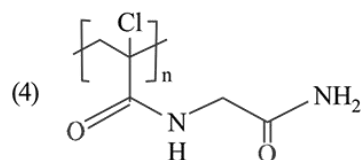
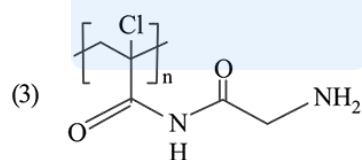
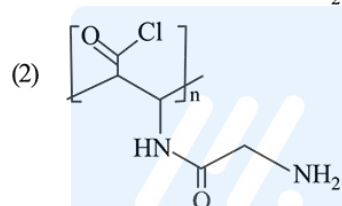
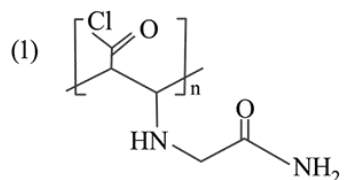
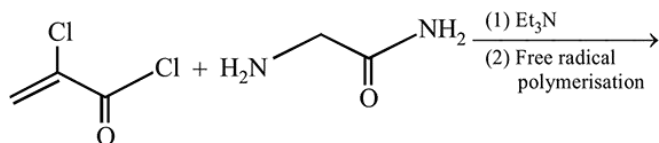


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Biomolecules and Polymers - Questions

Q1

Major product of the following reaction is:



9 Jan Morning

Q2

The increasing order of pKa of the following amino acids in aqueous solution is:

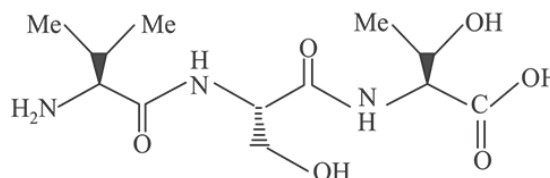
Gly Asp Lys Arg

- (1) Asp < Gly < Arg < Lys
- (2) Gly < Asp < Arg < Lys
- (3) Asp < Gly < Lys < Arg
- (4) Arg < Lys < Gly < Asp

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Q3

The correct sequence of amino acids present in the tripeptide given below is:



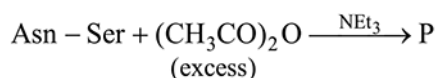
- (1) Val - Ser - Thr
- (2) Thr - Ser - Val
- (3) Leu - Ser - Val
- (4) Thr - Ser - Leu

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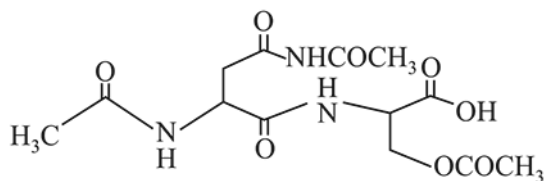
Q4

Biomolecules and Polymers

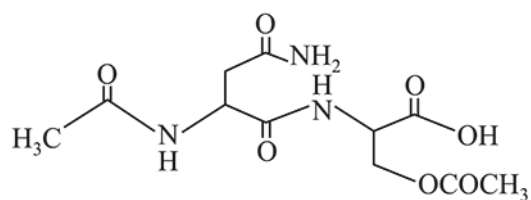
The correct structure of product 'P' in the following reaction is:



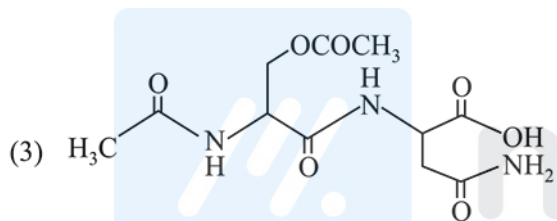
(1)



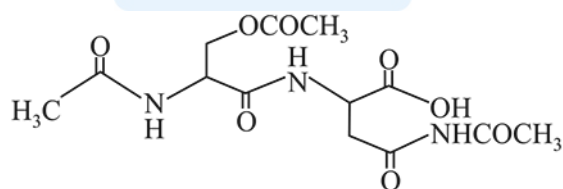
(2)



(3)



(4)

