JEE Adv. May 2026

Question Paper With Text Solution

17 May | Paper-2

CHEMISTRY

MATRIX

JEE Main & Advanced | XI-XII Foundation| VI-X Pre-Foundation

Office : Piprali Road, Sikar (Raj.) | Ph. 01572-241911
Website : www.matrixedu.in ; Email : smd@matrixacademy.co.in

JEE ADV. MAY 2026 | 17 MAY PAPER-2

SECTION – 1 (MAXIMUM MARKS: 12)

- This section contains **FOUR (04)** question stems.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +3 **ONLY** the correct option is chosen;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : –1 In all other cases.

1. At 300 K, the molar conductivities of the aqueous solutions of three salts at two different concentrations are given below:

Salt	Concentration (M)	Molar conductivity (S cm^2 mol^{-1})
$NaNO_3$	0.01	111
	0.04	101
NaCl	0.01	117
	0.04	107
$AgNO_3$	0.01	125
	0.04	116

The conductivity of a saturated aqueous solution of AgCl is 1.40×10^{-6} S cm^{-1} at 300 K. If the solubility of AgCl in water at 300 K is X mol L^{-1}, then $\log_{10}(X^{-1})$ is

(Assume that AgCl dissolved in water ionizes completely and that the molar conductivity of saturated AgCl solution is equal to its limiting molar conductivity.)

(A) 3 (B) 4 (C) 5 (D) 6

Ans. C

Sol. For $NaNO_3$ Salt

$$111 = (\lambda m^\circ)_{NaNO_3} - A\sqrt{0.01}$$

$$101 = (\lambda m^\circ)_{NaNO_3} - A\sqrt{0.04}$$

$A = 100 \Rightarrow (\lambda m^\circ) = 121\, s\, cm^2 mol^-$

For NaCl Salt

$117 = \lambda_m^\circ - A\sqrt{0.01}$

$107 = \lambda_m^\circ - A\sqrt{0.04}$

$A = 100 \Rightarrow \left(\lambda_m^\circ\right)_{Nacl} = 127$

For $AgNO_3$ salt

$125 = \lambda m^\circ - A\sqrt{0.01}$

$126 = \lambda m^\circ - A\sqrt{0.04}$

$A = 90 \Rightarrow (\lambda m^\circ) AgNO_3 = 134\, s\, cm^2 mol^-$

$(\lambda m^\circ)_{AgCl} = (\lambda m^\circ)_{AgNO_3} + (\lambda m^\circ)_{NaCl} - (\lambda m^\circ) NaNO_3$

140 s cm^2 mol^-

$$\left(\lambda_m^\circ\right)_{Agcl} = \frac{K_{Agcl} \times 1000}{S} = \frac{1.40 \times 10^{-6} \times 1000}{S} = 140$$

$S = 10^{-5} = X$

$\log_{10} X^- = \log_{10}\left(10^{+5}\right) = 5$

2. The correct order of ONO bond angle in the given species is

(A) $NO_2^+ < NO_2 < NO_3^- < NO_2^-$ (B) $NO_2^- < NO_3^- < NO_2 < NO_2^+$

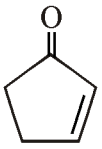
(C) $NO_3^- < NO_2^- < NO_2 < NO_2^+$ (D) $NO_2^- < NO_3^- < NO_2^+ < NO_2$

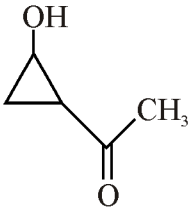
Ans. B

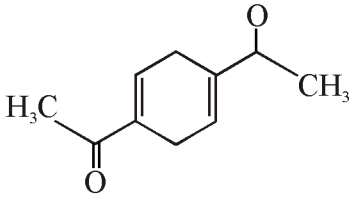
Sol. $NO_2^- < NO_3^- < NO_2 < NO_2^+$

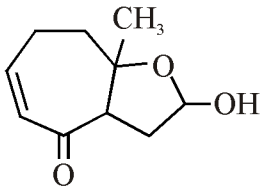
$(\approx 115^\circ)\ (120^\circ)\ (\approx 132^\circ)\ (180^\circ)$

3. Natural rubber on complete ozonolysis (O_3/Zn-H_2O) gives compound X as the major product. X gives positive iodoform and Tollen's tests. X on heating with aqueous NaOH gives Y as the major product. Y is

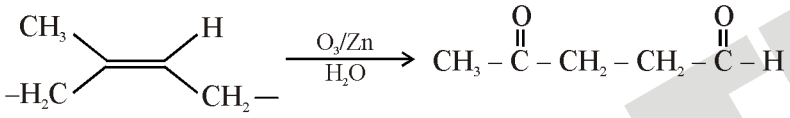
(A) 

(B) 

(C) 

(D) 

