Aakash
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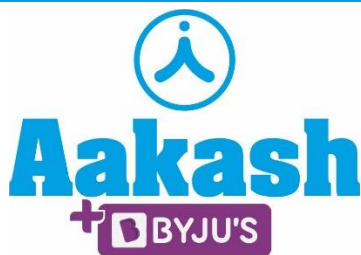*Corporate Office* : **Aakash Tower, 8, Pusa Road, New Delhi-110005 | Ph.: 011-47623456**

Answers & Solutions

for

CUET UG-2022

(CHEMISTRY)

Time : 45 min.   **M.M. : 200**

IMPORTANT INSTRUCTIONS:

1.   The test is of 45 Minutes duration.

2.   The test contains 50 Questions out of which 40 questions need to be attempted.

3.   Marking Scheme of the test:

   a.   Correct answer or the most appropriate answer: Five marks (+5)

   b.   Any incorrect option marked will be given minus one mark (–1).

   c.   Unanswered/Marked for Review will be given no mark (0).

Choose the correct answer :

Question ID: 692771

At a certain place, pure water boils at 99.725°C. Calculate the boiling point of 0.69 m solution of urea in water at the same place. (Given k_b of water = 0.513°C kg mol⁻¹)

(A) 0.3539°C

(B) 100.079°C

(C) 99.37°C

(D) 99.725°C

Answer (B)

Sol. $\Delta T_b = ik_bm$

$k_b = 0.513°C$ kg mol⁻¹   [i = 1]

m = 0.69 m

$T_b^s - T_b^o = 0.513 \times 0.69$

$T_b^s - 99.725 = 0.354$

$T_b^s = 0.354 + 99.725$

$T_b^s = 100.079°C$

Question ID: 692772

Henry's law constant of oxygen in water at 298 K is 36 k bar. What is the solubility of oxygen in water at 298 K under 1.80 bar pressure?

(A) 5.55×10^{-3} M

(B) 5.55×10^{-4} M

(C) 2.775×10^{-3} M

(D) 2.775×10^{-4} M

Answer (C)

Sol. $k_H = 36 \times 10^3$ bar

p = 1.80 bar

$p = k_H \times x_{O_2}$

$1.80 = 36 \times 10^3 \times x_{O_2}$

$x_{O_2} = \dfrac{1.8}{36 \times 10^3} = 5 \times 10^{-5}$

Number of moles of $H_2O = \dfrac{1000}{18} = 55.5$ mol

$x_{O_2} = \dfrac{n_{O_2}}{n_{O_2} + H_2O} \simeq \dfrac{n_{O_2}}{n_{H_2O}} = 5 \times 10^{-5}$

$\dfrac{n_{O_2}}{55.5} = 5 \times 10^{-5}$

$n_{O_2} = 277.5 \times 10^{-5} = 2.775 \times 10^{-3}$ mol

Solubility = 2.775×10^{-3} M

Question ID: 692773

Which one of the following 1 molal aqueous solution will show maximum freezing point depression?

(A) $[Co(H_2O)_3Cl_3] \cdot 3H_2O$

(B) $[Co(H_2O)_6]Cl_3$

(C) $[Co(H_2O)_5Cl]Cl_2 \cdot H_2O$

(D) $[Co(H_2O)_4Cl]Cl_2 \cdot 2H_2O$

Answer (B)

Sol. $\Delta T_f = ik_fm$

Higher the value of 'i', higher will be the depression in freezing point.

Solutions	i
$[Co(H_2O)_3Cl_3] \cdot 3H_2O$	1
$[Co(H_2O)_6]Cl_3$	4
$[Co(H_2O)_5Cl]Cl_2 \cdot H_2O$	3
$[Co(H_2O)_4Cl]Cl_2 \cdot 2H_2O$	3

Question ID: 692774

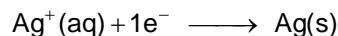Calculate the quantity of electricity in coulombs required to deposit all the silver metal from 2.50 mL of 1 M AgNO₃ solution.

(Given molar mass of Ag = 108 g mol⁻¹ and 1 F = 96500 C)

(A) 241250 C

(B) 24125 C

(C) 893.5 C

(D) 2412.5 C

Answer (NA)

Sol. Moles of Ag deposited = $1 \times 2.5 \times 10^{-3}$

$= 2.5 \times 10^{-3}$ mol

$Ag^+(aq) + 1e^- \longrightarrow Ag(s)$

1 mole Ag⁺ require 1 F charge.

2.5×10^{-3} mol Ag⁺ require

$= 2.5 \times 10^{-3} \times 1$ F charge

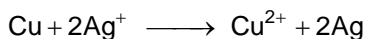$= 2.5 \times 10^{-3} \times 96500$

$= 241.25$ C

Question ID: 692775

A cell Cu | Cu^{2+} || Ag$^+$ | Ag was made up using 0.01 M AgNO$_3$ and 0.0001 M Cu(NO$_3$)$_2$ the cell potential at 298 K is

Given $E^o_{cell} = 0.46$ V, $\dfrac{2.303RT}{F} = 0.059$ V

(A) +0.46 V   (B) +0.40 V

(C) −0.46 V   (D) +0.519 V

Answer (A)

Sol. Cu | Cu^{2+}(0.0001 M) || Ag$^+$(0.01 M) | Ag

$$Cu + 2Ag^+ \longrightarrow Cu^{2+} + 2Ag$$

$$E_{cell} = E^o_{cell} - \frac{0.059}{n}\log\frac{[Ag^+]^2}{[Cu^{2+}]}$$

$$E_{cell} = 0.46 - \frac{0.059}{n}\log\frac{[0.01]^2}{[0.0001]}$$

$$E_{cell} = 0.46 - 0 = +0.46 \text{ V}$$

Question ID: 692776

Which of the following method cannot prevent corrosion?

(A) Covering the surface with paint

(B) Covering the surface with other more reactive metal

(C) Covering the surface with sacrificial electrode of another metal

(D) Covering the surface with non-metal

Answer (D)

Sol. Corrosion of metal can be prevented by covering the surface with paint, with some other reactive metal (Sn, Zn etc.) or with sacrificial electrode of another metal (Mg, Zn etc.) which corrodes itself but saves the object.

Question ID: 692777

The rate of a gaseous reaction becomes half when the volume of the vessel is doubled. The order of the reaction is

(A) Zero   (B) One

(C) Two   (D) Three

Answer (B)

Sol. Rate = k[A]^n …(i)

When volume of vessel is doubled, concentration of gas is halved.

i.e., $\dfrac{Rate}{2} = k\left[\dfrac{A}{2}\right]^n$ …(ii)

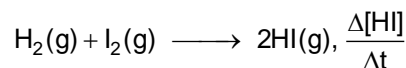On comparing (i) and (ii),

n = 1

i.e., First order reaction.