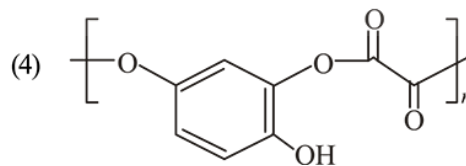
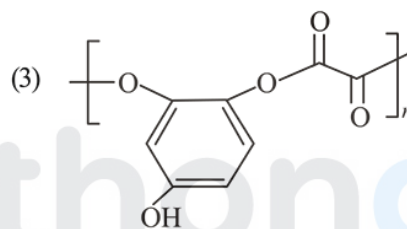
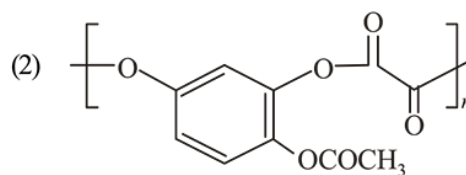
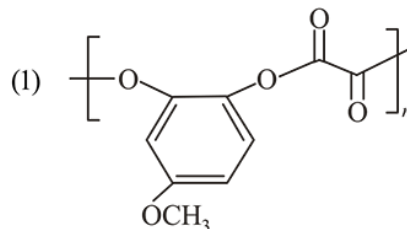
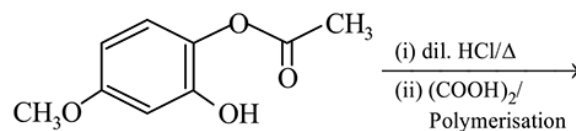


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Q5

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The major product of the following reaction is:



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Q6

Which of the following tests cannot be used for identifying amino acids?

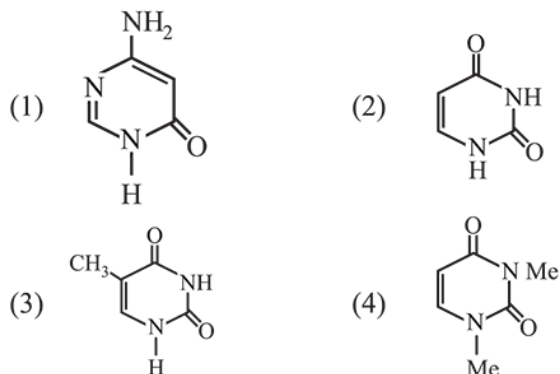
- (1) Biuret test (2) Barfoed test
(3) Ninhydrin test (4) Xanthoproteic test

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Q7

Biomolecules and Polymers

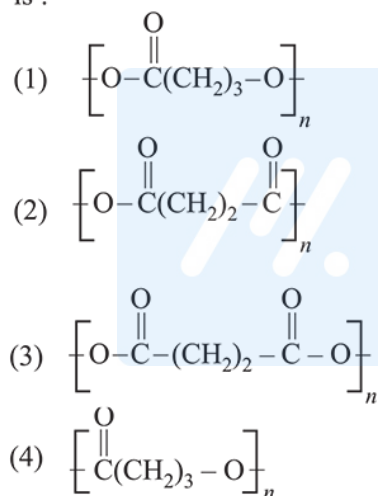
Among the following compounds, which one is found in RNA ?



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Q8

The homopolymer formed from 4-hydroxy-butanoic acids is :



11 Jan Evening

Q9

The correct match between Item I and Item II is:

- | Item I | Item II |
|------------------------|---------|
| (A) Ester test | (P) Tyr |
| (B) Carbylamine test | (Q) AsP |
| (C) Phthalein dye test | (R) Ser |
| | (S) Lys |
- (1) (A) → (Q, R); (B) → (S); (C) → (P)
 (2) (A) → (R); (B) → (Q); (C) → (P)
 (3) (A) → (R); (B) → (S); (C) → (Q)
 (4) (A) → (Q); (B) → (S); (C) → (R)

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Q10

Among the following compounds most basic amino acid is:

- (1) Asparagine (2) Lysine
 (3) Serine (4) Histidine

12 Jan Morning

Q11

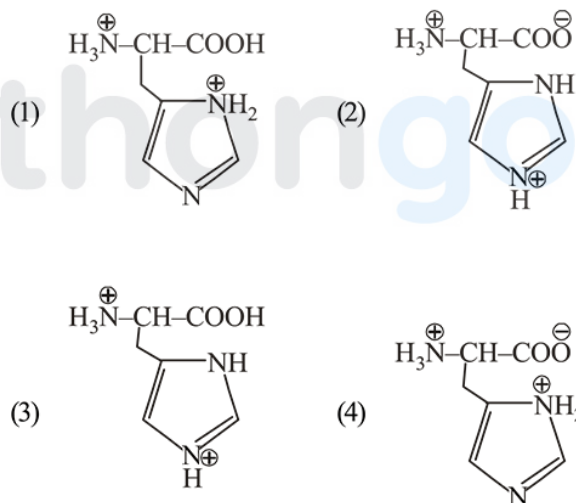
Poly-β-hydroxybutyrate-co-β-hydroxy valerate (PHBV) is a copolymer of _____.

