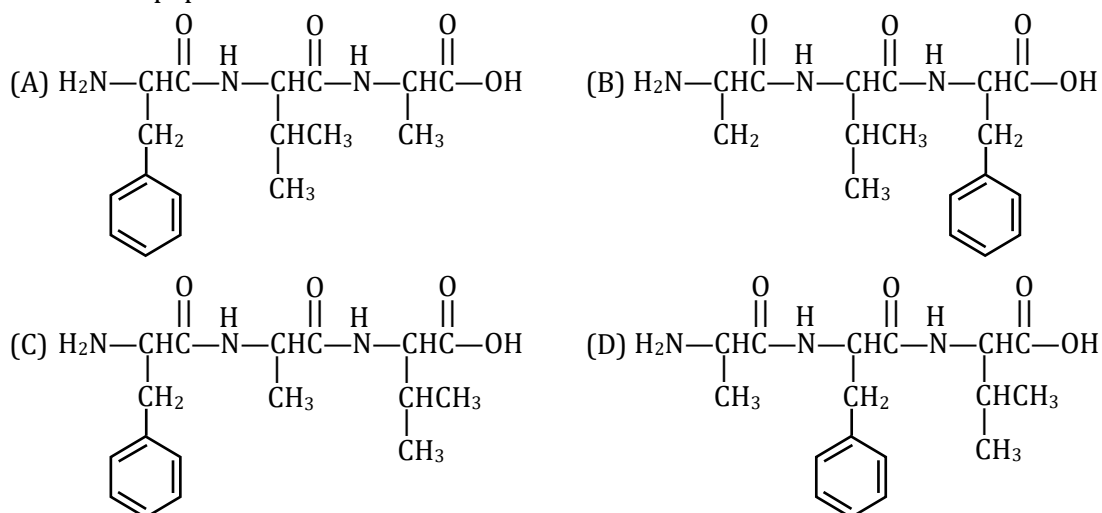
19. Which of the following is correct about H-bonding in nucleotide ?
 (A) A---A and T---T (B) G---T and A---C
 (C) A --- G and T ----C (D) A --- T and G ---- C CB0117

20. In DNA the linkages between different nitrogenous bases are :
 (A) Peptide linkage (B) phosphate linkage
 (C) H-bonding (D) glycosidic linkage CB0118

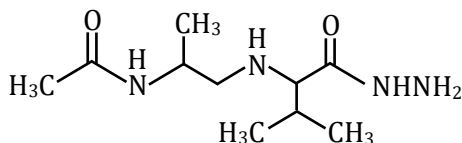
21. The sugar produced after complete hydrolysis of DNA is
 (A) a pentose sugar (B) a hexose sugar
 (C) a polysaccharide (D) a disaccharide CB0119

22. Fat soluble vitamin is :
 (A) Vitamin B₁ (B) Vitamin B₆ (C) Vitamin-C (D) Vitamin-E CB0125

23. Choose the peptide that matches the abbreviation Phe-Val-Ala.



24. The number of peptide bonds in the compound. CB0129



- (A) 1 (B) 2 (C) 3 (D) 4

CB0130

EXERCISE - S

(a) Carbohydrates and their classification

(b) Reactions of glucose, sucrose, maltose, lactose, starch, cellulose.

1. The optical rotational of the α -form of a pyranose is $+150.7^\circ$, that of the β -form is $+52.8^\circ$. In solution an equilibrium mixture of these anomers has an optical rotation of $+80.2^\circ$. The percentage of the α -form in equilibrium mixture is :

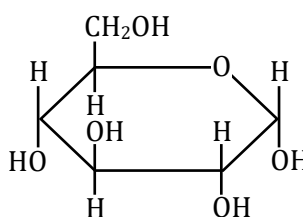
CB0131

2. For the complex conversion of D-glucose into the corresponding osazone, the minimum number of equivalents of phenyl hydrazine required is :

CB0132

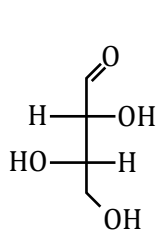
3. Stereoisomers of aldohexose is (a) and stereoisomers of ketohexose is (b).
Ratio of a/b is :

CB0133

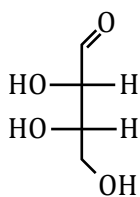
4.  $\xrightarrow[\text{H}_2\text{O}]{\text{Br}_2}$ Compound (A) ; Number of chiral centre in compound A is

CB0134

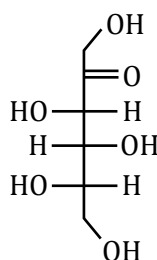
5. Identify the total number of carbohydrates which have D-configuration



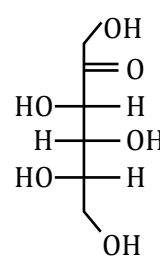
(a)



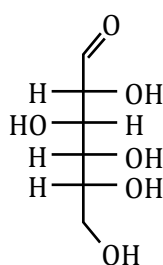
(b)



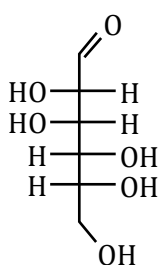
(c)



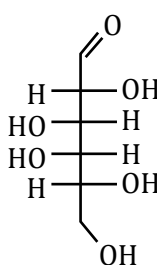
(d)



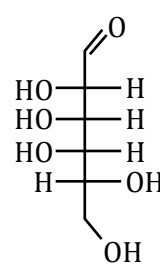
(e)



(f)



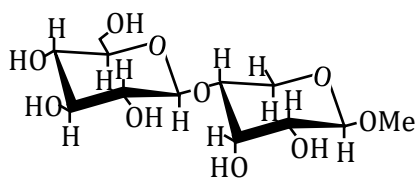
(g)



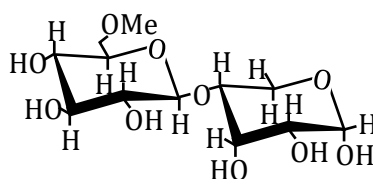
(h)

CB0135

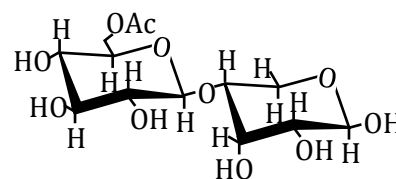
6. Identify the total number of carbohydrates which give mutarotation



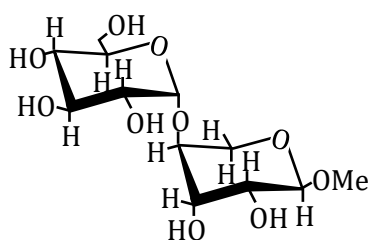
(i)



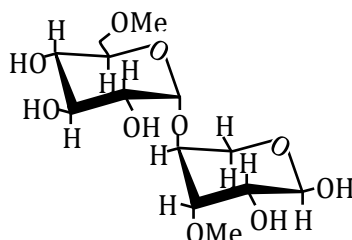
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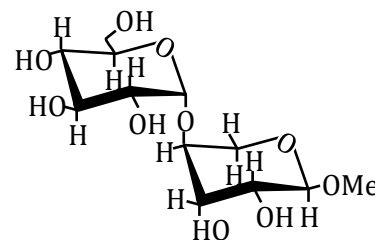
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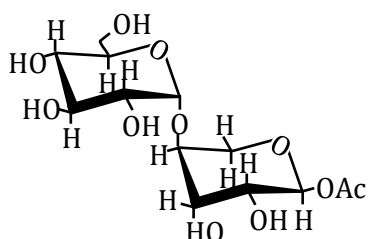
(iv)



(v)



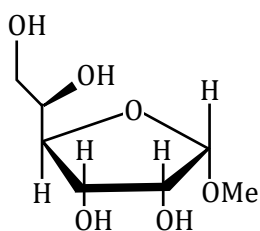
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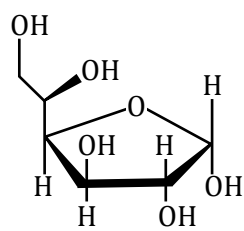
(vii)

CB0136

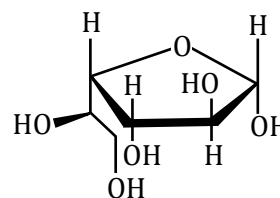
7. Identify the total number of carbohydrates which give mutarotation



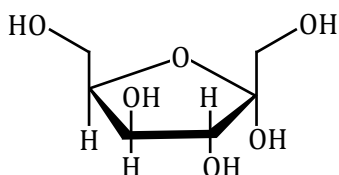
(i)