Question ID: 692778

At T(K), for the reaction:

$$H_2(g) + I_2(g) \longrightarrow 2HI(g), \frac{\Delta[HI]}{\Delta t}$$

is found to be 2 × 10^{-4} mol L^{-1} min^{-1}. What is the average rate of this reaction in mol L^{-1} min^{-1}?

(A) 2 × 10^{-4} (B) 10^{-4}

(C) 4 × 10^{-4} (D) 8 × 10^{-4}

Answer (B)

Sol. $H_2 + I_2 \longrightarrow 2HI$

$$\frac{\Delta[HI]}{\Delta t} = 2\times10^{-4} \text{ mol L}^{-1}\text{ min}^{-1}$$

(Average rate) $r_{av} = \dfrac{1}{2}\dfrac{\Delta[HI]}{\Delta t}$

$$= \frac{1}{2}\times2\times10^{-4}$$

$$= 10^{-4} \text{ mol L}^{-1}\text{ min}^{-1}$$

Question ID: 692779

Match List-I with List-II

	LIST-I		LIST-II
A.	Hardy-Schulze rule	I.	Hardening of leather
B.	Tyndall effect	II.	Coagulation of colloids by electrolytes
C.	Cottrell precipitator	III.	Scattering of light
D.	Tanning	IV.	Removal of pollutants from industrial waste gases

Choose the **correct** answer from the options given below:

(A) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

(B) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

(C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

(D) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Answer (C)

Sol.
- Hardy-Schulze rule refers that coagulating power of ion with higher opposite charge of electrolyte is higher.

- Tyndall effect works with scattering of light when it interacts with colloidal particle.

- Cottrell precipitator removes pollutants from industrial waste gases.

- Tanning is hardening of leather by chemical process.

Question ID: 6927710

Which of the following is the correct expression for adsorption isotherm. (x = mass of gas adsorbed, m = mass of adsorbent, p = pressure, k and n = constants)

(A) $\log\dfrac{x}{m} = \log k + \dfrac{1}{n}\log p$

(B) $\log\dfrac{m}{x} = \log k + \dfrac{1}{n}\log p$

(C) $\log p = \log k + \dfrac{1}{n}\log\dfrac{x}{m}$

(D) $\log\dfrac{x}{m} = \log k + n\log p$

Answer (A)

Sol. According to Freundlich adsorption isotherm

$\dfrac{x}{m} = kp^{1/n}$

Taking log on both sides,

$\log\left(\dfrac{x}{m}\right) = \log k + \log p^{1/n}$

$\log\left(\dfrac{x}{m}\right) = \log k + \dfrac{1}{n}\log p$

Question ID: 6927711

The metals present in brass are?

(A) Cu & Zn

(B) Cu & Fe

(C) Fe & Zn

(D) Cu & Ni

Answer (A)

Sol. Brass consists 60% Cu and 40% Zn.

Question ID: 6927712

Which one of the following is the ore of copper?

(A) Calamine

(B) Siderite

(C) Malachite

(D) Kaolinite

Answer (C)

Sol. Calamine $\rightarrow ZnCO_3$

Siderite $\rightarrow FeCO_3$

Malachite $\rightarrow CuCO_3.Cu(OH)_2$

Kaolinite $\rightarrow Al_2(OH)_4Si_2O_5$

Question ID: 6927713

Which one of the following reactions does not take place in blast furnace?

(A) $3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$

(B) $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

(C) $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$

(D) $FeO + SiO_2 \rightarrow FeSiO_3$

Answer (D)

Sol. At 500-800 K (lower temperature range in the blast furnace),

Fe_2O_3 is first reduced to Fe_3O_4 and then to FeO

$3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$

$Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

$Fe_2O_3 + CO \rightarrow 2FeO + CO_2$
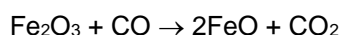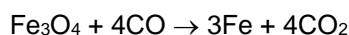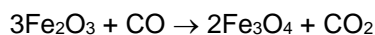
Question ID: 6927714

Match List-I with List-II

	LIST-I Molecules of Halogens		LIST-II Colour
A.	F_2	I.	Yellow
B.	Cl_2	II.	Violet
C.	Br_2	III.	Greenish Yellow
D.	I_2	IV.	Red

Choose the correct answer from the options given below:

(A) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

(B) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(C) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)

(D) (A)-(I), (B)-(III), (C)-(IV), (D)-(II)

Answer (D)

Sol. $F_2 \rightarrow$ Yellow

$Cl_2 \rightarrow$ Greenish yellow

$Br_2 \rightarrow$ Red

$I_2 \rightarrow$ Voilet

Question ID: 6927715

Which of the following oxoacids of phosphorous contains only one –OH group in its structure?

(A) Orthophosphoric acid

(B) Phosphoric acid
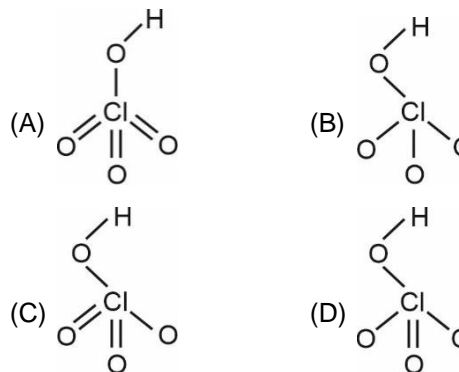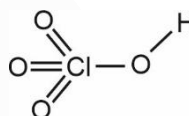
(C) Orthophosphorous acid

(D) Hypophosphorous acid

Answer (D)

Sol.
- Orthophosphoric/Phosphoric acid contains 3, –OH groups.
- Orthophosphorous acid contains 2, –OH groups.
- Hypophosphorous acid has only one –OH group.
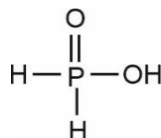
Question ID: 6927716

The correct structure of perchloric acid is :

Answer (A)

Sol. Perchloric acid

Question ID : 6927717

	List I Compounds of Xe		List II Shape
A.	XeF_6	I.	Distorted octahedral
B.	XeO_3	II.	Square Planar
C.	$XeOF_4$	III.	Pyramidal
D.	XeF_4	IV.	Square pyramidal

Choose the correct answer from the options given below:

(A) A(I), B(II), C(III), D(IV)

(B) A(II), B(I), C(III), D(IV)

(C) A(I), B(III), C(IV), D(II)

(D) A(III), B(II), C(I), D(IV)

Answer (C)

Sol.