- (1) 3-Hydroxybutanoic acid and 4-Hydroxypentanoic acid
 (2) 2-Hydroxybutanoic acid and 3-Hydroxypentanoic acid
 (3) 3-Hydroxybutanoic acid and 2-Hydroxypentanoic acid
 (4) 3-Hydroxybutanoic acid and 3-Hydroxypentanoic acid

12 Jan Morning

Q11

The correct structure of histidine in a strongly acidic solution (pH = 2) is :



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Q12

The two monomers for the synthesis of nylon 6, 6 are :

- (1) HOOC(CH₂)₄COOH, H₂N(CH₂)₆NH₂
 (2) HOOC(CH₂)₆COOH, H₂N(CH₂)₆NH₂
 (3) HOOC(CH₂)₄COOH, H₂N(CH₂)₄NH₂
 (4) HOOC(CH₂)₆COOH, H₂N(CH₂)₄NH₂

12 Jan Evening

Q13

Maltose on treatment with dilute HCl gives :

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

8 April Morning

Q14

The structure of Nylon-6 is:

- (1) $\left[(\text{CH}_2)_4 - \overset{\text{O}}{\parallel} \text{C} - \overset{\text{H}}{\text{N}} \right]_n$
- (2) $\left[\overset{\text{O}}{\parallel} \text{C} - (\text{CH}_2)_6 - \overset{\text{H}}{\text{N}} \right]_n$
- (3) $\left[\overset{\text{O}}{\parallel} \text{C} - (\text{CH}_2)_5 - \overset{\text{H}}{\text{N}} \right]_n$
- (4) $\left[(\text{CH}_2)_6 - \overset{\text{O}}{\parallel} \text{C} - \overset{\text{H}}{\text{N}} \right]_n$

8 April Evening

Q14

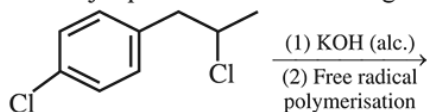
Fructose and glucose can be distinguished by:

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

8 April Evening

Q15

The major product of the following reaction is:



- (1)
- (2)
- (3)
- (4)

9 April Morning

Q16

Which of the following statements is not true about sucrose?

- (1) It is a non reducing sugar.
- (2) The glycosidic linkage is present between C₁ of α-glucose and C₁ of β-fructose.
- (3) It is also named as invert sugar.
- (4) On hydrolysis, it produces glucose and fructose.

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Q17

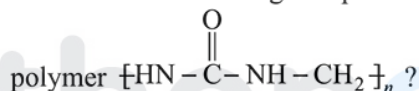
The peptide that gives positive ceric ammonium nitrate and carbylamine tests is:

- (1) Ser - Lys
- (2) Gln - Asp
- (3) Lys - Asp
- (4) Asp - Gln

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Q18

Which of the following compounds is a constituent of the



- (1) N-Methyl urea
- (2) Formaldehyde
- (3) Methylamine
- (4) Ammonia

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Q19

Amylopectin is composed of :

- (1) α-D-glucose, C₁ - C₄ and C₁ - C₆ linkages
- (2) β-D-glucose, C₁ - C₄ and C₂ - C₆ linkages
- (3) β-D-glucose, C₁ - C₄ and C₁ - C₆ linkages
- (4) α-D-glucose, C₁ - C₄ and C₂ - C₆ linkages

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Q20

Which of the following is a condensation polymer?

- (1) Buna - S
- (2) Neoprene
- (3) Teflon
- (4) Nylon 6, 6

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Q21

Biomolecules and Polymers

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The correct match between **Item – I** and **Item- II** is :

Item-I		Item-II	
(a)	High density polythene	(I)	Peroxide catalyst
(b)	Polyacrylonitrile	(II)	Condensation at high temperature & pressure
(c)	Novolac	(III)	Ziegler-Natta catalyst
(d)	Nylon 6	(IV)	Acid or base catalyst

- (1) (a) → (IV), (b) → (II), (c) → (I), (d) → (III)
(2) (a) → (II), (b) → (IV), (c) → (I), (d) → (III)
(3) (a) → (III), (b) → (I), (c) → (II), (d) → (IV)
(4) (a) → (III), (b) → (I), (c) → (IV), (d) → (II)

10 April Evening

Q22

Which of the following is a thermosetting polymer ?