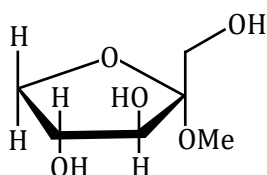
(ii)



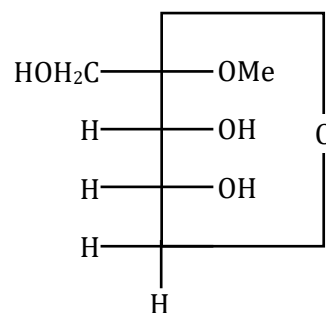
(iii)



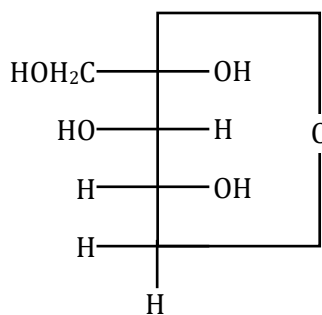
(iv)



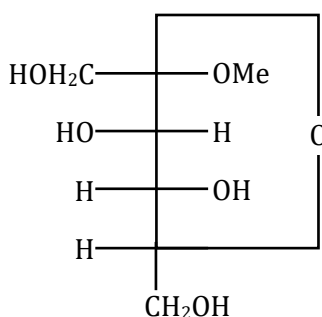
(v)



(vi)



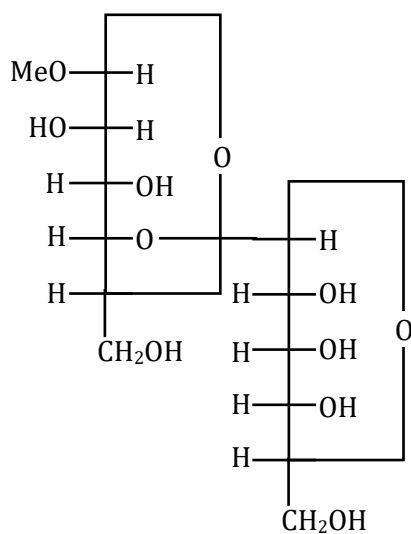
(vii)



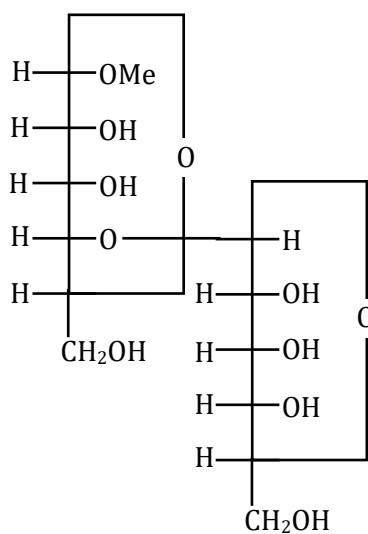
(viii)

CB0137

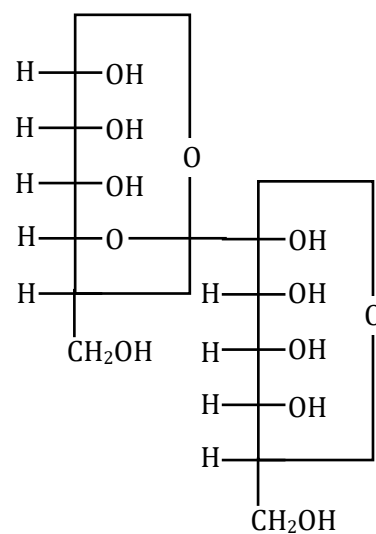
8. Identify total number of carbohydrates which give positive tollens' test



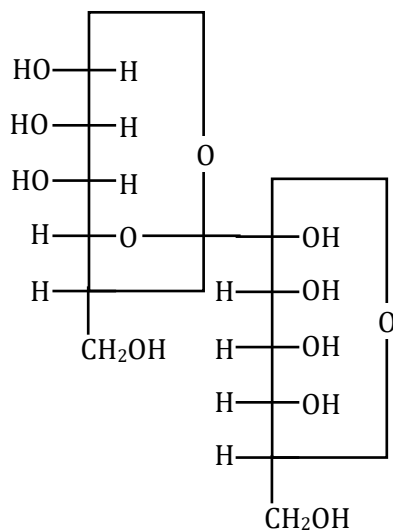
(i)



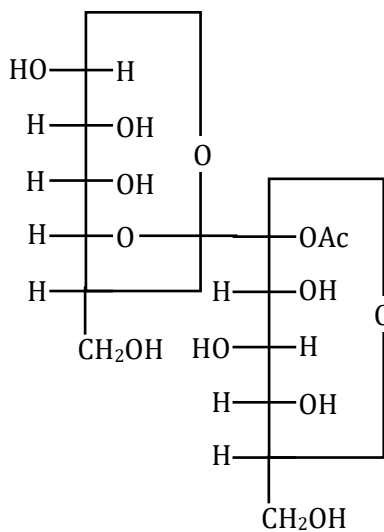
(ii)



(iii)



(iv)



(v)

CB0138

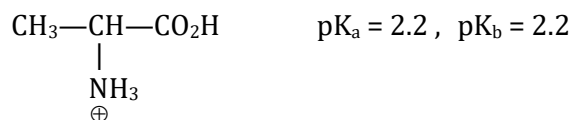
9. Glucose is treated with excess of HIO_4 . How many moles of HIO_4 will be consumed per mole of the

CB0139

(a) Amino acids and their classification zwitter ion, isoelectric point and electrophoresis

(b) Nucleic acids, vitamins, enzymes

10. Find iso-electric point of given amino acid



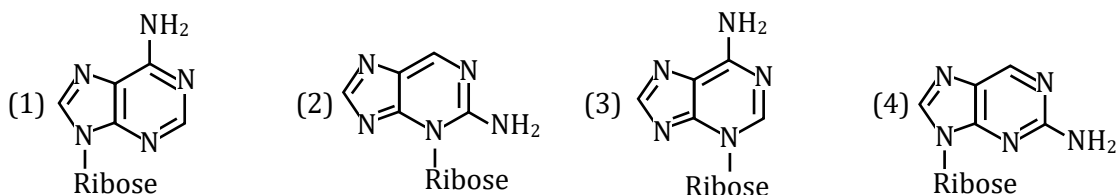
CB0140

11. Identify total number of water soluble vitamins : vitamin A, vitamin B, vitamin C, vitamin D, vitamin E and vitamin K.

CB0141

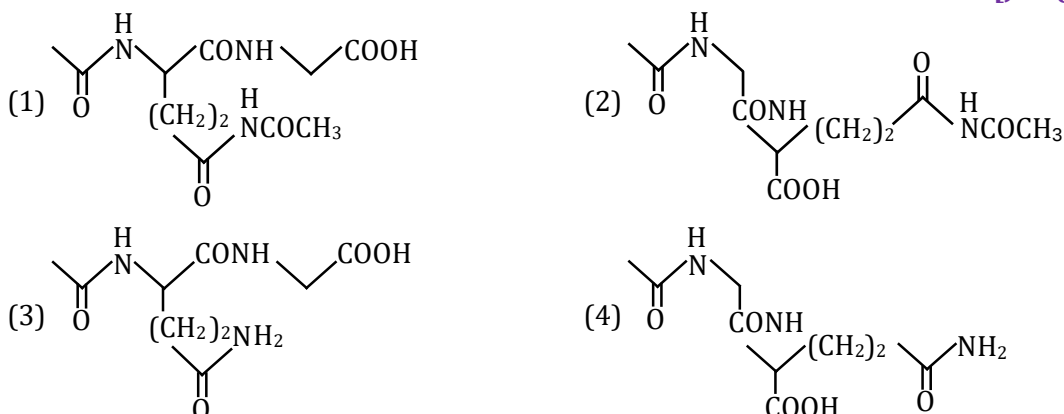
EXERCISE - JEE (Main) PYQ

1. Which of the following is the correct structure of Adenosine ? [JEE (Main) 2018]



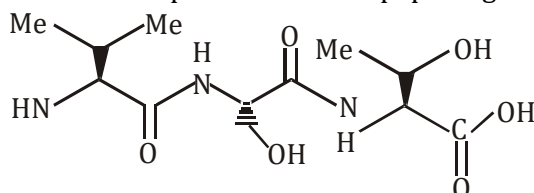
CB0081

2. The dipeptide, Gln-Gly, on treatment with CH_3COCl followed by aqueous work up gives : [JEE (Main) 2018]



CB0082

3. The correct sequence of amino acids present in the tripeptide given below is : [JEE (Main) 2019]



- (1) Leu - Ser - Thr (2) Thr - Ser - Leu (3) Thr - Ser - Val (4) Val - Ser - Thr