$XeF_6 \rightarrow sp^3d^3 +$ one lone pair $\rightarrow$ Distorted octahedral

$XeO_3 \rightarrow sp^3 +$ one lone pair $\rightarrow$ Pyramidal

$XeOF_4 \rightarrow sp^3d^2 +$ one lone pair $\rightarrow$ Square Pyramidal

$XeF_4 \rightarrow sp^3d^2 +$ two lone pair $\rightarrow$ Square Planar

Question ID : 6927718

The correct order of oxidation states of nitrogen in NO, N_2O, NO_2 and N_2O_3 respectively is

(A) $N_2O < NO_2 < NO < N_2O_3$

(B) $N_2O < NO < N_2O_3 < NO_2$

(C) $NO_2 < N_2O_3 < N_2O < NO$

(D) $NO_2 < NO < N_2O < N_2O_3$

Answer (B)

Sol.

Oxide	Oxidation state of Nitrogen
N_2O	+1
NO	+2
N_2O_3	+3
NO_2	+4

Correct Order of O.S is :

$N_2O < NO < N_2O_3 < NO_2$
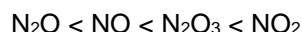
Question ID : 6927719

$4d$ series can be represented by

(A) Y to Cd (Y = Yttrium & Cd = Cadmium)

(B) La and Hf to Hg (La = Lanthanum Hf = hafnium & Hg = Mercury)

(C) Sc to Zn (Sc = Scandium & Zn = Zinc)

(D) Ce to Lu (Ce = Cerium & Lu = Lutetium)

Answer (A)

Sol. $4d$ series starting at yttrium (Z = 39) and ends at cadmium (Z = 48)

Question ID : 6927720

The group of elements in which the differentiating electron enters the prepenultimate shell of atoms is called:

(A) s-Block elements   (B) p-Block elements

(C) d-Block elements   (D) f-Block elements

Answer (D)

Sol. In f-block elements, the differentiating electron enters the prepenultimate shell of atom having general electronic configuration is $(n - 2) f^{1-14} (n - 1)d^{0-1} ns^2$

Question ID : 6927721

Which of the following elements exist in +5 oxidation state?

A. Actinium

B. Thorium

C. Protactinium

D. Uranium

(A) A and B only   (B) A and C only

(C) B and C only   (D) C and D only

Answer (D)

Sol. Protactinium (Pa) and uranium (U) can show +5 oxidation state while, Actinium (Ac) and Thorium (Th) can only show +3 and +4 oxidation state respectively.
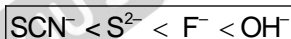
Question ID : 6927722

Which one of the following ligand produces weakest field?

(A) SCN^- (B) S^{2-}

(C) F^- (D) OH^-

Answer (A)

Sol. SCN^- ligand produce weakest field.

Correct order for field strength is :

$$\boxed{SCN^- < S^{2-} < F^- < OH^-}$$

Question ID : 6927723

The chelating ligand used in the treatment of lead poisoning is

(A) Desferrioxime B   (B) Cis-platin

(C) EDTA   (D) D-penicillamine

Answer (C)

**Sol.** EDTA is used in the treatment of lead poisoning.

Question ID : 6927724

In which of the following, nitro chlorobenzene derivative can easily be converted into its corresponding phenolic compound by heating with water.

(A) 4-Nitrochlorobenzene

(B) 3-Nitrochlorobenzene

(C) 2, 4-Dinitrochlorobenzene

(D) 2,4,6-Trinitrochlorobenzene

Answer (D)

Sol. When 2, 4, 6-trinitrochlorobenzene react with warm water, it gives 2, 4, 6- trinitrophenol as a product.

More the number of electron withdrawing groups present at ortho and para positions, faster is the nucleophilic substitution reaction.
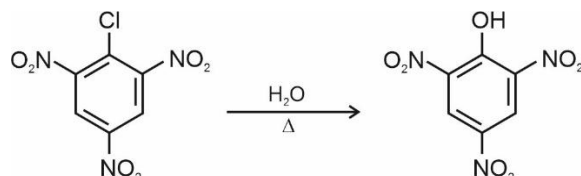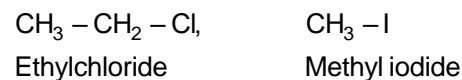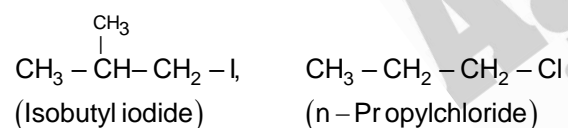

Question ID: 6927725

Predict the correct order of reactivity of the following compounds by S_N2 reaction. Isobutyliodide, n-Propylchloride Ethylchloride and Methyl iodide.

(A) Ethylchloride > Methyl iodide >n-Propylchloride > Isobutyliodide

(B) Methyl iodide > Isobutyl idodide > Ethyl chloride > n-Propylchloride

(C) n-Propylchoride > Isobutyl iodide > Ethylchloride > Methyliodide

(D) Methyliodide > Ethylchloride > n-Propylchloride > Isobutyl iodide

Answer (D)

Sol. The correct order of reactivity is S_N2 reaction is:

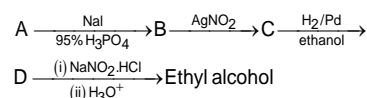Primary halide > Secondary halide > Tertiary halide

$$CH_3 - \overset{\overset{CH_3}{|}}{CH} - CH_2 - I, \quad CH_3 - CH_2 - CH_2 - Cl$$
(Isobutyl iodide)   (n − Propylchloride)

$$CH_3 - CH_2 - Cl, \quad CH_3 - I$$
Ethylchloride   Methyl iodide

Less bulky group have more reactivity for S_N2.

So correct order for reactivity is:

$CH_3I > CH_3CH_2Cl > CH_3CH_2CH_2Cl >$

$(CH_3)_2CHCH_2I$
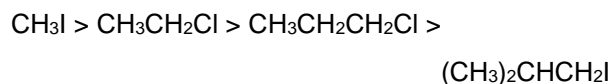
Question ID: 6927726

In the following sequence of reactions, 'A' is

$$A \xrightarrow[95\% \, H_3PO_4]{NaI} B \xrightarrow{AgNO_2} C \xrightarrow[ethanol]{H_2/Pd}$$
$$D \xrightarrow[(ii) \, H_3O^+]{(i) \, NaNO_2 \cdot HCl} \text{Ethyl alcohol}$$

(A) Acetaldehyde   (B) Diethyl ether

(C) Dimethyl ether   (D) Nitroethane

Answer (B)

Sol. $A \xrightarrow[95\% \, H_3PO_4]{NaI} B \xrightarrow{AgNO_2} C \xrightarrow[ethanol]{H_2/Pd}$

$D \xrightarrow[(ii) \, H_3O^+]{(i) \, NaNO_2+HCl} \text{Ethyl alcohol}$

(i) $D \xrightarrow[(ii) \, H_3O^+]{(i) \, NaNO_2+HCl} CH_3CH_2OH$

So, D is $CH_3 - CH_2 - NH_2$.
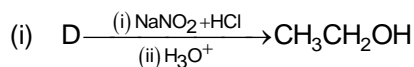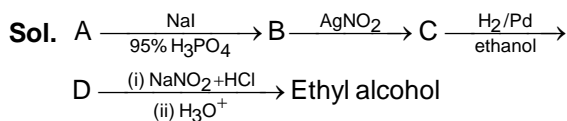
(ii) $C \xrightarrow[ethanol]{H_2/Pd} \underset{(D)}{CH_3 - CH_2 - NH_2}$.