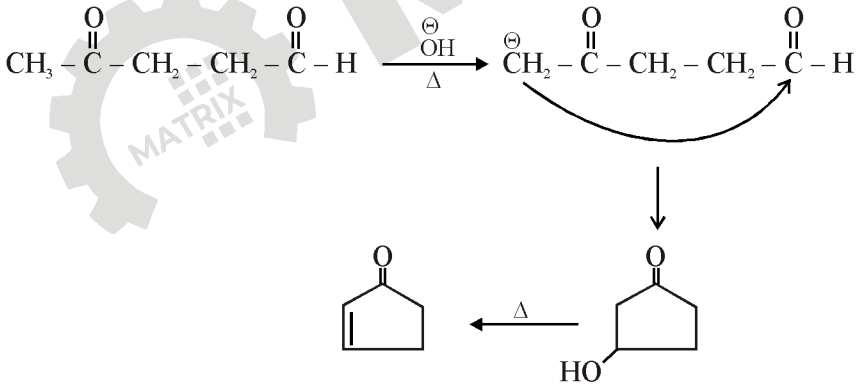
Ans. A

Sol. 

Natural rubber +ve Tollens test

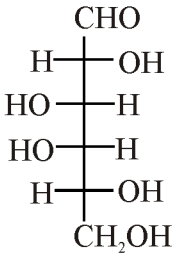
+ve Iodoform test

On breaking of every c = c bond, it gives 4-oxopentanal

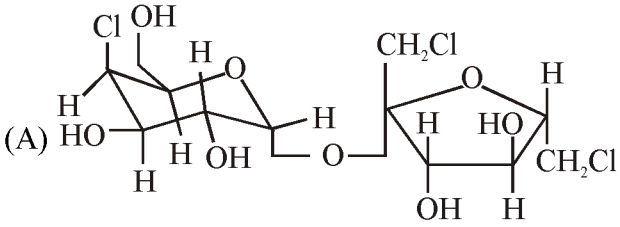


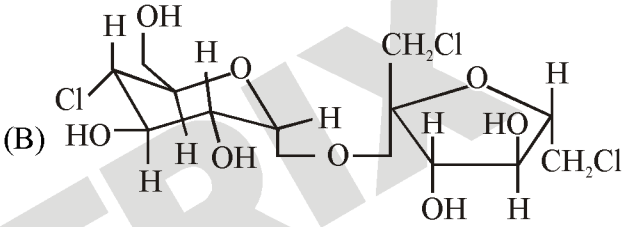
Correct answer is (A)

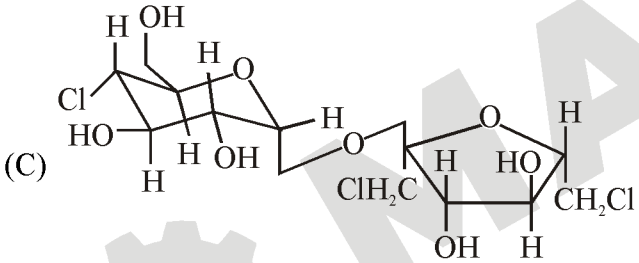
4. A known artificial sweetener X is composed of 4-chloro-4-deoxy-a-D-galactose and 1,6-dichloro-1,6-dideoxy-β-D-fructose joined by a glycosidic linkage. Structure of D-galactose is given below:

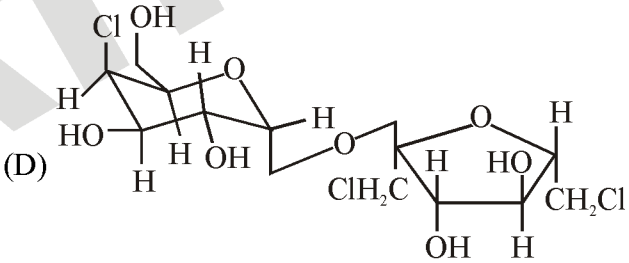

= D-galactose

The correct structure of X is

(A) 

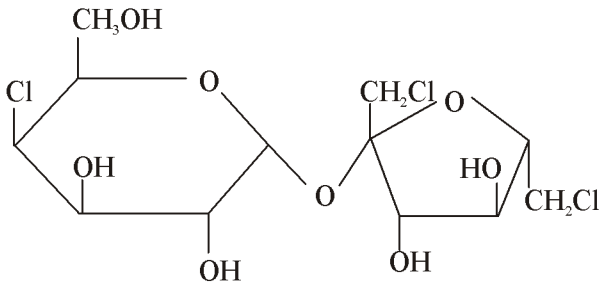
(B) 

(C) 

(D) 

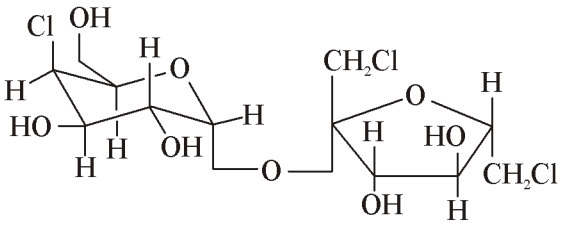
Ans. A

Sol. Artificial sweetner is sucralose. Sucralose is formed by 4-chloro-4-deoxy-degalactose and 1,6-dichloro-1,6-dideoxy fructose.