CB0031

4. Maltose on treatment with dilute HCl gives : [JEE (Main) 2019]

- (1) D-Galactose (2) D-Glucose
(3) D-Glucose and D-Fructose (4) D-Fructose

CB0032

5. Fructose and glucose can be distinguished by : [JEE (Main) 2019]

- (1) Fehling's test (2) Barfoed's test (3) Benedict's test (4) Seliwanoff's test

CB0033

6. The number of chiral centres present in threonine is _____. [JEE (Main) 2020]

CB0142

7. Which of the following statements is correct- [JEE (Main) 2020]

- (1) Gluconic acid can form cyclic (acetal/ hemiacetal) structure
(2) Gluconic acid is a partial oxidation product of glucose
(3) Gluconic acid is obtained by oxidation of glucose with HNO_3
(4) Gluconic acid is a dicarboxylic acid

CB0034

8. Which among the following pairs of Vitamins is stored in our body relatively for longer duration ?
[JEE (Main) 2021]
(1) Thiamine and Vitamin A (2) Vitamin A and Vitamin D
(3) Thiamine and Ascorbic acid (4) Ascorbic acid and Vitamin D
CB0035
9. The secondary structure of protein is stabilised by:
[JEE (Main) 2021]
(1) Peptide bond (2) glycosidic bond (3) Hydrogen bonding (4) van der Waals forces
CB0036
10. Identify the incorrect statement from the following
[JEE (Main) 2021]
(1) Amylose is a branched chain polymer of glucose
(2) Starch is a polymer of α -D glucose
(3) β -Glycosidic linkage makes cellulose polymer
(4) Glycogen is called as animal starch
CB0038
11. Which one of the following statements is not true about enzymes ?
[JEE (Main) 2021]
(1) Enzymes are non-specific for a reaction and substrate.
(2) Almost all enzymes are proteins.
(3) Enzymes work as catalysts by lowering the activation energy of a biochemical reaction.
(4) The action of enzymes is temperature and pH specific
CB0039
12. The total number of negative charge in the tetrapeptide, Gly-Glu-Asp-Tyr, at pH 12.5 will be _____. (Integer answer)
[JEE (Main) 2021]
CB0040
13. Given below are two statements : one is labelled as **Assertion (A)** and other is labelled as **Reason (R)**.
Assertion (A) : Sucrose is a disaccharide and a non-reducing sugar.
Reason (R) : Sucrose involves glycosidic linkage between C₁ of β -glucose and C₂ of α -fructose.
Choose the **most appropriate** answer from the options given below :
[JEE (Main) 2021]
(1) Both **(A)** and **(R)** are true but **(R)** is not the true explanation of **(A)**
(2) **(A)** is false but **(R)** is true.
(3) **(A)** is true but **(R)** is false
(4) Both **(A)** and **(R)** are true and **(R)** is the true explanation of **(A)**
CB0041
14. A polysaccharide 'X' on boiling with dil H₂SO₄ at 393 K under 2-3 atm pressure yields 'Y'.
'Y' on treatment with bromine water gives gluconic acid. 'X' contains β -glycosidic linkages only.
Compound 'X' is :
[JEE (Main) 2022]
(1) starch (2) cellulose (3) amylose (4) amylopectin
CB0042
15. In alanylglycylleucylalanylvaline, the number of peptide linkages is _____.
[JEE (Main) 2022]
CB0043

16. During the denaturation of proteins, which of these structures will remain intact ?

[JEE (Main) 2022]

(1) Primary (2) Secondary (3) Tertiary (4) Quaternary

CB0044

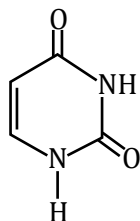
17. Glycosidic linkage between C₁ of α-glucose and C₂ of β-fructose is found in

[JEE (Main) 2022]

(1) maltose (2) sucrose (3) lactose (4) amylose

CB0045

18. Uracil is base present in RNA with the following structure. % of N in uracil is . [JEE (Main) 2023]



Given :

Molar mass N = 14 g mol⁻¹; O = 16 g mol⁻¹; C = 12 g mol⁻¹; H = 1 g mol⁻¹;

CB0046

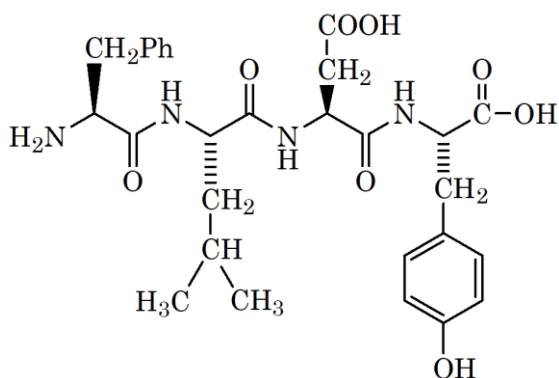
19. Total number of tripeptides possible by mixing of valine and proline is ____.

[JEE (Main) 2023]

CB0047

20. Following tetrapeptide can be represented as

[JEE (Main) 2023]



(F, L, D, Y, I, Q, P are one letter codes for amino acids)

(1) FIQY (2) FLDY (3) YQLF (4) PLDY

CB0049

EXERCISE - JEE (Advanced) PYQ

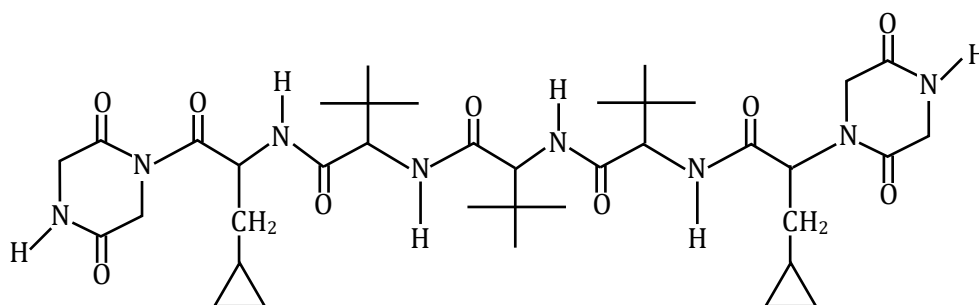
1. A tetrapeptide has -COOH group on alanine. This produces glycine (Gly), valine (Val), phenyl alanine (Phe) and alanine (Ala), on complete hydrolysis. For this tetrapeptide, the number of possible sequences (primary structures) with -NH_2 group attached to a chiral center is :

[JEE (Advanced) 2013]

CB0069

2. The total number of distinct naturally occurring amino acids obtained by complete acidic hydrolysis of the peptide shown below is

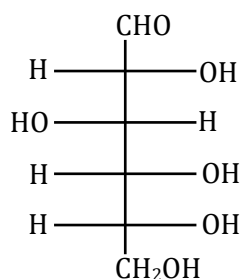
[JEE (Advanced) 2014]



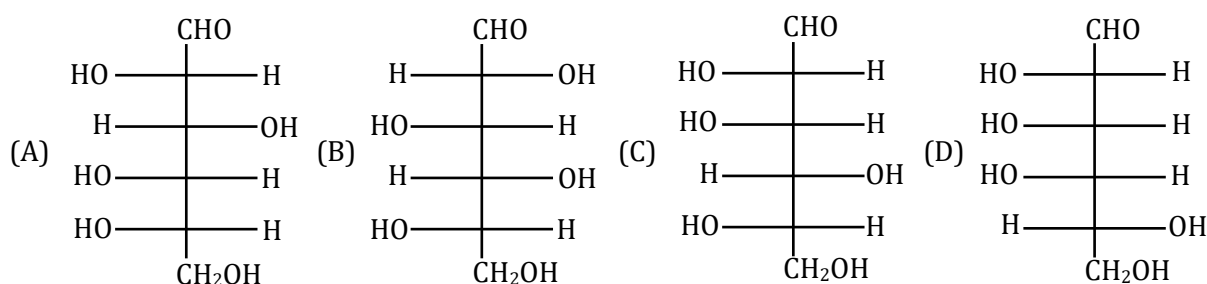
CB0070

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

[JEE (Advanced) 2015]



The structure of L-(-)-glucose is



CB0071

4. For 'invert sugar', the correct statement(s) is (are) :
- (Given : specific rotations of (+)-sucrose, (+)-maltose, L-(-)-glucose and L-(+)-fructose in aqueous solution are $+66^\circ$, $+140^\circ$, -52° and $+92^\circ$, respectively)
- (A) 'Invert sugar' is prepared by acid catalyzed hydrolysis of maltose
- (B) 'Invert sugar' is an equimolar mixture of D-(+) glucose and D-(-)-fructose
- (C) Specific rotation of 'invert sugar' is -20°
- (D) On reaction with Br_2 water, 'invert sugar' forms saccharic acid as one of the products