So, C is $CH_3 - CH_2 - NO_2$.
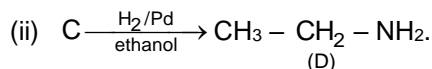
(iii) $B \xrightarrow{AgNO_2} CH_3 - CH_2 - NO_2$

So, B is $CH_3 - CH_2 - I$.
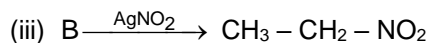
$A \xrightarrow{\dfrac{KI}{95\% \, H_3PO_4}} \underset{(A)}{CH_3 - CH_2 - I}$
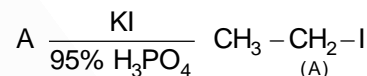
So, out of given options, A is $CH_3CH_2-O-CH_2CH_3$
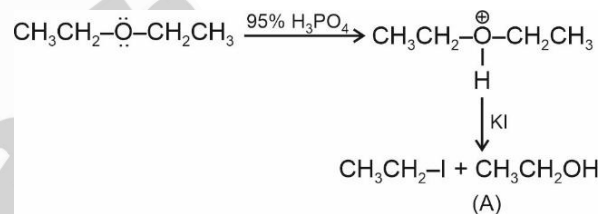
Question ID: 6927727

Match the type of alkyl halide from column I with examples from column II and mark the appropriate answer.

	LIST-I		LIST-II
A.	Primary alkyl halide	I.	Chlorophenyl methane
B.	Secondary alkyl halide	II.	Methylene chloride
C.	Geminal dihalide	III.	Isopropyl chloride
D.	Benzylic halide	IV.	Isobutyl chloride

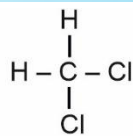Choose the correct answer from the options given below:

(A) A-IV, B-III, C-II, D-I   (B) A-II, B-III, C-I, D-IV

(C) A-II, B-IV, C-I, D-III   (D) A-IV, B-II, C-III, D-I
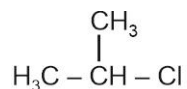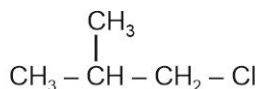
Answer (A)

Sol.
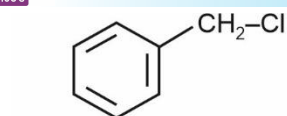
Benzylic halide
(Chlorophenyl methane)

Geminal dihalide
(Methylene chloride)

$H_3C - \underset{\underset{CH_3}{|}}{CH} - Cl$; $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - Cl$

2° alkyl halide
(Isopropyl chloride)

1° alkyl halide
(Isobutyl chloride)
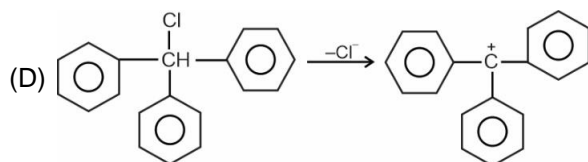
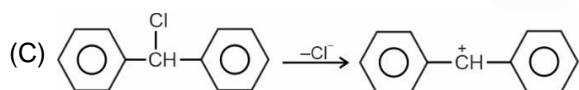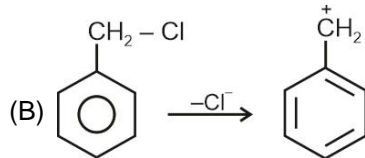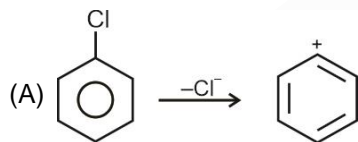**Correct Answer :** A-IV, B-III, C-II, D-I

Question ID: 6927728

Which one of the following compounds will undergo unimolecular nucleophilic substitution at the fastest rate?

(A) C_6H_5Cl

(B) $C_6H_5CH_2Cl$

(C) $(C_6H_5)_2CHCl$
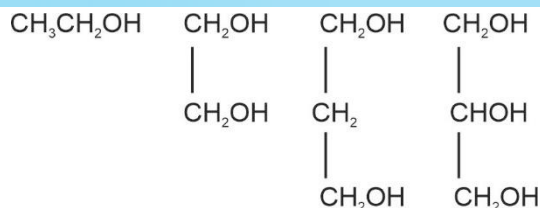
(D) $(C_6H_5)_3CCl$

Answer (D)

Sol. Alkyl halide form more stable carbocation will give fastest rate of unimolecular nucleophilic substitution (S_N1) reaction.

(A)

(B)

(C)

(D)

Correct Answer (D) is highly stable carbocation due to maximum resonance effect, hence (D) give fastest rate of S_N1 reaction

Question ID: 6927729

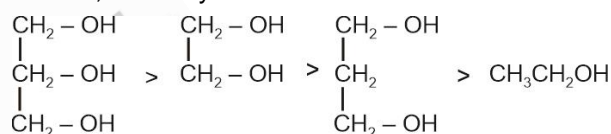The Correct decreasing order of solubility of the following alcohols in water is:

CH_3CH_2OH

$\underset{\underset{CH_2OH}{|}}{CH_2OH}$

$\underset{\underset{CH_2}{|}\underset{\underset{CH_2OH}{|}}{}}{CH_2OH}$

$\underset{\underset{CHOH}{|}\underset{\underset{CH_2OH}{|}}{}}{CH_2OH}$

I   II   III   IV

(A) III > IV > II > I

(B) IV > II > III > I

(C) IV > III > II > I

(D) IV > II > I > III

Answer (B)

Sol.

- As the extend of H-bonding increases, solubility of alcohol increases in water

- As hydrophobic part increases, solubility of alcohol decreases in water.