(Structure of Sucralose)

Matches with option (A).



Answer (A).

SECTION – 2 (MAXIMUM MARKS: 20)

- This section contains **FIVE (05)** question stems.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4 **ONLY** if (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;

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is acorrect option;

Zero Marks : 0 If unanswered;

Negative Marks : –1 In all other cases.

- For example, in a question, if (A), (B) and (D) are the ONLY three options corresponding to correct answers, then

choosing ONLY (A), (B) and (D) will get +4 marks;

choosing ONLY (A) and (B) will get +2 marks;

choosing ONLY (A) and (D) will get +2marks;

choosing ONLY (B) and (D) will get +2 marks;

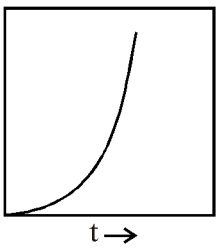
choosing ONLY (A) will get +1 mark;

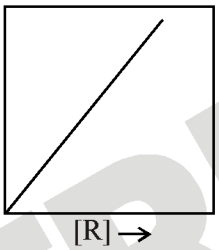
choosing ONLY (B) will get +1 mark;

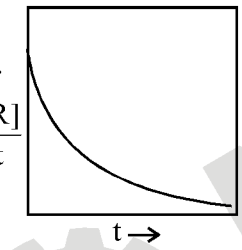
choosing ONLY (D) will get +1 mark;

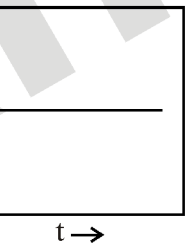
choosing no option(s) (i.e. the question is unanswered) will get 0 marks and choosing any other option(s) will get -1 marks.

5. For a first-order reaction R → P at a given temperature, k is the rate constant. For this reaction, at the given temperature, the concentrations of R and P at a time t are [R] and [P], respectively. The correct graphical representation(s) for this reaction is(are)

(A) 

(B) 

(C) 

(D) 

Ans. CD

Sol. (A) $R \longrightarrow P$

Rate = K[R]

$$-\frac{d[R]}{dt}+\frac{d[P]}{dt}=K[R]=K[R_0].e^{-kt}$$

conc. at R at time t

$[R] = [R_0]. e^{-kt}$

conc. of P at time t

$[P] = [R_0] (1 - e^{-kt})$

$[P] = [R_0] (1 - e^{-kt})$

$t = 0 \Rightarrow [P] = 0$

$t \to \infty \Rightarrow [P] = [R_0]$

Given graph is parbalic **INCORRET**

(B) $\frac{d[R]}{dt} = -k[R] \Rightarrow$ INCORRECT

Slope = –ve

(C) $\frac{d[P]}{dt} = K[R_0].e^{-kt} \Rightarrow$ expnential decreaing

(D) Rate constant is independent of time

6. Correct statement(s) about the compounds P, Q and R is(are)

$Xe(g) + F_2(g) \xrightarrow{873K, 7bar} \mathbf{P}$

(1:5 ratio)

$\mathbf{P} + O_2F_2 \xrightarrow{143K} \mathbf{Q} + O_2$

$Q + H_2O \xrightarrow{\text{complete hydrolysis}} \mathbf{R} + HF$

(A) **P** has two lone pairs of electrons on the central atom.
(B) **Q** has a perfect octahedral geometry.
(C) **Q** can act as a fluorinating agent.
(D) The molecular structure of **R** is trigonal pyramidal.

Ans. A, C, D

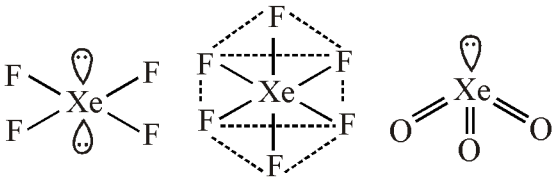
Sol. $Xe(g) + F_2(g) \xrightarrow[7bar]{873K} XeF_4(P)$

1 : 5

$XeF_4 + O_2F_2 \xrightarrow{143K} XeF_6(Q) + O_2$

$XeF_4 + H_2O \longrightarrow XeO_3 + HF$

(R)



(P) square planar

(Q) capped

Pyramidal

Dist. octahedral

* Xenonfluoride act as fluorinating agent.

7. The correct statement(s) regarding the periodic properties of elements is(are)

(A) Second ionization enthalpy of carbon atom is less than that of boron atom.

(B) Increasing order of ionic radii: $Al^{3+} < Mg^{2+} < Na^{+}$

(C) Under identical conditions, in solid state, the density of potassium metal is more than density of sodium metal.

(D) The H–H bond is weaker than F–F bond.