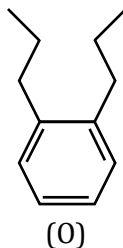
[JEE (Advanced) 2016]

CB0072

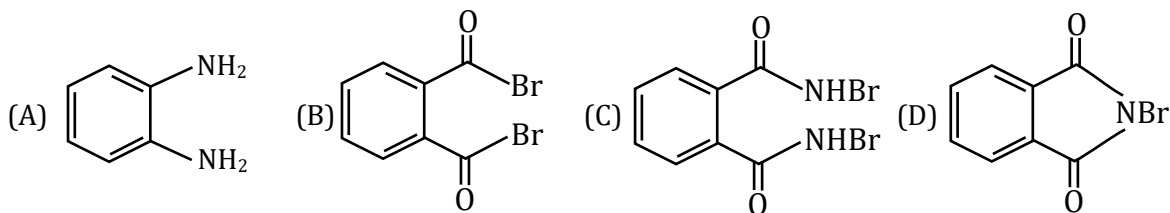
Comprehension : Q.No. 5 to 6

Treatment of compound **O** with $\text{KMnO}_4 / \text{H}^+$ gave **P**, which on heating with ammonia gave **Q**. The compound **Q** on treatment with $\text{Br}_2 / \text{NaOH}$ produced **R**. On strong heating, **Q** gave **S**, which on further treatment with ethyl 2-bromopropionate in the presence of KOH following by acidification, gave a compound **T**.

[JEE (Advanced) 2016]



5. The compound **R** is :



CB0073

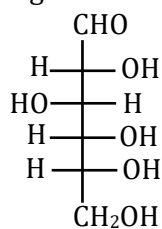
6. The compound **T** is :

- (A) Glycine (B) Alanine (C) Valine (D) Serine

CB0074

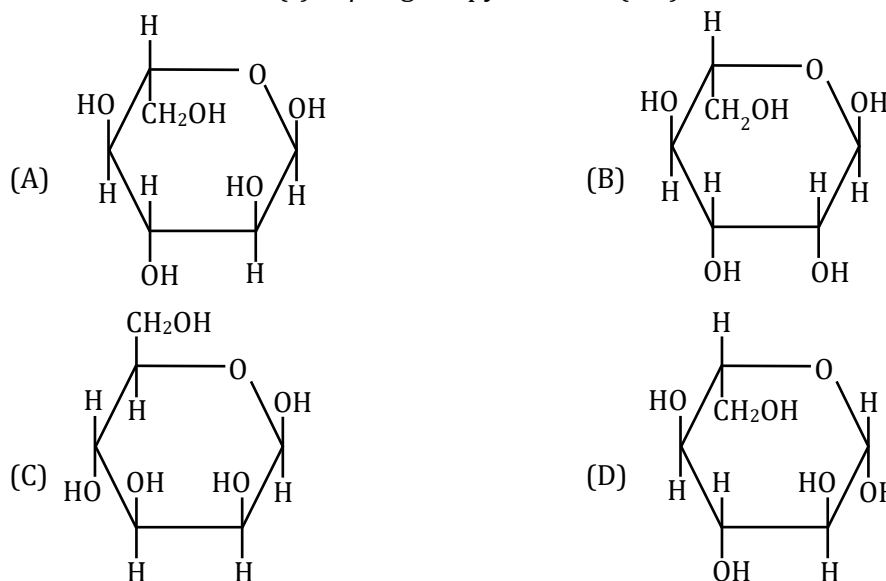
7. The Fischer presentation of D-glucose is given below.

[JEE (Advanced) 2018]



D-glucose

The correct structure(s) of β -L-glucopyranose is (are) :-

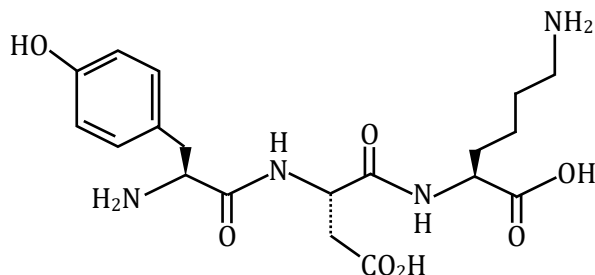


CB0075

8. Which of the following statement(s) is(are) true ? [JEE (Advanced) 2019]
- (A) Oxidation of glucose with bromine water gives glutamic acid
 (B) The two six-membered cyclic hemiacetal forms of D-(+)-glucose are called anomers
 (C) Hydrolysis of sucrose gives dextrorotatory glucose and laevorotatory fructose
 (D) Monosaccharides **cannot** be hydrolysed to give polyhydroxy aldehydes and ketones

CB0076

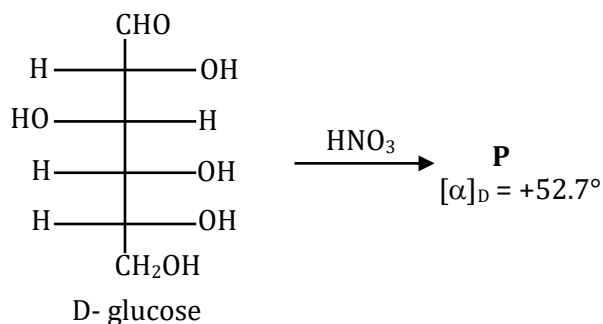
9. The structure of a peptide is given below [JEE (Advanced) 2020]



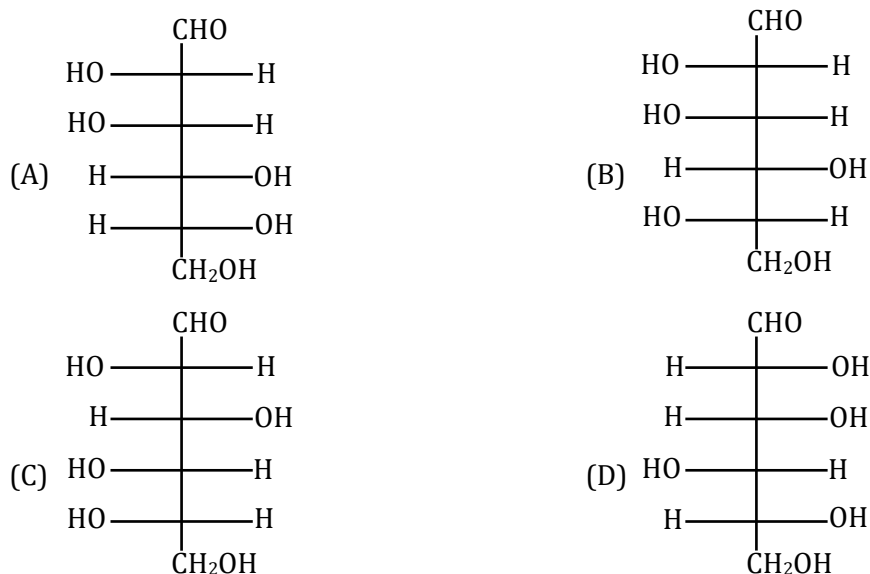
If the absolute values of the net charge of the peptide at pH = 2, pH = 6, and pH = 11 are $|Z_1|$, $|Z_2|$ and $|Z_3|$, respectively, then what is $|Z_1| + |Z_2| + |Z_3|$?