- More number of –OH groups increases the extend of H–bonding

Hence, solubility order is

$\underset{\underset{CH_2-OH}{|}\underset{\underset{CH_2-OH}{|}}{}}{CH_2-OH} > \underset{\underset{CH_2-OH}{|}}{CH_2-OH} > \underset{\underset{CH_2}{|}\underset{\underset{CH_2-OH}{|}}{}}{CH_2-OH} > CH_3CH_2OH$

Question ID: 6927730

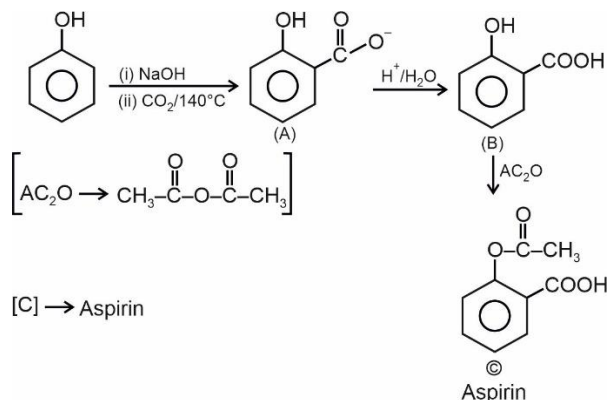Consider the following sequence of reactions:
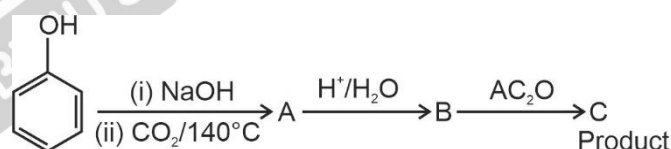
The final Product 'C' is

(A) Salicylic acid

(B) Salicylaldehyde
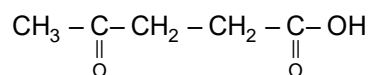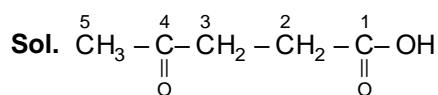
(C) Aspirin

(D) Ethyl salicylate

Answer (C)

Sol.

Question ID: 6927731

Write the correct IUPAC name of the compound 'x' given below:

$$CH_3 - \underset{\underset{O}{\|}}{C} - CH_2 - CH_2 - \underset{\underset{O}{\|}}{C} - OH$$

(A) 2-Oxopentanoic acid

(B) 4-Formylpentanoic acid

(C) 4-Oxopentanoic acid

(D) 4-Onepentanoic acid

Answer (C)

Sol. $$\overset{5}{C}H_3 - \overset{4}{\underset{\underset{O}{\|}}{C}} - \overset{3}{C}H_2 - \overset{2}{C}H_2 - \overset{1}{\underset{\underset{O}{\|}}{C}} - OH$$
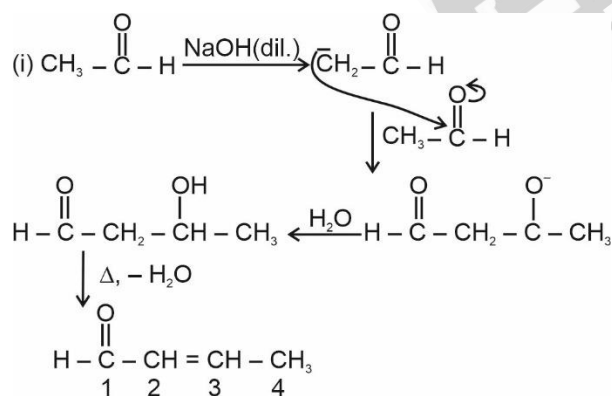
IUPAC name $\Rightarrow$ 4-Oxopentanoic acid.

Question ID: 6927732

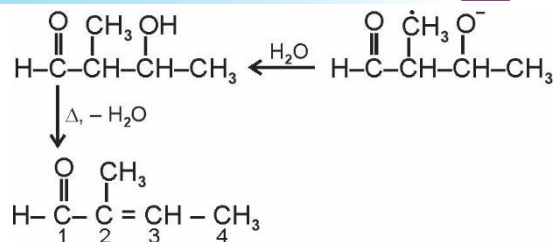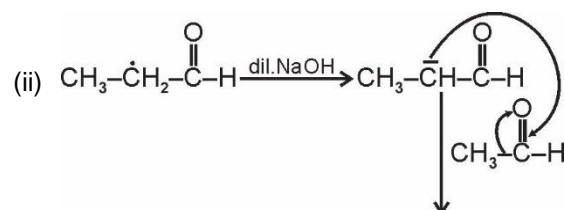Which one of the following product is NOT formed when mixture of ethanal and propanol heated with dil NaOH?

(A) But-2-enal (B) Pent-3-enal

(C) 2-Methylpent-2-enal (D) 2-Methylbut-2-enal
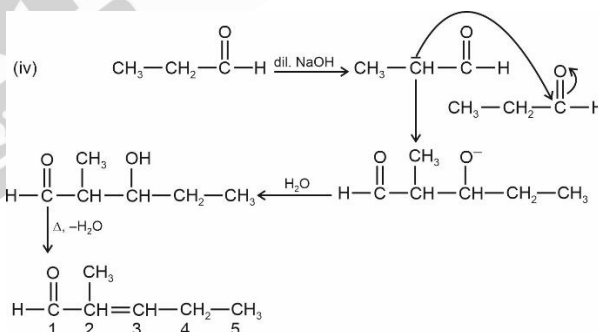
Answer (B)

Sol. If mixture of ethanal and propanal, heated with dil. NaOH. Then possible products are.

But –2–enal. (self product)

2-Methylbut-2-enal [Cross product]

Pent-2-enal [Cross product]
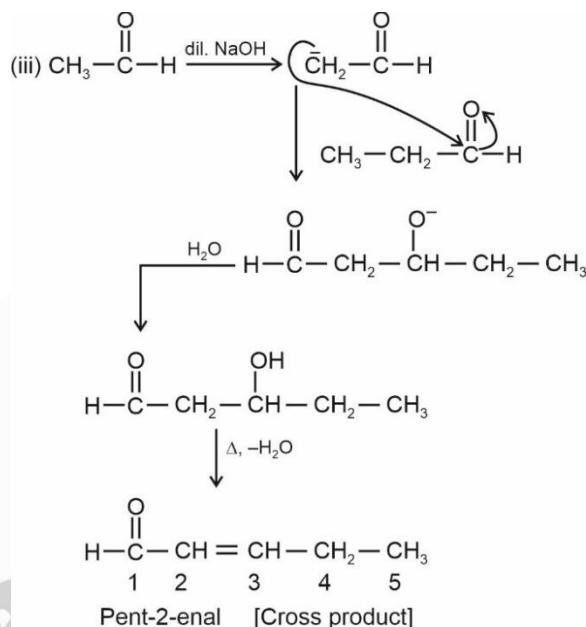
- Pent-3-enal not formed.

- **Note** → In the question instead of propanol we have to use propanal.