Ans. A,B

Sol. (A) II^{nd} I.E :- B > C

(B) Ionic redii:- $Al^{3+} < Mg^{2+} < Na^{+}$ (isoelectronic species)

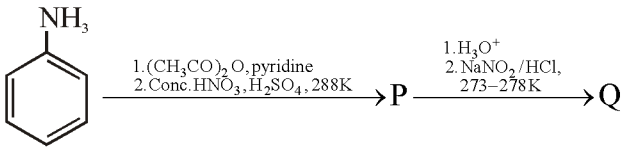
(C) Density:- Na > K

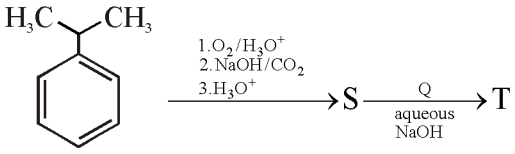
gcm^{-3} (0.987) (0.86)

(D) Bond diss. energy:- $H_2 > F_2$

($\approx$ 436KJ / mole)

8. In the following reaction sequence, P, Q, S and T are the major products.





The correct statement(s) about P, Q, S and T is(are)

(A) Q on treatment with ethanol generates an aromatic aldehyde.

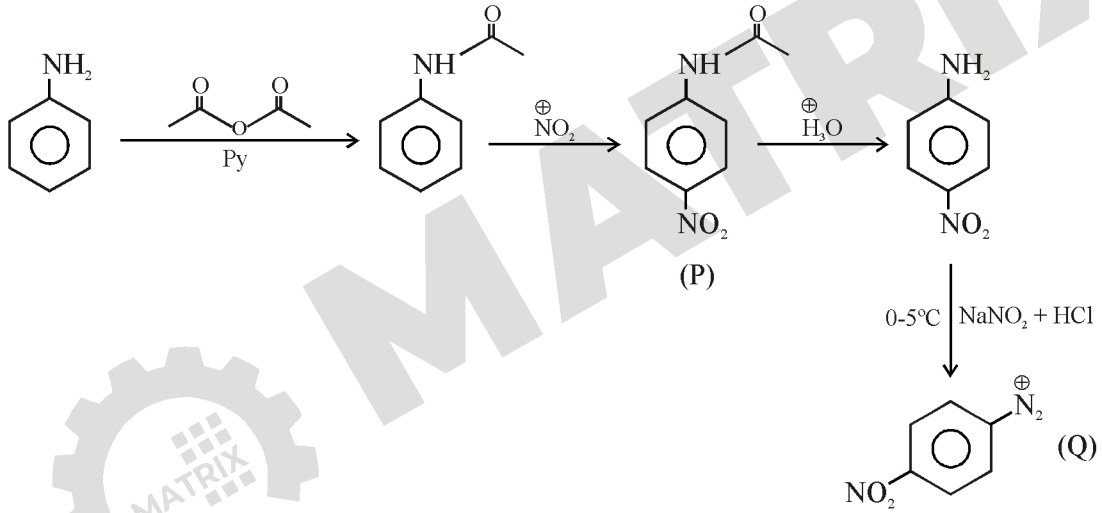
(B) S gives positive phthalein dye test.

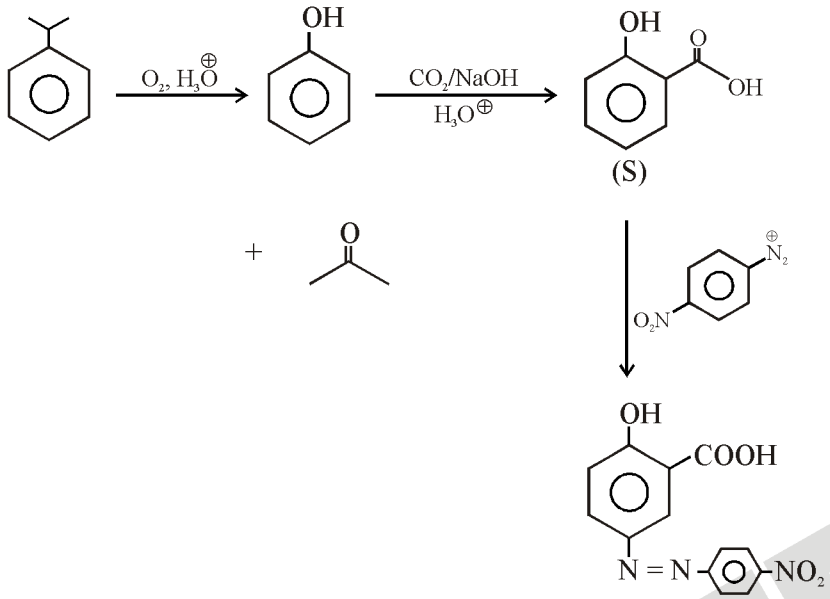
(C) P is a dinitro compound.

(D) T is a coloured compound.

Ans. B,D

Sol.





(A) 

(Not an aromatic acid)

(B) Gives the phthalein dye test due to phenolic group

(C) P is not dinitro compound

(D) T is coloured compound due to coupling reaction.