CB0077

10. Given : [JEE (Advanced) 2021]



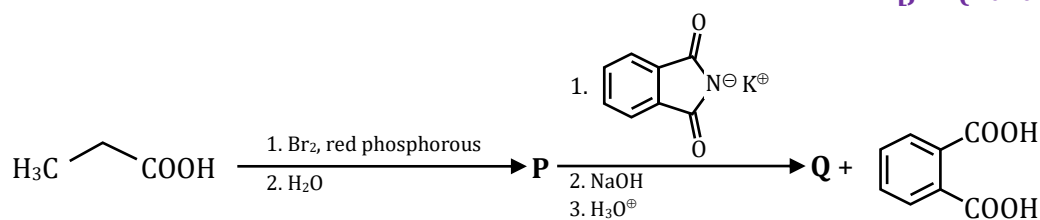
The compound(s), which on reaction with HNO_3 will give the product having degree of rotation $[\alpha]_D = -52.7^\circ$ is (are)



CB0078

11. Considering the reaction sequence given below, the correct statement(s) is(are)

[JEE (Advanced) 2022]

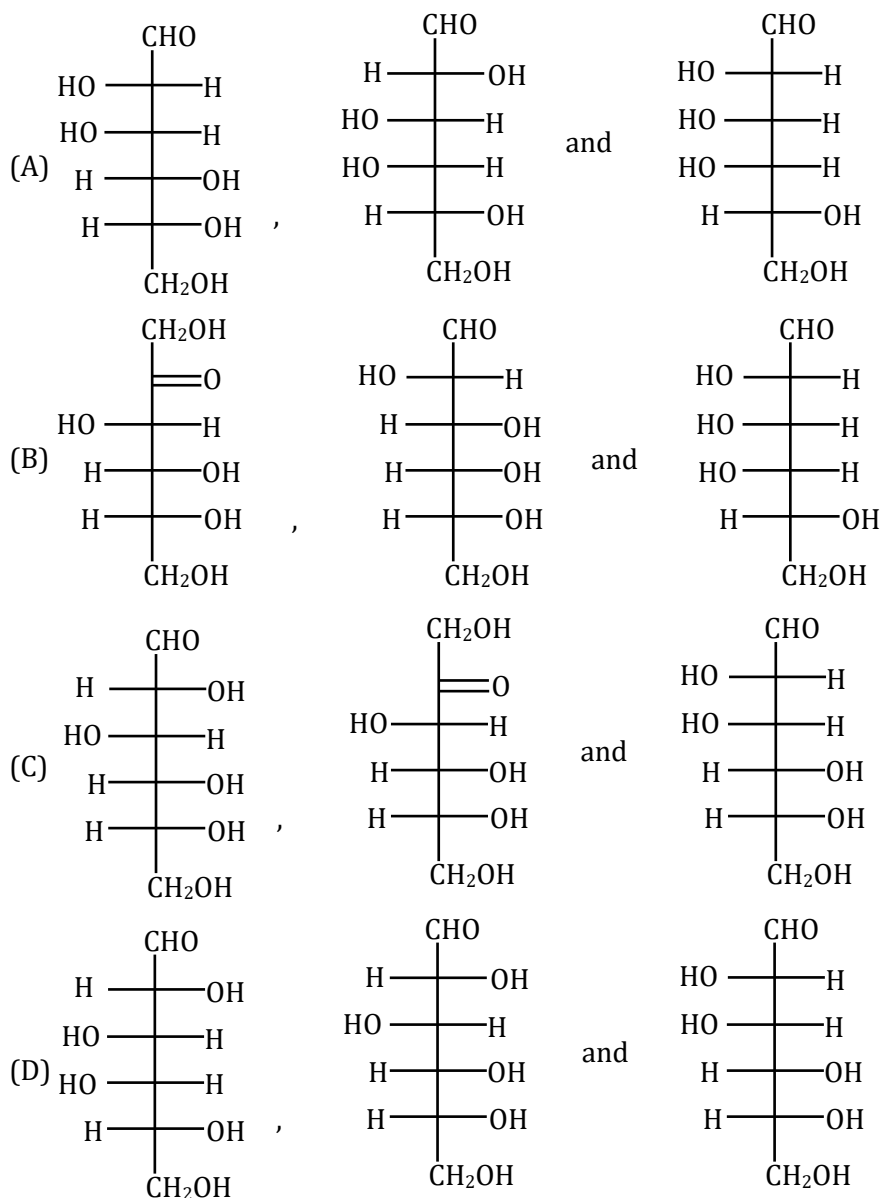


- (A) **P** can be reduced to a primary alcohol using NaBH_4 .
 (B) Treating **P** with conc. NH_4OH solution followed by acidification gives **Q**.
 (C) Treating **Q** with a solution of NaNO_2 in aq. HCl liberates N_2 .
 (D) **P** is more acidic than $\text{CH}_3\text{CH}_2\text{COOH}$.

CB0079

12. Treatment of D- glucose with aqueous NaOH results in a mixture of monosaccharides, which are

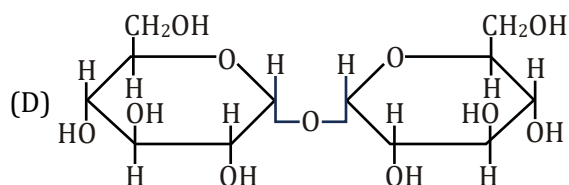
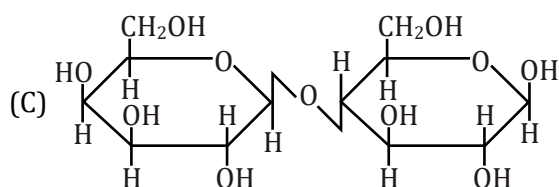
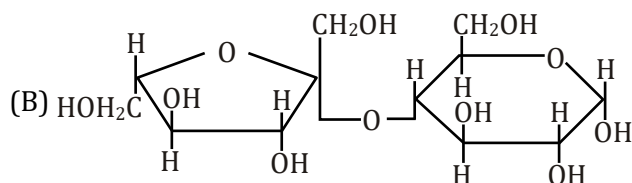
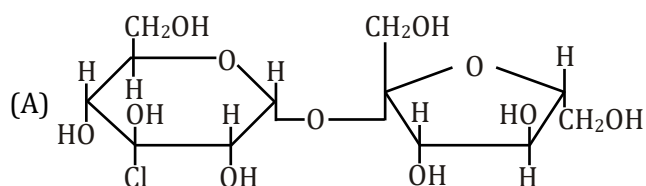
[JEE (Advanced) 2022]



CB0080

13. A disaccharide **X** cannot be oxidised by bromine water. The acid hydrolysis of **X** leads to a laevorotatory solution. The disaccharide **X** is

[JEE (Advanced) 2023]

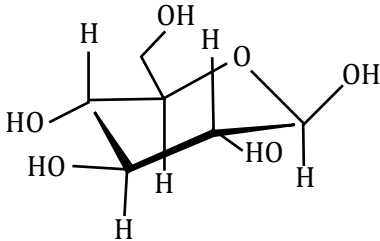


CB0143

JEE (Main) Practice Paper

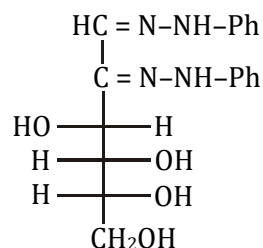
This paper is for yourself practice and assessment the discussion of this paper is optional though you can see PDF solutions or video solutions or solutions in hardcopy whichever is provided.

SECTION-A

- This section contains **TWENTY** questions.
 - Each question has **FOUR** options (1), (2), (3) and (4). **ONLY ONE** of these four options is correct.
 - For each question, darken the bubble corresponding to the correct option in the ORS.
 - For each question, marks will be awarded in one of the following categories :
Full Marks : +4, if only the bubble corresponding to the correct option is darkened.
Zero Marks : 0, if none of the bubbles is darkened.
Negative Marks : -1 in all other cases
-
1. Glucose on reduction with Na/Hg and water gives ?
 (1) Sorbitol (2) Fructose (3) Saccharic acid (4) Gluconic acid
CB0001
 2. Glucose or fructose is converted into C₂H₅OH in the presence of ?
 (1) Diastase (2) Maltase (3) Invertase (4) Zymase
CB0002
 3. Starch is changed into disaccharide in presence of ?
 (1) Diastase (2) Maltase (3) Lactase (4) Zymase
CB0003
 4. The following carbohydrate is :

 (1) A ketohexose (2) An aldohexose (3) An α-furanose (4) An α-pyranose
CB0004
 5. Iso-electric point of alanine is (pH = 6). At which pH, maximum concentration of zwitter ion of alanine will be present ?
 (1) pH > 6 (2) pH < 6 (3) pH = 6 (4) pH = 7
CB0005
 6. $\text{H}-\text{C}\equiv\text{C}-\text{H} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HgSO}_4} (\text{A}) \xrightarrow[(2) \text{H}_3\text{O}^+]{(1) \text{NH}_3 + \text{HCN}} (\text{B})$; Product (B) of given reaction is:
 (1) Glycine (2) Alanine (3) Valine (4) Leucine
CB0006
 7. Which amino acid does not contain chiral centre ?
 (1) Valine (2) Leucine (3) Glycine (4) Iso-leucine
CB0007
 8. Which of the following is Sanger reagent ?
 (1) 2,4-Di-nitro fluorebenzene (2) Phenyl isocyanane
 (3) 2,4-Di-nitro chlororbenzene (4) 12,4-Di-nitro-iodobenzene
CB0008

9. A D-carbohydrate is :
 (1) Always dextrorotatory
 (2) Always laevorotatory
 (3) Always the mirror of the corresponding L-carbohydrate
 (4) None of these