Question ID: 6927733

Match List-I with List-II

	LIST-I		LIST-II
A.	Hoffman Bromamide degradation	I.	X_2/Red phosphorus
B.	Hell-Volhard-Zelinsky reaction	II.	Br_2 + NaOH

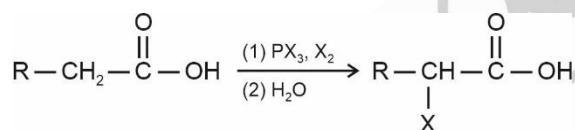| C. | Rosenmund reduction | III. | $SnCl_2 + HCl$ |
| D. | Stephen reaction | IV. | H_2, Pd-BaSO$_4$ |

Choose the correct answer from the options given below:

(A) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

(B) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

(C) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
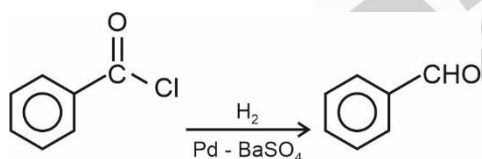
(D) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

Answer (B)
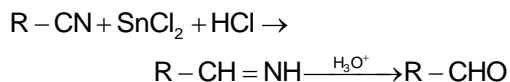
Sol. (A) Hoffman Bromamide degradation reaction.
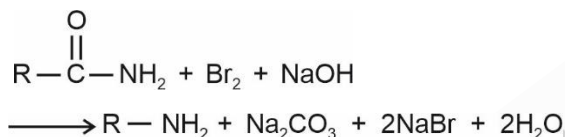
(B) Hell-Volhard Zelinsky reaction

(C) Rosenmund reduction

(D) Stephen reaction

$$R - CN + SnCl_2 + HCl \rightarrow$$
$$R - CH = NH \xrightarrow{H_3O^+} R - CHO$$

List I   List II

(A) Hoffman Bromamide degradation   (II) Br$_2$ + NaOH

(B) Hell-Volhard-Zelinsky reaction   (I) X$_2$/Red phosphorus

(C) Rosenmund reduction   (IV) H$_2$, Pd-BaSO$_4$

(D) Stephen reaction   (III) SnCl$_2$ + HCl

(A)-(II), (B)-(I), (C)-(IV), (D)-(III)

Question ID: 6927734

Identify the product (A) formed in the following sequence of reaction

Answer (C)

Sol.
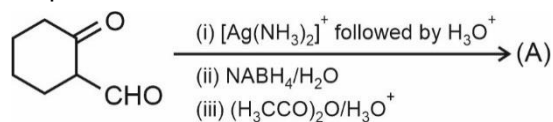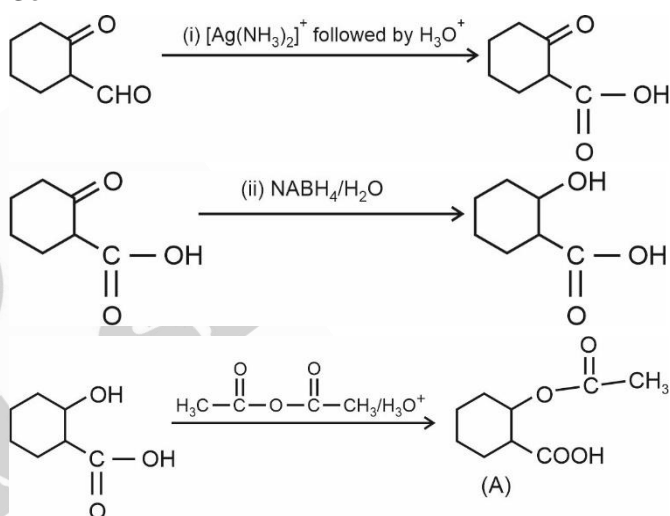
Question ID: 6927735

Which of the following amines reacts with Heinsberg's reagent to form a compound which is insoluble in alkali?

(A) C$_2$H$_5$NH$_2$ (B) C$_2$H$_5$NHC$_2$H$_5$

(C) (C$_2$H$_5$)$_3$N (D) (CH$_3$)$_3$N

Answer (B)

Sol. Heinsberg's reagent
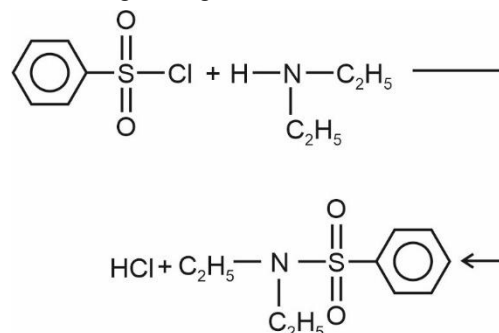
Since, N, N-diethylbenzene sulphonamide does not contain any hydrogen atom attached to nitrogen atom, it is not acidic and hence insoluble in alkali.

Question ID: 6927736

Consider the following sequence of reactions.
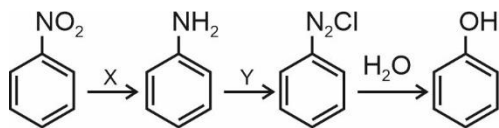
The correct reagent 'X' and 'Y' are:

(A)

X	Y
Sn + HCl	NaNO$_2$ + HCl

(B)

X	Y
Zn + HCl	NaNH$_2$ + HCl

(C)

X	Y
Fe + HCl	NaNH$_2$ + HCl

(D)

X	Y
Zn + HCl	NaNO$_3$ + HCl

Answer (A)

Sol.

X $\longrightarrow$ Sn + HCl

Y $\longrightarrow$ NaNO$_2$ + HCl
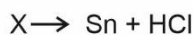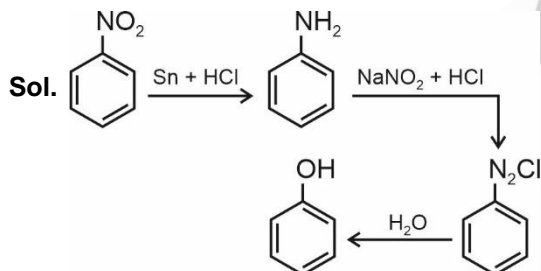
Question ID: 6927737

Complete hydrolysis of RNA yields,

(A) β-D-2-deoxyribose, phosphoric acid and nitrogen containing heterocyclic bases

(B) β-D-ribose, phosphoric acid & nitrogen containing homocyclic bases

(C) β-D-ribose, phosphoric acid & nitrogen containing heterocyclic bases

(D) β-D-deoxyribose, phosphorus acid & nitrogen containing homocyclic bases

Answer (C)

Sol. Complete hydrolysis of RNA yields β-D-ribose (a pentose sugar), phosphoric acid and nitrogen containing heterocyclic bases.

Question ID: 6927738

Glucose on reaction with bromine water gives.

Answer (A)

Sol.