9. The correct statement(s) regarding sugars is(are)

Given: Specific rotations of L-(–)-glucose and L-(+)-fructose are –52.5° and +92.5°, respectively.

(A) On treatment with HNO_3, gluconic acid is oxidized to saccharic acid, whereas glucose is not oxidized to saccharic acid.

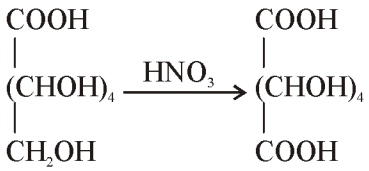
(B) Fructose gives a positive Fehling's test because it isomerises to glucose and another aldohexose in the presence of Fehling's reagent.

(C) Invert sugar is an equimolar mixture of D-glucose and D-fructose formed after hydrolysis of the corresponding disaccharide.

(D) Specific rotation of invert sugar is –40°.

Ans. B,C

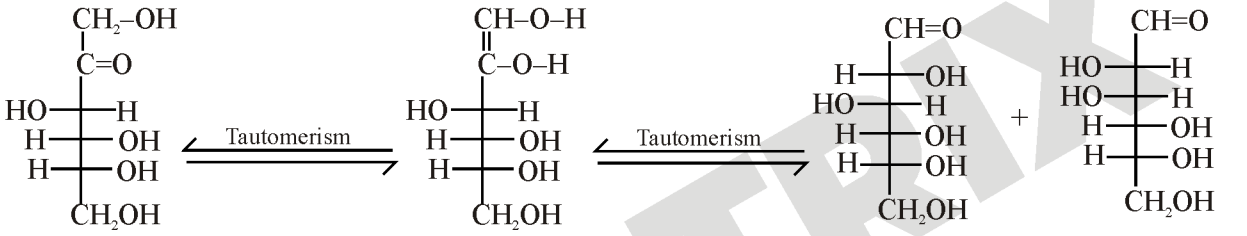
Sol. (A)



(Gluconic acid) (Saccharic acid)

Glucose $\xrightarrow{HNO_3}$ Saccharic Acid

(B) Fructose gives the fehling test becuase it isomerise into glucose & mannose in basic medium.



D-fructose

Enediol of D-fructose
Enediol of D-Glucose
Enediol of D-Mannose
Intermediate

D-Glucose D-Mannose

(C) Invert sugar is equimolar mixture of α-D-Glucose + β-D-fructose.

(D) Sucrose $\xrightarrow{H_3O^{\oplus}}$ $\underset{(+52.7)}{\alpha-D-Glucose} + \underset{(-92.5^\circ)}{\beta-D-fructose}$

$$\text{specific rotation of invert sugar} = \frac{52.7+(-92.5)}{2}$$

$= -20^\circ$

Answer : B, C

SECTION – 3 (MAXIMUM MARKS: 20)

- This section contains **FIVE (05)** question stems.
- The answer to each question is a **NUMERICAL VALUE.**

- For each question, enter the correct integer corresponding to the answer using the mouse and the onscreen virtual numeric keypad in the place designated to enter the answer.
- If the numerical value has more than two decimal places, **truncate/round-off** the value to **TWO** decimal places.
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4 If **ONLY** the correct integer is entered;

Zero Marks : 0 In all other cases.

10. X^{a+} and Y^{b+} are hydrogen-like species. The wavelength of light absorbed during the transition between the states with principal quantum numbers $n = 1$ and $n = 2$ of X^{a+} is λ. The wavelength of light absorbed during the transition between the states with principal quantum numbers $n = 2$ and $n = 4$ of Y^{b+} is 9λ. The lowest possible value of (a+b) is _____.

Ans. 3

Sol. X^{+a} $n = 1 \rightarrow n = 2$

$Z_1 = (a + 1)$

$$\frac{1}{\lambda} = R \times (a+1)^2 \left(\frac{1}{1^2} - \frac{1}{2^2}\right)$$

Y^{+b} $n = 2 \rightarrow n = 4$

$Z_2 = (b + 1)$

$$\frac{1}{9\lambda} = R \times (b+1)^2 \left(\frac{1}{2^2} - \frac{1}{4^2}\right)$$

From eq. (1) & (2)

$$9 = \frac{(a+1)^2}{(b+1)^2} \times 2^2$$

$$\frac{a+1}{b+1} = \frac{3}{2}$$

lowest possible values

$b = 1$ and $a = 2$

$a + b = 3$

11. At a given temperature, 0.45 g of acetic acid in 50 mL of water is shaken with 1.0 g of charcoal and the pH of the resulting solution is 3.0. Assume, the adsorption of acetic acid from the aqueous solution by charcoal follows Freundlich isotherm .

$$\frac{x}{m} = kC^{1/n}$$

If the plot of $\log_{10}(x/m)$ against $\log_{10}C$ gives a straight line with slope 1, the value of k in L mol^{-1} is ____.