CB0009

10.  The given osazone can be obtained by :

- (1) D-glucose (2) D-mannose (3) D-Idose (4) Both (A) & (B)

CB0010

11. The monomer of nucleic acids are held together by
 (1) Phosphodiester linkage (2) Amide linkage
 (3) Glycosidic linkage (4) Ester linkage

CB0011

12. A segment (X) of cellulose obtained on partial hydrolysis has molecular mass 1476 gm. On complete acidic hydrolysis, mass of the product obtained is 1620 gm. Find out the number of glycosidic linkage(s) present in segment (X) :
 (1) 8 (2) 6 (3) 4 (4) 10

CB0012

13. Mutarotation involve-
 (1) Racemisation (2) Diastereomerisation
 (3) Optical resolution (4) Conformational inversion

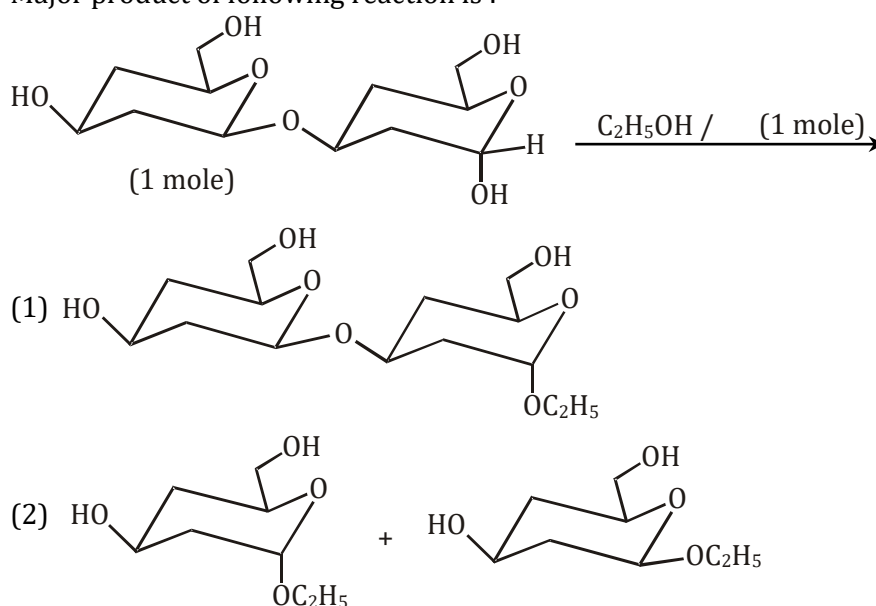
CB0013

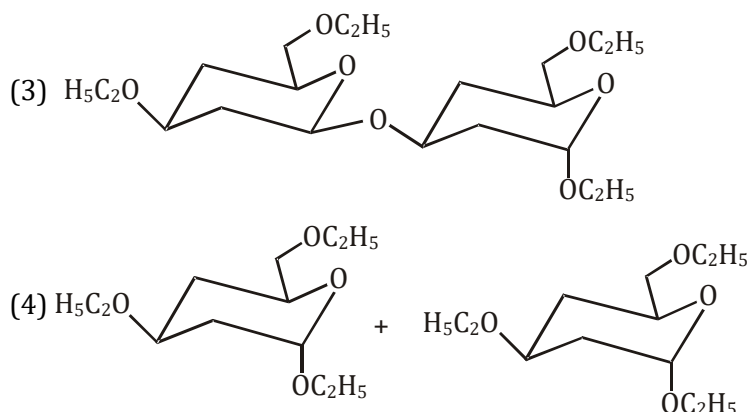
14. Glucose $\xrightarrow{\text{Br}_2/\text{H}_2\text{O}}$ A
 $\xrightarrow{\text{HNO}_3}$ B; What are A and B

- (1) Saccharic acid, Gluconic acid (2) Both are Gluconic acid
 (3) Gluconic acid, Saccharic acid (4) Lactic acid, Saccharic acid

CB0014

15. Major product of following reaction is :





CB0015

16. A hexapeptide with the composition Arg, Gly, leu, Pro has proline at both C-terminal and N-terminal position. The partial hydrolysis of the hexapeptide gives Gly-Pro-Arg, Arg-Pro, Pro-Leu-Gly.

- (1) Pro-Gly-Leu-Pro-Arg-Pro (2) Pro-Leu-Gly-Pro-Arg-Pro
(3) Pro-Leu-Gly-Arg-Pro-Pro (4) Pro-Arg-Pro-Leu-Gly-Pro

CB0016

17. Which of the following statements about β -pleated sheet secondary structure of proteins is correct?
(1) Parallel β -pleated sheet structure is more stable than the antiparallel sheet structure.
(2) Antiparallel β -pleated sheet structure is slightly stable than the parallel sheet structure.
(3) Both parallel and antiparallel sheet structures have equal stability.
(4) There is no clear relationship between the two in terms of stability.

CB0017

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

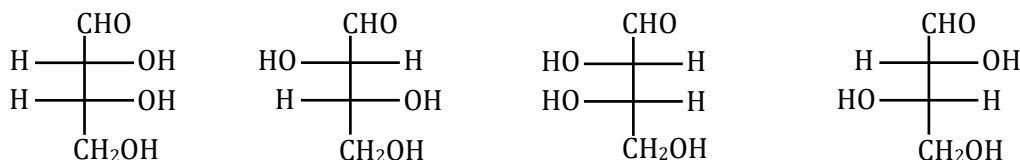
- (1) TTTT (2) TFTF (3) TTFT (4) FTTT

CB0018

19. In a protein molecule various amino acids are linked together by :
(1) Dative bond (2) α -Glycosidic bond (3) β -Glycosidic bond (4) Peptide bond

CB0019

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



respectively, is

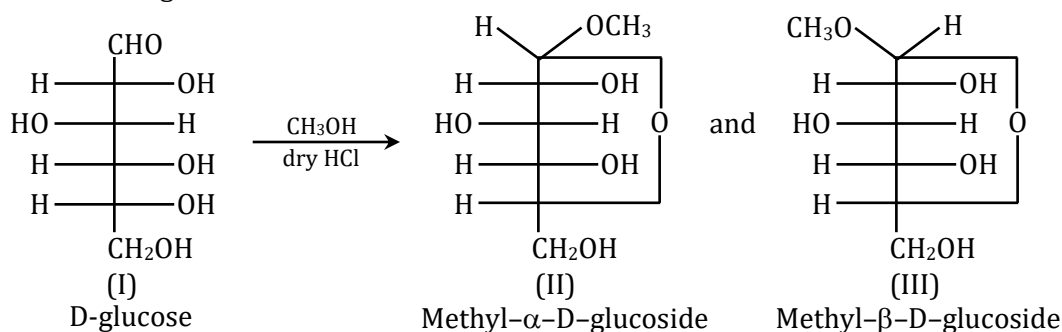
- (1) D-erythrose, D-threose, L-erythrose, L-threose
(2) L-erythrose, L-threose, L-erythrose, D-threose
(3) D-threose, D-erythrose, L-threose, L-erythrose
(4) L-erythrose, L-threose, D-erythrose, D-threose

CB0020

SECTION-B

- This section will have **TEN questions**. Candidate can choose to attempt any 5 questions out of these 10 questions. In case if candidate attempts more than 5 questions, first 5 attempted questions will be considered for marking.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value (Answer should be rounded off to the nearest integer).
- Answer to each question will be evaluated according to the following marking scheme:
 Full Marks : +4, if only correct answer is given.
 Zero Marks : 0, if no answer is given.
 Negative Marks :-1 for incorrect answer

- How many optically active molecules are possible with structural formula $\text{CH}_2\text{OHCHOHCHOHCHOHCHOHCHO}$
 CB0021
- Titration of the amino acid lysine has three pK_a values viz., pK_{a1} (2.18), pK_{a2} (8.95) and pK_{a3} (10.53). The pH at which this amino acid will show no net migration in an electric field is
 CB0022
- How many statements are correct?
 D-glucose, on treating with methanol in presence of dry HCl gives methyl glucosides according to the following reaction.



- The glucosides do not reduce Fehling's solution
 - The glucosides do not react with hydrogen cyanide or hydroxylamine
 - Behaviour of glucosides as stated in S_1 and S_2 indicates the absence of free $-\text{CHO}$ group.
 - The two forms of glucosides are enantiomers.
- How many statements are correct?