- (1) Bakelite (2) Buns-N
(3) Nylon 6 (4) PVC

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Q23

Glucose and Galactose are having identical configuration in all the positions except position.

- (1) C – 3 (2) C – 4
(3) C – 2 (4) C – 5

12 April Morning

Q24

Which of the following statements is not true about RNA?

- (1) It controls the synthesis of protein.
(2) It has always double stranded α -helix structure.
(3) It usually does not replicate.
(4) It is present in the nucleus of the cell.

12 April Morning

Q25

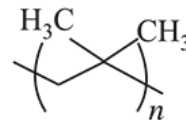
Which of the given statements is INCORRECT about glycogen ?

- (1) It is a straight chain polymer similar to amylose.
(2) Only α -linkages are present in the molecule.
(3) It is present in animal cells.
(4) It is present in some yeast and fungi.

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Q26

The correct name of the following polymer is:



- (1) Polyisobutane (2) Polytert-butylene
(3) Polyisoprene (4) Polyisobutylene

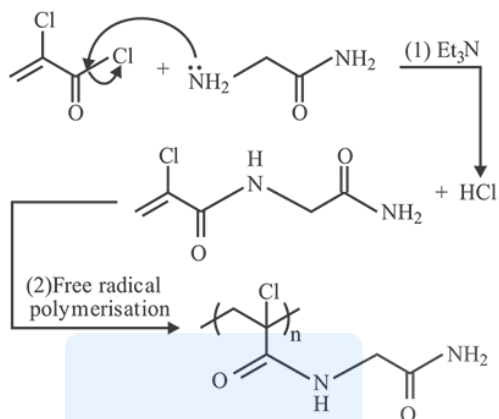
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Biomolecules and Polymers - Answers

Q1

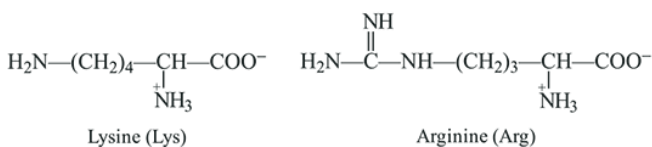
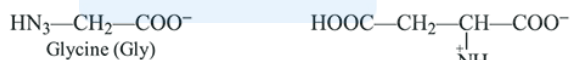
(4) Mechanism for the formation of major product is as follows:



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Q2

(3) Structure of the given α -amino acids are:



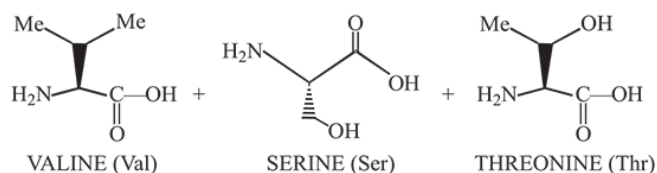
Here, aspartic acid is an acidic and glycine is a neutral amino acid while lysine and arginine are basic amino acids. Also, arginine is more basic due to the stronger basic functional groups.

\therefore The order of pK_a value is directly proportional to the basic strength of amino acids, i.e. $\text{Arg} > \text{Lys} > \text{Gly} > \text{Asp}$.

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Q3

(1)



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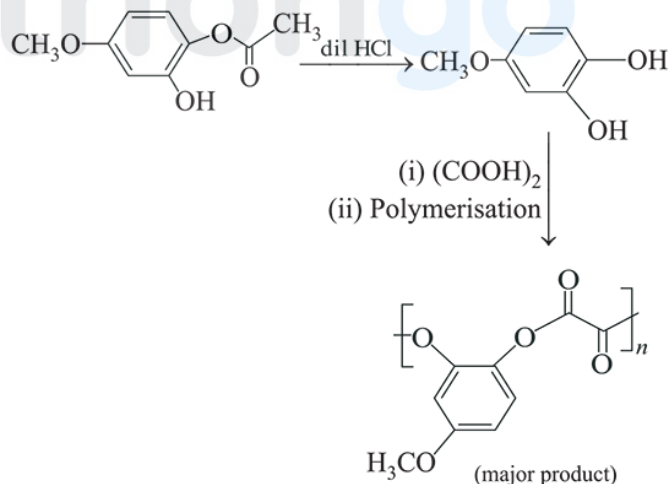
Q4

(2)

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Q5

(1) Reaction involved:



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Q6

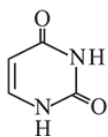
(2) Barfoed test is used to test the reducing nature of sugar (carbohydrate).