Gluconic acid
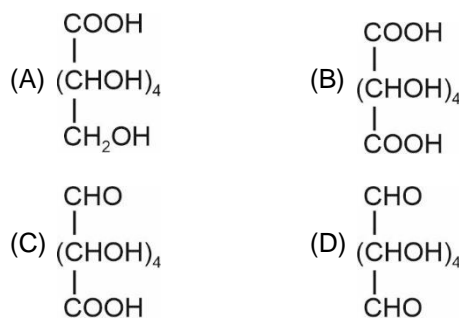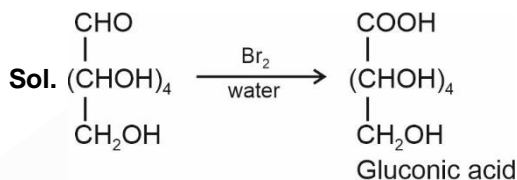
Question ID: 6927739

Aspartame is the most successful and widely used artificial sweetener but its use is limited in cold foods and soft drinks only. This is because

(A) It is soluble at low temperature only

(B) It has very low boiling point

(C) It is unstable at cooking temperature

(D) It is insoluble at high temperature

Answer (C)

Sol. Aspartame is the most successful and widely used artificial sweetener but its use is limited in cold foods and soft drinks only because it is unstable at cooking temperature.

Question ID: 6927740

Match List I with List II

	LIST II (Drug)		LIST II (Example)
A.	Antacid	I.	Penicillin
B.	Analgesic	II.	Tincture of iodine
C.	Antibiotic	III.	Aspirin
D.	Antiseptic	IV.	Ranitidine

Choose the correct answer from the options given below:

(A) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

(B) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)

(C) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

(D) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

Answer (A)

Sol. (A) Antacid $\rightarrow$ Ranitidine

(B) Analgesic $\rightarrow$ Aspirin

(C) Antibiotic $\rightarrow$ Penicillin

(D) Antiseptic $\rightarrow$ Tincture of iodine

Passage :

Solids have definite mass, volume and shape. Depending upon order, they are classified as crystalline solids and amorphous solids. Crystalline solids are further classified into molecular, ionic, metallic and covalent solids. Crystalline solids are made up of constituent particles which are arranged in a regular pattern, which is depicted in the form of three dimensional array of points in spaces called lattice points. Small characteristic repeating portion of lattice is called unit cell.

Unit cells can be primitive and also centred unit cells like face centred, body centred, end centred. Solids are not perfect. There are various types of defects (i) line defect (ii) point defect. Point defects are of three types : stoichiometric, impurity and non-stoichiometric defects. Solids show magnetic properties depending upon the orientation of electron.

Based on the paragraph Answer the following :

Question ID:6927741

For a primitive unit cell, the edge lengths are a $\neq$ b $\neq$ c and axial angles $\alpha \neq \beta \neq \gamma \neq 90°$, then find the crystal system

(A) Hexagonal

(B) Rhombohedral

(C) Tetragonal

(D) Triclinic

Answer (D)

Sol.

Crystal system	Possible variation	Edge lengths	Axial angles
Hexagonal	Primitive	a = b $\neq$ c	$\begin{cases} \alpha = \beta = 90° \\ \gamma = 120° \end{cases}$
Rhombohedral	Primitive	a = b = c	$\alpha = \beta = \gamma \neq 90°$
Tetragonal	Primitive, body-centred	a = b $\neq$ c	$\alpha = \beta = \gamma = 90°$
Triclinic	Primitive	a $\neq$ b $\neq$ c	$\alpha \neq \beta \neq \gamma \neq 90°$

For Triclinic crystal system ; edge lengths are, a $\neq$ b $\neq$ c and axial angles $\alpha \neq \beta \neq \gamma \neq 90°$

Question ID:6927742

CaF_2 is an example of :

(A) Metallic solid

(B) Covalent solid

(C) Ionic solid

(D) Molecular solid

Answer (C)

Sol. CaF_2 is an example of Ionic solid as it exists as Ca^{2+} and F^- in crystal lattice.

Question ID:6927743

Identify the type of magnetic property from the schematic alignment of magnetic moment given below :

(A) Diamagnetic

(B) Ferromagnetic

(C) Antiferromagnetic

(D) Ferrimagnetic

Answer (D)

Sol. In ferrimagnetic substance, the magnetic moments of the domains in the substance are aligned in parallel and anti-parallel directions in unequal numbers.

Question ID:6927744

Match List I with List II.

	LIST I		LIST II
A.	Schottky defect	I.	Irregularities from an ideal arrangement around an atom.
B.	Dislocation defect	II.	Decreases the density of the substance
C.	Point defect	III.	Frenkel defect
D.	Vacancy defect	IV.	Number of missing cations and anions are equal

Choose the correct answer from the options given below :

(A) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

(B) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

(C) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

(D) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)

Answer (B)

Sol.
- Schottky defect : It is basically a vacancy defect in ionic solids. In order to maintain electrical neutrality, the number of missing cations and anions are equal.
- Dislocation defect : Frenkel defect is also called dislocation defect
- Point defect : These are the irregularities from ideal arrangement around a point or an atom in a crystalline substance
- Vacancy defect : When some of the lattice sites are vacant, the crystal is said to have vacancy defect. This results in decrease in the density of substance.

Question ID:6927745

Certain properties of Crystalline solids are given below :

A. They have sharp melting points

B. They have long range order

C. They do not have definite enthalpy of fusion

D. They show anisotropy

E. Rubber, plastic are examples of crystalline solids

Incorrect statements are :

Choose the correct answer from the options given below :

(A) A and C only　　　　(B) B and C only

(C) C and E only　　　　(D) A, B and D only

Answer (C)

Sol.
- Crystalline solids have definite enthalpy of fusion.
- Rubber, plastic are example of amorphous solids.

Passage :

High molecular mass macromolecules are called polymers which consist of repeating structural units derived from corresponding monomers. These polymers can be classified in a number of ways, such as based on their source, method of preparation intermolecular forces of attraction etc.

Natural rubber is a polymer of cis-1, 4-isoprene and can be made tough with vulcanisation process. Polymers are useful in manufacturing of various materials such as toys, fibres, pipes, television cabinets etc.

In view of potential environmental hazards of waste disposal certain biodegradable polymers are synthesised such as PHBV.

Based on the paragraph given above answer the questions

Question ID:6927746

Some statements about polymers are given below. Identify the correct statement.

A. The order of intermolecular forces is terylene > polythene > neoprene

B. High density polythene is a linear polymer

C. Novolac on heating with formaldehyde gives Bakelite.

D. natural rubber is a linear polymer called as trans-1-4-polyisoprene.

E. Aliphatic polyesters are important classes of biodegradable polymers

Choose the most appropriate answer from the options given below :

(A) A, B & C only

(B) A, B, C & E only

(C) B, C & E only

(D) A, B, D & E only

Answer (C)

Sol. • The order of intermolecular force : terylene > neoprene > polythene

• HDP (High density polythene) consists of linear molecules

• Novolac on heating with formaldehyde undergoes cross linking to form an infusible solid mass called bakelite.