CB0023

- Calculate of pI of glutamic acid
 $\text{HOOCCH}_2\text{CH}_2\text{CH}(\text{NH}_3^+)\text{COOH} \leftarrow \text{pK}_a=2.19$
 $\uparrow$
 $\text{pK}_a=4.25$
 (report answer $\text{pI} \times 10$ upto two digit)

CB0024

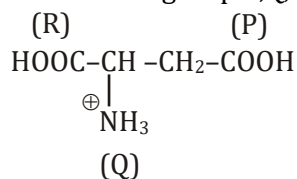
- Number of chiral carbon present in threonine is.

CB0025

- Number of nitrogen atoms present in histidine molecule are :

CB0026

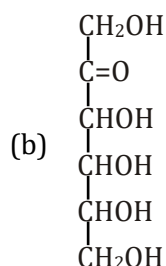
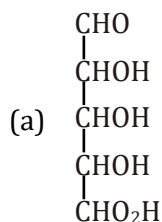
7. The pKa values for the three acidic group P,Q,R are 4.3, 9.7 and 2.2 respectively



Calculate the isoelectric point of the amino acid ?

CB0027

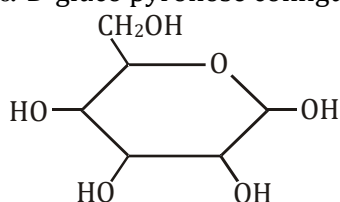
8. For given compound



- (i) Number of possible isomers
(ii) Number of possible D-configuration isomers
(iii) Number of possible L-configuration isomers

CB0028

9. Number of possible isomers of α -D-glucopyranose configuration.



CB0029

10. Calculate isoelectric point of following amino acid.

		pKa ₁ (α -COOH)	pKa ₂ (α -COOH)	pKa (side chain)
(a)	Glycine $\text{NH}_3^+-\text{CH}_2-\text{COOH}$	2.3	9.6	—
(b)	Serine $\begin{array}{c} \text{CH}_2-\text{CH}-\text{COOH} \\ \quad \\ \text{OH} \quad \text{NH}_3^+ \end{array}$	2.2	9.2	—
(c)	Alanine $\begin{array}{c} \text{NH}_3^+ \\ \\ \text{CH}_3-\text{CH}-\text{COOH} \end{array}$	2.3	9.7	—
(d)	Aspartic acid $\begin{array}{c} \text{HOOC}-\text{CH}_2-\text{CH}-\text{COOH} \\ \\ \text{NH}_3^+ \end{array}$	2.1	9.8	3.9
(e)	Lysine $\begin{array}{c} \text{NH}_3^+-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}-\text{COOH} \\ \\ \text{NH}_3^+ \end{array}$	2.2	9.0	10.5

Find the sum of isoelectric point of a + b + c + d + e

CB0030

JEE (Advanced) Practice Paper

This paper is for yourself practice and assessment the discussion of this paper is optional though you can see PDF solutions or video solutions or solutions in hardcopy whichever is provided.

SECTION-I

- This section contains **FIVE** questions.
- Each question has FOUR options (A), (B), (C) and (D). ONLY ONE of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories:
 Full Marks : +3, if only the bubble corresponding to the correct option is darkened.
 Zero Marks : 0, if none of the bubbles is darkened.
 Negative Marks : -1, in all other cases

1. Consider following reagent :

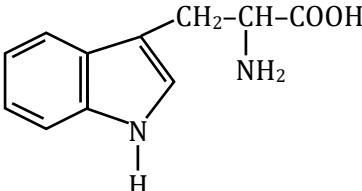
I. Br₂ water II. Tollen's reagent III. Fehling's solution

which can be used to make distinction between an aldose and a ketose ?

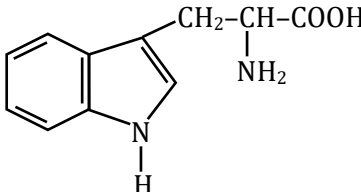
(A) I, II and III (B) II and III (C) I only (D) II only

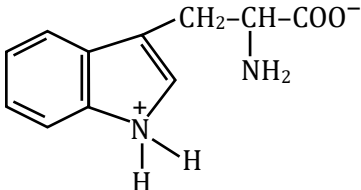
CB0050

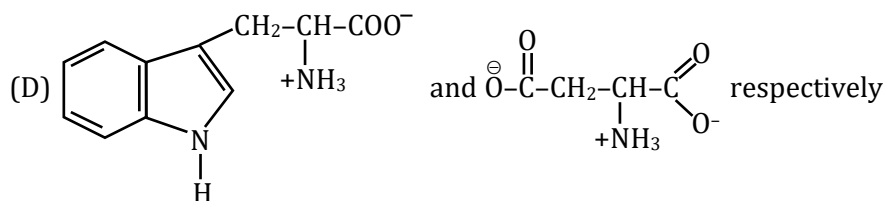
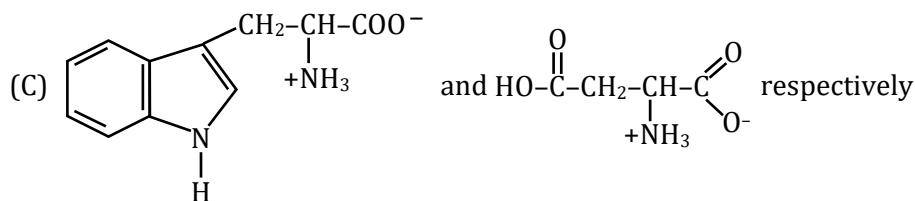
2. Alanine $\text{CH}_3-\text{CH}(\text{NH}_2)-\text{C}(=\text{O})\text{OH}$ in aqueous solution is found as $\text{CH}_3-\text{CH}(\text{NH}_3^+)-\text{C}(=\text{O})\text{O}^-$, then Tryptophan

 and Aspartic acid $\text{HO}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{C}(=\text{O})\text{OH}$ is found in neutral aqueous

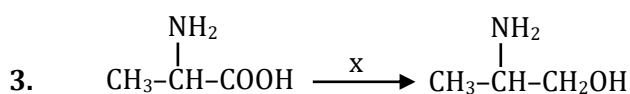
solution as

(A)  and $\text{HO}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{C}(=\text{O})\text{OH}$ respectively

(B)  and $\text{HO}-\text{C}(=\text{O})-\text{CH}_2-\text{CH}(\text{NH}_2)-\text{C}(=\text{O})\text{O}^-$ respectively



CB0051



The reagent (X) can be :

(A) H_2 / Pd/BaSO₄/quinoline

(B) NaBH₄

(C) LiAlH₄

(D) CH₃MgI

CB0052

4. If on a strand of DNA the base sequence is ATTGACGCAT then the sequence transcription on RNA would be -

(A) UAACUGCGUA

(B) AUUCUGCGUA

(C) UAACTGCGUA

(D) TAACTGCGTA

CB0053

5. Select the correct statement among following

(A) Number of chiral atom in α-D-glucose is less than D-glucose

(B) D-glucose and D-fructose give same product with HIO₄

(C) D-glucose and D-fructose give same product with H₂NOH

(D) D-glucose and D-fructose form same product with H₂N-NH-Ph

CB0054

SECTION-II

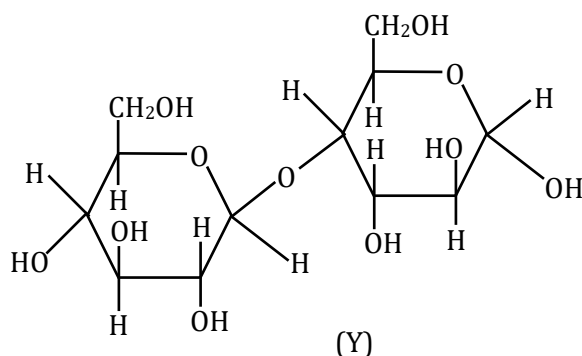
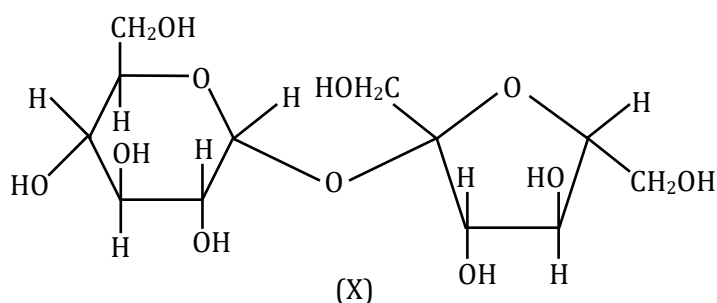
- This section contains **ELEVEN** questions.
- Each question has **FOUR** options for correct answer(s). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct option(s).
- For each question, choose the correct option(s) to answer the question.
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks	: +4 If only (all) the correct option(s) is (are) chosen.
Partial Marks	: +3 If all the four options are correct but ONLY three options are chosen.
Partial Marks	: +2 If three or more options are correct but ONLY two options are chosen, both of which are correct options.
Partial Marks	: +1 If two or more options are correct but ONLY one option is chosen and it is a correct option.
Zero Marks	: 0 If none of the options is chosen (i.e. the question is unanswered).
Negative Marks	: -2 In all other cases.