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Q7

Biomolecules and Polymers

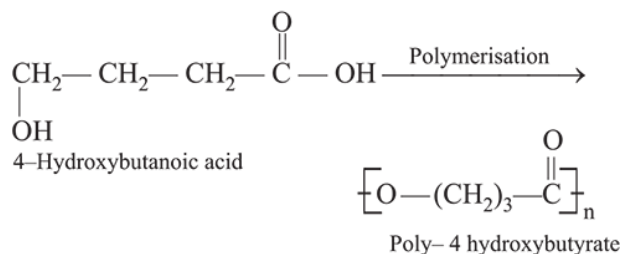
(2) R.N.A contain uracil



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Q8

(4)



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Q9

(1) Name	Abbreviations	Functional group	Test
(P) Tyrosine	Tyr	$(-\text{CH}_2-\text{C}_6\text{H}_4-\text{OH})$	Phthalein dye test (C)
(Q) Aspartic acid	Asp	$(-\text{CH}_2\text{COOH})$	Ester test (A)
(R) Serine	Ser	$(-\text{CH}_2\text{OH})$	Ester test (A)
(S) Lysine	Lys	$(-(\text{CH}_2)_4-\text{NH}_2)$	Carbylamine test (B)

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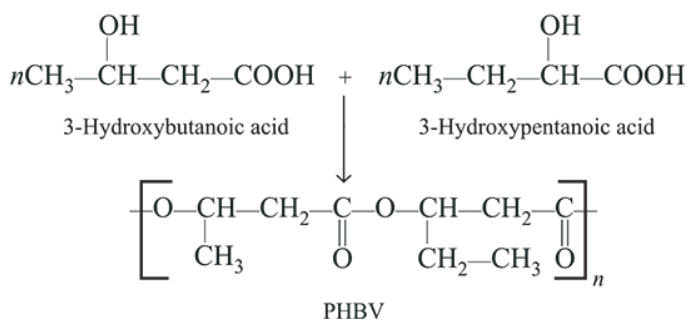
Q10

(2) Lysine

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Q11

(4)



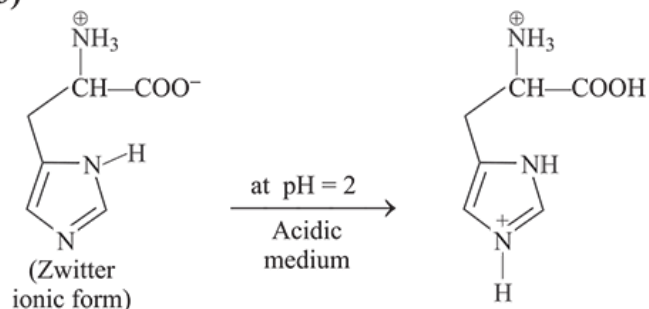
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Q11

(3)



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Q12

(1) Adipic acid (having 6C) and hexamethylene diamine (having 6C).

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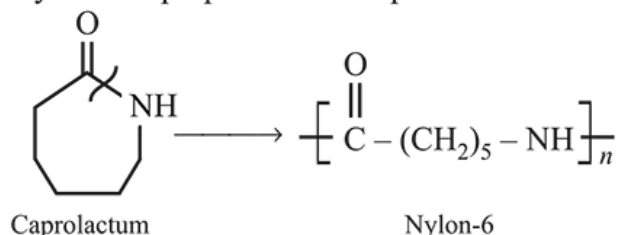
Q13

(4) Hydrolysis of maltose gives glucose as maltose is composed of two α -D glucose units.

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Q14

(3) Nylon-6 is prepared from caprolactam.