Given: The molar mass of acetic acid is 60 g mol^{-1}.

The acid dissociation constant of acetic acid is 1.0×10^{-5} at the given temperature.

x is the mass (in grams) of acetic acid adsorbed.

m is the mass (in grams) of charcoal.

C is the equilibrium concentration of acetic acid in the solution after the adsorption is complete.

k and n are constants for acetic acid–charcoal system at the given temperature.

Ans. 1.5

Sol. Initially 0.45g acetic acid

+ 50 mL water

after 1g charcoal

pH = 3

$H^+ = 10^{-3} = \sqrt{K_a C}$

$10^{-3} = \sqrt{10^{-5}.C}$

$C = 10^{-1}$

Moles of acetic acid = $\frac{10^{-1}\times50}{1000}$

Mass of acetic acid = $\frac{5}{1000}\times60 = 0.3g$

Mass of acetic acid adsorbed = 0.15g

$$\frac{x}{m} = \frac{0.15}{1} = K(10^{-1})^{1/n}$$

Slope of $\log_{10}\frac{x}{m}$ v/s C is $1 \Rightarrow \frac{1}{n} = 1$

$\boxed{K = 1.5}$

12. In a solvent S, a compound B is partially dissociated into C and D as given below:

$$B \rightleftharpoons 2C + 2D$$

B, C and D are non-volatile in nature. The molar mass of B is 10 times the molar mass of S. The standard boiling point and the standard enthalpy of vaporization of S are 400 K and 10R J mol^{-1}, respectively (R is the gas constant in J K^{-1} mol^{-1}). A solution of B in S with an initial concentration of B as 0.25% (mass/mass) has a boiling point of 408 K at 1 bar pressure. In this solution, the mole percent of B that has been dissociated is _____.

Ans. 33.15-33.20

Sol. $Mw_B = 10 \times Mw_s$

$$Kb_s = \frac{Mw_s \times R \times \left(T_b^0\right)^2}{1000 \times \Delta H_{vap}} = \frac{Mw_s \times R \times (400)^2}{1000 \times 10R} = 16Mw_s$$

$\Delta T_b = K_b \cdot m \cdot i$

% w/w = 0.25

$$m = \frac{\%w/w \times 1000}{Mw_B \times (100 - \%w/w)}$$

$$m = \frac{0.25 \times 1000}{Mw_B \times 99.75}$$

$B \longrightarrow 2C + 2D$

$i = 1 + \alpha(4 - 1)$

$$\Delta T_b = 8 = 16Mw_s \times \frac{0.25 \times 1000}{Mw_B \times 99.75} \times (1 + 3\alpha)$$

$$1+3\alpha = \frac{997.5}{1000\times 0.5}$$

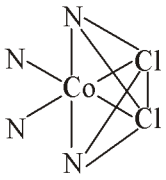
$\alpha = 0.33166$

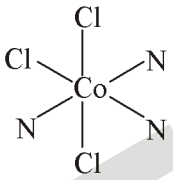
Percentage dissociation = 33.17%

13. Consider that the coordinating atoms of the ligands in cis-$[Co(NH_3)_4Cl_2]Cl$ and mer-$[Co(NH_3)_3Cl_3]$ octahedral complexes are at the vertices of an octahedron. The sum of total number of the triangular faces in both the complexes having one N atom and two Cl atoms at their corners is _____.

Ans. 6

Sol.





(2) Triangular faces having One 'N' + Two 'Cl'

(4) Triangular faces having One 'N' + Two 'Cl'

Answer = 2 + 4 = 6

14. In the following reaction sequence, major products X and Y are acyclic monomers.

$$CH_3I \xrightarrow[2.H_3O+,\Delta \\ 3.Red\,P,Br_2 \\ 4.NH_3\,(excess)]{1.KCN} X$$

$$Caprolactam \xrightarrow[\Delta]{H_3O^+} Y$$

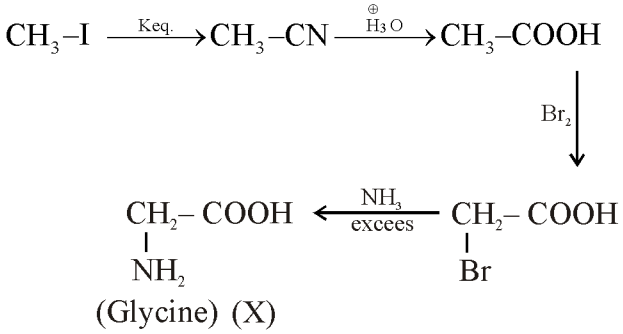
500 mol of X completely reacts with 500 mol of Y to give 1 mol of a single biodegradable acyclic copolymer Z as the only product. The amount of Z formed in grams is ____.

Given:

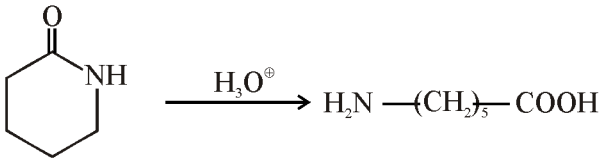
Atomic mass (in amu): H : 1, C : 12, N : 14, O : 16, Br : 80

Ans. 85018

Sol.