6. The correct statement (s) about starch :
- (A) It is a pure single compound.
 (B) It is mixture of two polysaccharides of glucose.
 (C) It involves the (C₁ – C₄) α - glycosidic linkage between two α - D glucose units.
 (D) It involves branching by (C₁ – C₆) glycosidic linkage.

CB0055

7. The correct statement(s) about the following sugars **X** and **Y** is(are) :



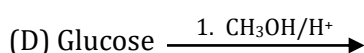
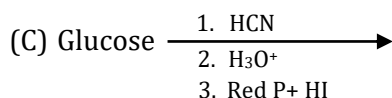
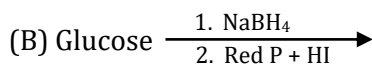
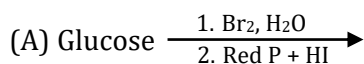
- (A) **X** is a reducing sugar and **Y** is a non-reducing sugar.
 (B) **X** is a non-reducing sugar and **Y** is a reducing sugar.
 (C) The glucosidic linkages in **X** and **Y** are α and β , respectively.
 (D) The glucosidic linkages in **X** and **Y** are β and α , respectively.

CB0056

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

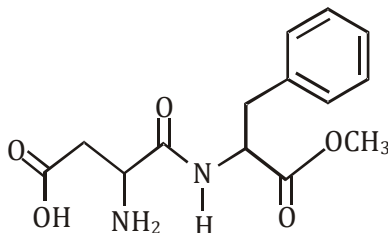
CB0057

9. The final product of which of the following reactions furnishes evidence that glucose has unbranched carbon chain :



CB0058

10. Carbohydrates may be :
 (A) Sugars
 (B) Starch
 (C) Polyhydroxy aldehyde/ ketones
 (D) Compounds that can be hydrolysed to sugar
 CB0059
11. Select the correct statement :
 (A) Glycosides do not undergo mutarotation
 (B) All OH groups of a cyclic monosaccharides are converted to ethers by treatment with base and an alkyl halide
 (C) α -D glucose reacts with Ag_2O and excess CH_3I to form tetramethyl ether
 (D) D-glucose upon treatment with warm HNO_3 forms D-glucaric acid
 CB0060
12. "Aspartame" is roughly 100 times as sweet as cane sugar. On complete hydrolysis of aspartame, products obtained is/are :



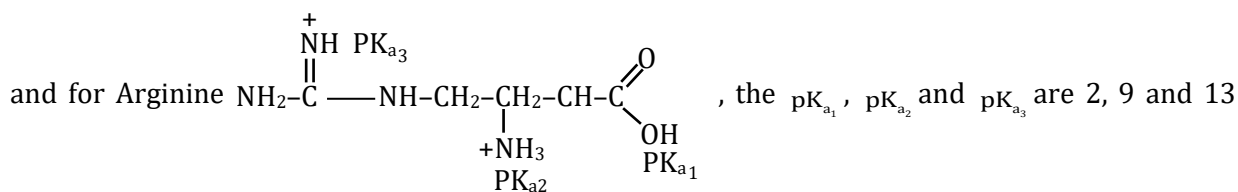
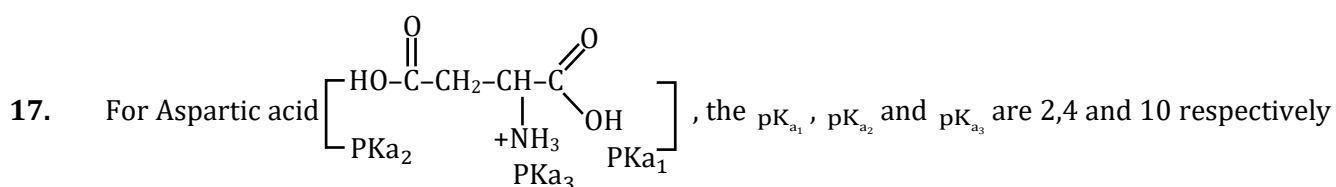
- (A) $\text{PhCH}_2\text{-CH(NH}_2\text{)-CO}_2\text{H}$ (B) $\text{H}_2\text{N-CH(CH}_2\text{CO}_2\text{H)-CO}_2\text{H}$ (C) CH_3OH (D) $\text{CH}_3\text{-CH(NH}_2\text{)-CO}_2\text{H}$

13. Starch molecules are polymer with repeating glucose units. Select the correct statement(s).
 (A) Glucose units are joined through α -glycosidic linkage
 (B) The branches of amylopectin are linked to the chain with α -1,6'-glycosidic linkages
 (C) The linear linkages of amylopectin are formed by α -1,6'-glycosidic bond
 (D) Amylose has an unbranched skeleton of glucose molecules with α -1,4'-glycosidic linkages
 CB0061
14. Select the correct option.
 (A) Isoelectric point is the pH at which an amino acid exists primarily in its neutral form.
 (B) Isoelectric point is the average of pK_a values of α -COOH amino α - NH_3^+ groups [valid only for neutral amino acid]
 (C) Glycine is characterised by two pK_a values
 (D) For neutral amino acid the concentration of zwitter ion is maximum at its isoelectric point
 CB0062
15. Amino acids are synthesised from
 (A) α -Halo acids by reaction with NH_3
 (B) Aldehydes by reaction with NH_3 and cyanide ion followed by hydrolysis
 (C) Pyruvic acid is treated with NH_3 followed by addition of $\text{H}_2(\text{Ni})$
 (D) Alcohols by reaction with NH_3 and CN^- ion followed hydrolysis is.
 CB0063
16. Which of the following carbohydrates develops blue colour on treatment with iodine solution ?
 (A) Glucose (B) Amylose (C) Starch (D) Fructose
 CB0064

CB0065

SECTION-III

- This section contains **THREE** questions.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to the second decimal place; e.g. 6.25, 7.00, -0.33, -0.30, 30.27, -127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct).
- Answer to each question will be evaluated according to the following marking scheme:
 Full Marks : +3, if ONLY the correct numerical value is entered as answer.
 Zero Marks : 0, in all other cases.



CB0066

18. Allose and Glucose are isomeric structures with similar structural formula but different configurations. If D-Allose and (L) - Glucose differs in configuration along C_i no. of carbons ($\text{C}_i = \text{C}_1, \text{C}_2, \text{C}_3, \dots$), then $\sum \text{C}_i$ is

CB0067

19. A decapeptide (Mol. Wt. 796) on complete hydrolysis gives glycine (Mol. Wt. 75), alanine and phenylalanine. Glycine contributes 47.0 % to the total weight of the hydrolysed products. The number of glycine units present in the decapeptide is

CB0068

ANSWER KEY

EXERCISE - O

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	D	C	A	B	A	B	A	B	D	D
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	D	D	B	B	B	C	C	D	D	C
Que.	21	22	23	24						
Ans.	A	D	A	A						

EXERCISE - S

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	28	3	2/1	4	4	3	4	3	5	5.9
Que.	11									
Ans.	2									

EXERCISE - JEE (Main) PYQ

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	1	3	4	2	4	2	2	2	3	1
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	1	4	3	2	4	1	2	25	8	2

EXERCISE - JEE (Advanced) PYQ

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	4	1	A	BC	A	B	D	BCD	5	CD
Que.	11	12	13							
Ans.	BCD	C	A							

JEE (Main) Practice Paper

Section-A	Q.	1	2	3	4	5	6	7	8	9	10
	A.	1	4	1	2	3	2	3	1	3	4
	Q.	11	12	13	14	15	16	17	18	19	20
	A.	1	1	2	3	1	2	2	3	4	1
Section-B	Q.	1	2	3	4	5	6	7	8		
	A.	16	9.74	3	32	2	3	3.25	(a) (i) 8 (ii) 4 (iii) 4 (b) (i) 8 (ii) 4 (iii) 4		
	Q.	9	10								
	A.	16	30.4								

JEE (Advanced) Practice Paper

Section-I	Q.	1	2	3	4	5				
	A.	C	D	C	A	D				
Section-II	Q.	6	7	8	9	10	11	12	13	
	A.	BCD	BC	ABCD	ABC	ABCD	ABD	ABC	ABD	
	Q.	14	15	16						
	A.	ABD	ABC	BC						
Section-III	Q.	17	18	19						
	A.	14	11	6						