8 April Evening

Q14

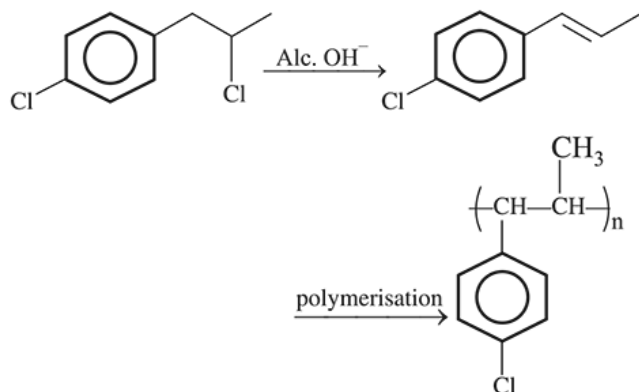
(4) Seliwanoff's test is used to distinguish aldose and ketose sugars.

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Q15

Biomolecules and Polymers

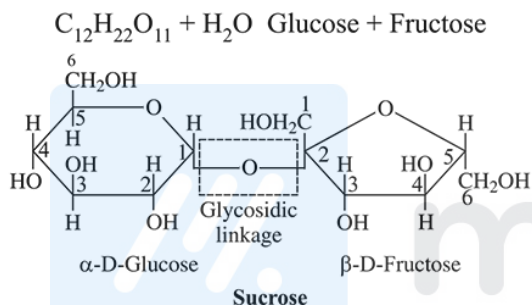
(4)



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Q16

- (2) Sucrose contains glycosidic link between C₁ of α-D glucose and C₂ of β-D-fructose.



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Q17

- (1) Ceric ammonium nitrate test is given by alcohol. Only serine (ser) contains –OH group.

9 April Evening

Q18

- (2) The polymer $\left[\text{NH} - \overset{\text{O}}{\parallel} \text{C} - \text{NH} - \text{CH}_2 \right]_n$ is urea-formaldehyde resin. Its monomers are urea and formaldehyde.

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Q19

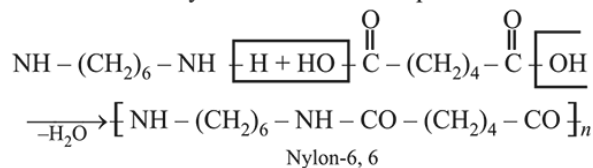
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- (1) Starch is a polymer of α-D-glucose. It has two components.
- Amylose which has only α-1, 4-glycosidic linkage and is a linear polymer.
 - Amylopectin which has α-1, 6-glycosidic linkage in addition to α-1, 4-glycosidic linkage and is a cross-linked polymer.

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Q20

- (4) Nylon-6, 6 is obtained by condensation polymerisation of hexamethylenediamine and adipic acid.



So, nylon-6, 6 is a condensation polymer. Other given polymers are addition polymers.

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Q21

- HDPE - Ziegler-Natta catalyst
- Polyacrylonitrile - Peroxide catalyst
- Novolac - Catalysed by acid or base
- Nylon-6 - Condensation at high T and P

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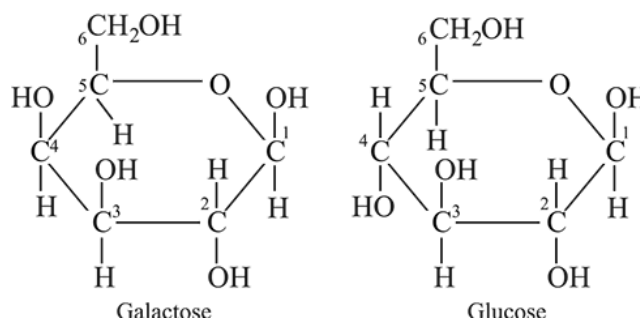
Q22

- (1) Bakelite is an example of thermosetting polymer. PVC and Nylon 6 are thermoplastic and Buna-N is an elastomer.

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Q23

- (2) Galactose and glucose are C₄ epimers.



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Q24

- (2) RNA has a single helix structure, whereas, DNA has a double helix structure.

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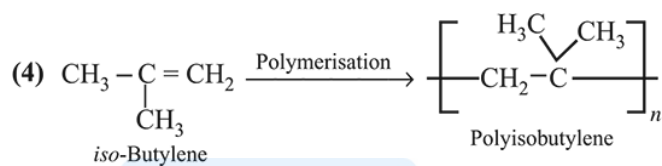
Q25

- (1) Structure of glycogen is similar to amylopectin.

It is found in yeast and fungi and stored in animal body.
It contains α -glycosidic linkages.

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Q26



12 April Evening



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