(Glycine) (X)



Caprolactum (Y)

500mol x + 500 mol y → 1 mole simple acyelic copolymer

Total monomer unit = 1000

No. of H_2O required = 999

Mass of polymer = 500(75) + 500(131) – 999(18)

= 85018 gm

75 → mole wt. of x

131 → mole wt. of y

SECTION – 4 (MAXIMUM MARKS: 8)

- This section contains **TWO (02)** question stems.
- This section contains **TWO (02)** questions corresponding to each question stem.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value corresponding to the answer in the designated place using the mouse and the on-screen virtual numeric keypad.
- If the numerical value has more than two decimal places, **truncate/round-off** the value to **TWO** decimal places.

- Answer to each question will be evaluated according to the following marking scheme:

  Full Marks : +2 If **ONLY** the correct numerical value is entered in the designated place;

  Zero Marks : 0 In all other cases.

Question Stem for Question Nos. 15 and 16

Two volatile liquids A and B form an ideal solution. Consider a 5 molal solution of B in A inside a closed container having a total vapour pressure of 100 mm Hg at 300 K. The vapour pressure of pure A at 300K is 105 mm Hg. Assume that A and B behave as ideal gases in the vapour phase.

Given:

The gas constant R = 0.08 L atm K^{-1} mol^{-1}

Molar mass of A is 50 g mol^{-1}

Molar mass of B is 57 g mol^{-1}

Density of liquid B at 300 K is 0.5 g/mL

1 atm = 760 mm Hg

15. At 300 K, the ratio of the molar volume of pure B in vapour phase to its molar volume in liquid phase is ____.

Ans. 2000

Sol. Ps = 100 mm P_A° = 105 mm

5 moles solution at B in A $\Rightarrow$

$$5 = \frac{X_B \times 1000}{X_A \times 50}$$

$$X_B = \frac{1}{5},\ X_A = \frac{4}{5}$$

$$\frac{X_B}{X_A} = \frac{1}{4}$$

$$100 = \frac{4}{5} \times 105 + \frac{1}{5} \times P_B^\circ$$

$P_B^\circ = 80$ mm

$$\frac{Y_B}{Y_A} = \frac{\frac{1}{5}\times 80}{\frac{4}{5}\times 105} = \frac{4}{21}$$

$$Y_B = \frac{4}{25}$$

molar volume of B in vapour phase

$$V_{vapor} = \frac{nRT}{P_B} = \frac{1\times 0.08\times 300\times 760}{80} = 228L$$

molar volume of B in liquid phase

$m_B = 57g$ $\quad$ $d_B = 0.5$ g/mL

$$V_{liquid} = \frac{57}{0.5}mL$$

$= 114$ mL

$$\frac{V_{vapour}}{V_{liquid}} = \frac{228\,L}{114\times10^{-3}\,L} = 2000$$

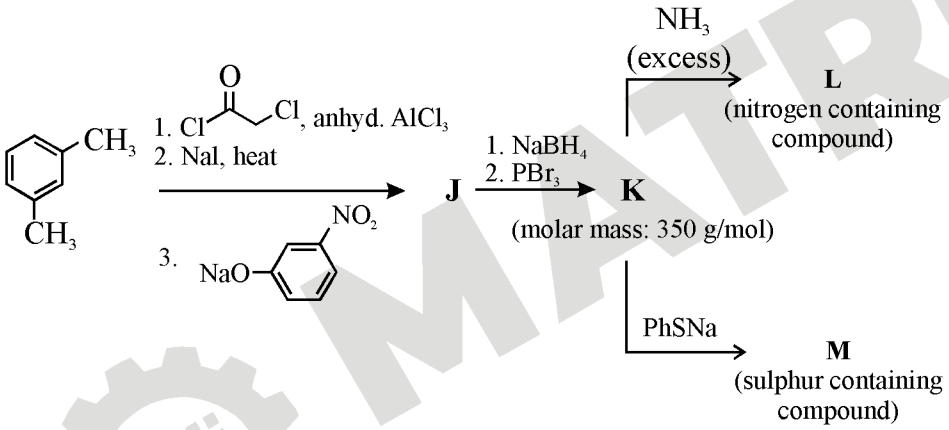
16. The mole fraction of B in vapour phase which is in equilibrium with this solution is ____.

Ans. 0.16

Sol. $Y_B = \frac{4}{25}$

Question Stem for Question Nos. 17 and 18

Consider the following reaction sequence in which J, K, L and M are the major products.