• Natural rubber is a linear polymer called poly-cis-isoprene.

• Aliphatic polyesters (eg : PHBV) are one of the important classes of biodegradable polymers
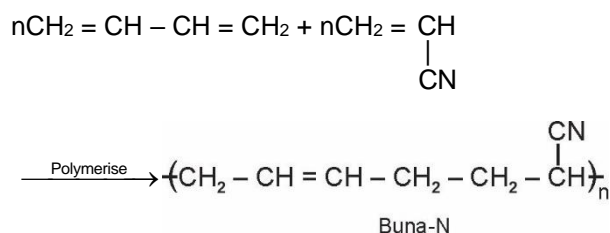
Question ID:6927747

Which among the following statement is **Not** true for copolymer Buna-N?

(A) It contains cyano group

(B) It is used in the manufacture of unbreakable crockery

(C) It is a copolymer of 1, 3-Butadiene and acrylonitrile

(D) It is an example of synthetic rubber

Answer (B)

Sol. BUNA-N is a synthetic rubber obtained by copolymerisation of 1, 3-butadiene and acrylonitrile.

$$nCH_2 = CH - CH = CH_2 + nCH_2 = CH$$
$$\underset{CN}{|}$$

$$\xrightarrow{\text{Polymerise}} (CH_2 - CH = CH - CH_2 - CH_2 - \underset{\underset{CN}{|}}{CH})_n$$

Buna-N

It is used in making oil seals, tank lining etc.

Question ID:6927748

Match List I with List II.

	LIST I		LIST II
A.	Polypropene	I.	Manufacture of paints and lacquers
B.	Polyvinylchloride	II.	For making combs, electrical switches, handles of utensils and computer discs
C.	Glyptal	III.	Manufacture of ropes, toys, pipes, fibres, etc.
D.	Bakelite	IV.	Manufacture of rain-coats, handbags vinyl flooring water pipes

Choose the correct answer from the options given below:

(A) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(B) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)

(C) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(D) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

Answer (A, C)

Sol. • Polypropene : Used in manufacture of ropes, toys, pipes, fibres etc.

• Polyvinylchloride : Used in manufacture of rain-coats, handbags, vinyl flooring, water pipes, etc.

• Glyptal : Used in manufacture of paints and lacquers

• Bakelite : Used for making combs, electrical switches, handles of utensils and computer discs

Question ID:6927749

Match List I with List II.

	LIST I		LIST II
A.	Bakelite	I.	1, 3-butadiene + Acrylonitrile
B.	Glyptal	II.	Glycine + Amino caproic acid
C.	Nylon-2-Nylon-6	III.	Ethylene glycol + phthalic acid
D.	Buna-N	IV.	Phenol + formaldehyde

Choose the correct answer from the options given below :

(A) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

(B) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)

(C) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)

(D) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)

Answer (A)

Sol.

Novolac

Bakelite

(Glyptal)

Buna-N

Nylon 2-nylon-6
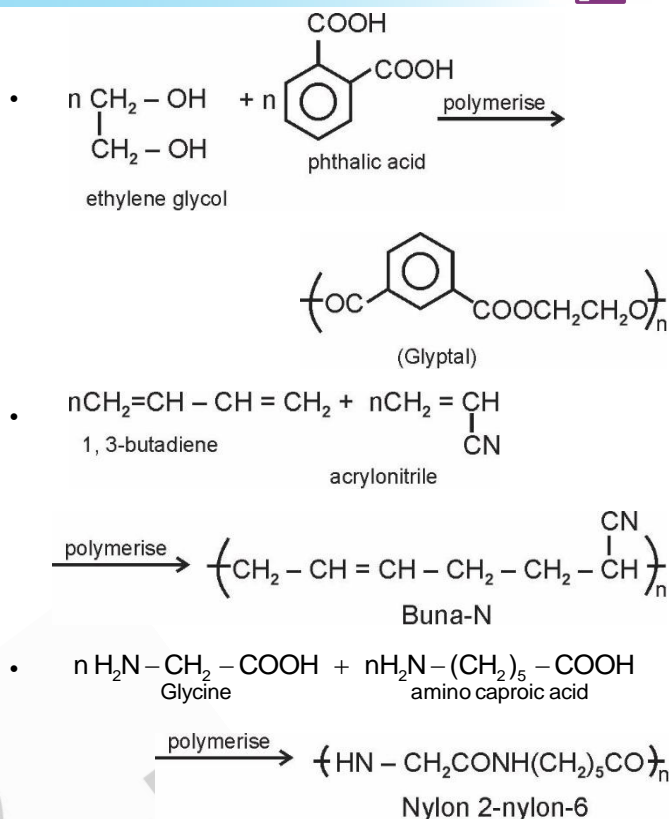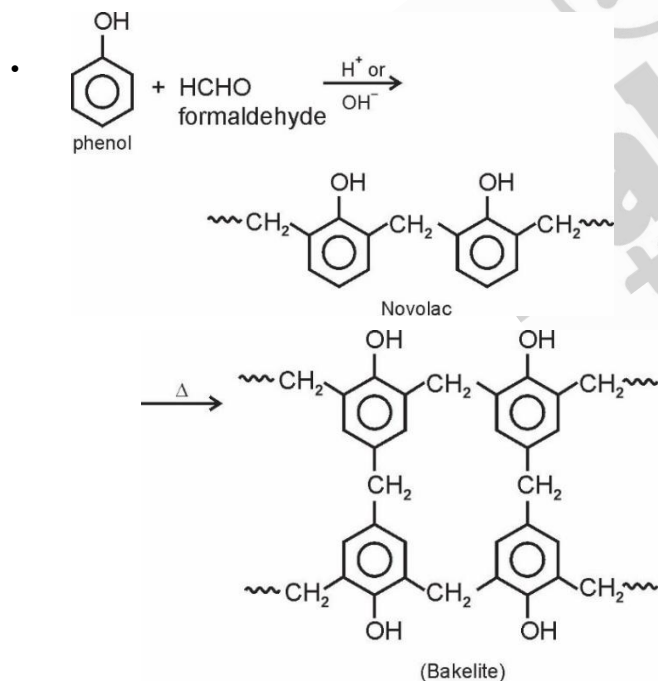
Question ID:6927750

Which of the following polymers is prepared by using monomers ethylene glycol and phthalic acid?

(A) Neoprene 　　　　 (B) Melamine

(C) Glyptal 　　　　　 (D) PVC

Answer (C)

Sol.

(Glyptal)

❑　❑　❑