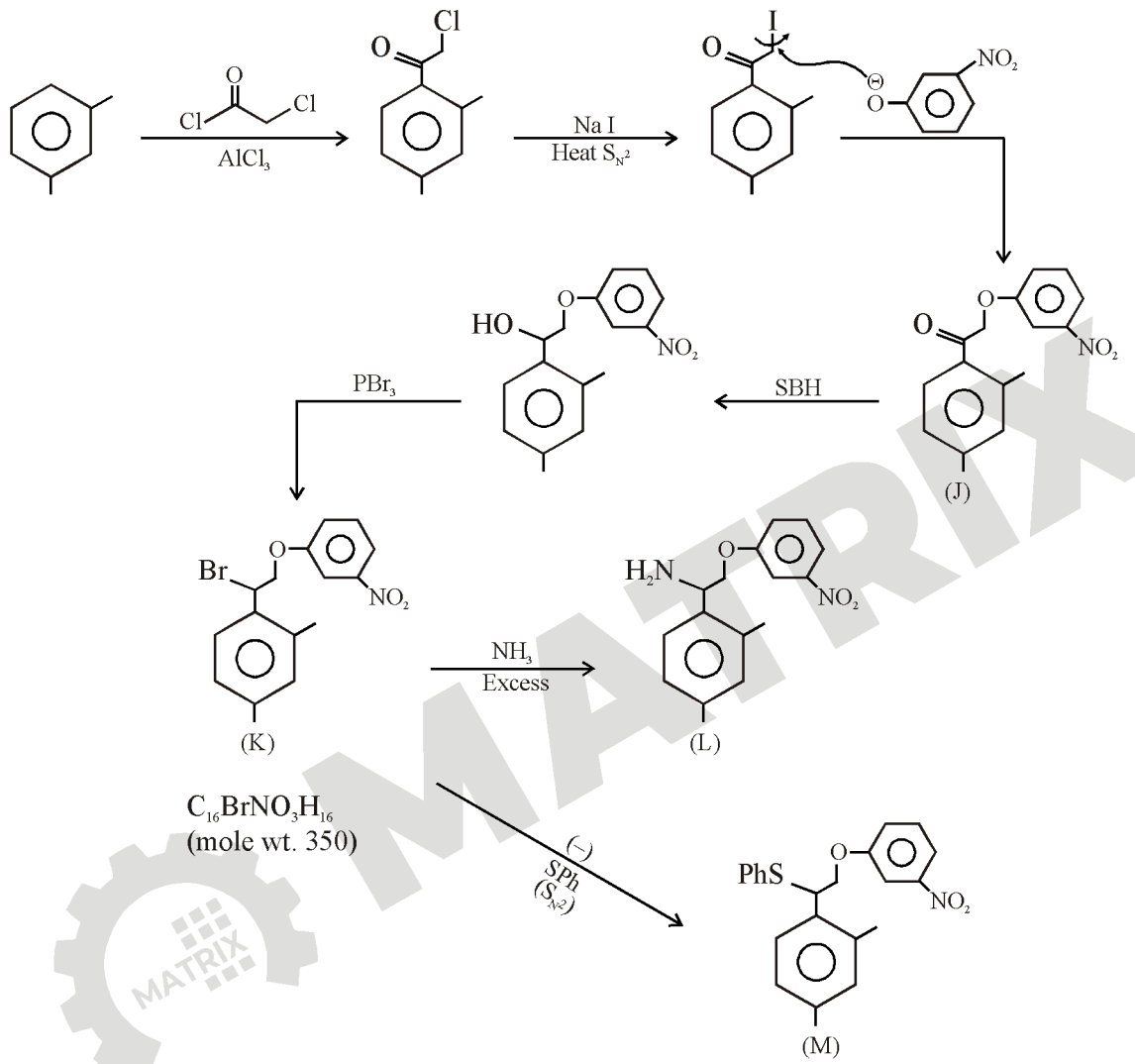
Given:

Atomic mass (in amu): H : 1, C : 12, N : 14, O : 16, S : 32, Br : 80, Ba : 137

17. The volume of 1 M aqueous H_2SO_4 required to completely neutralize the ammonia evolved from 5.72 g of L in Kjeldahl's method of nitrogen estimation is ____ mL. _____.

Ans. 10

Sol.



$$O.C\ (L) \longrightarrow NH_3 \uparrow$$

$$2NH_3 + H_2SO_4 \longrightarrow (NH_4)_2SO_4 + H_2O$$

$$\text{mole of L} = \frac{5.72}{286} = 0.02 = \text{mole of } NH_3$$

$$2NH_3 + H_2SO_4 \longrightarrow (NH_4)_2SO_4 + H_2O$$

$0.02 \qquad V \times 1M$

$2V = 0.02$

$V = 0.01$ lt

$\boxed{V = 10\text{ml}}$

18. In sulphur estimation by Carius method, the amount of $BaSO_4$ formed from 3.79 g of M is____ g.

Ans. 2.33

Sol. Mole of M = 379

$$\text{Moles of M} = \frac{3.79}{379} = 0.01$$

Mole of $BaSO_4 = 0.01$

wt. of $BaSO_4 = 0.01 \times 233$

$= 2.33$g