PAPER SOLUTION

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2025

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Question Paper

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#Q. The Product A and B in the following reactions, respectively:

$$(A) \xleftarrow{AgNo_2} CH_3CH_2CH_2Br_2 \xrightarrow{AgCN} B$$

A $CH_3 - CH_2 - CH_2 - ONO$, $CH_3 - CH_2 - CH_2 - CN$

B $CH_3 - CH_2 - CH_2 - NO_2$, $CH_3 - CH_2 - CH_2 - NC$

C $CH_3 - CH_2 - CH_2 - NO_2$, $CH_3 - CH_2 - CH_2CN$

D $CH_3 - CH_2 - CH_2 - ONO$, $CH_3 - CH_2 - CH_2 - NC$

Ans. (B)

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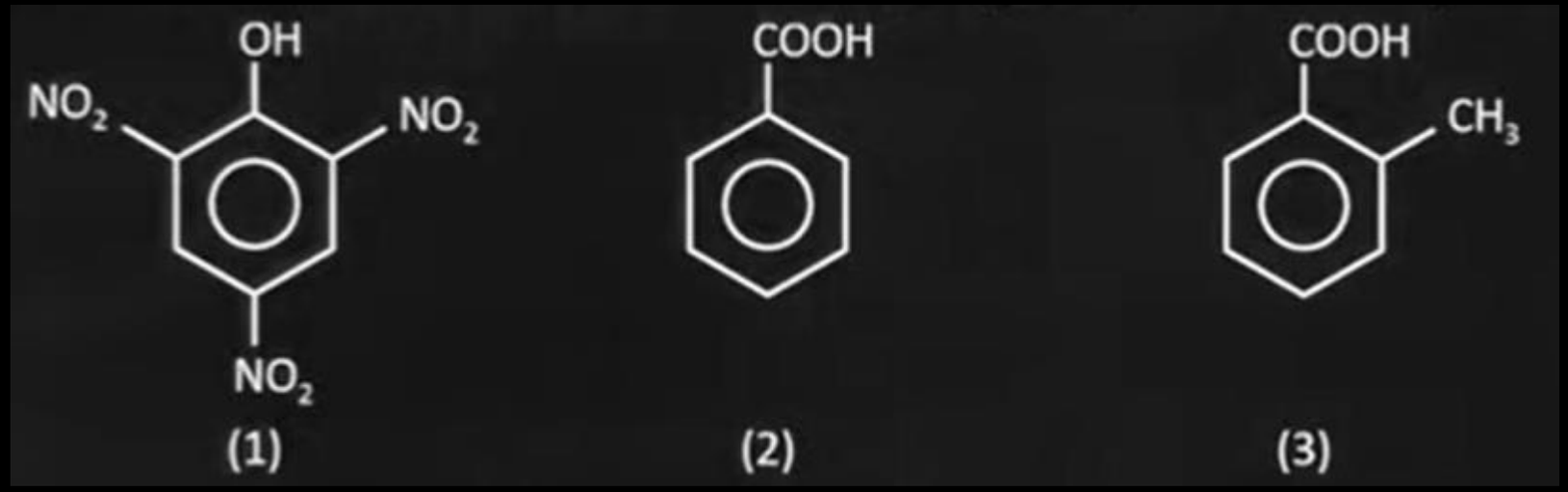
#Q. What is the rate of reaction for releasing $CO_{2(g)}$ with aq. $NaHCO_3$ among following?



A 1 > 2 > 3

B 1 > 3 > 2

C 3 > 2 > 1

D 2 > 3 > 1

Ans. (B)

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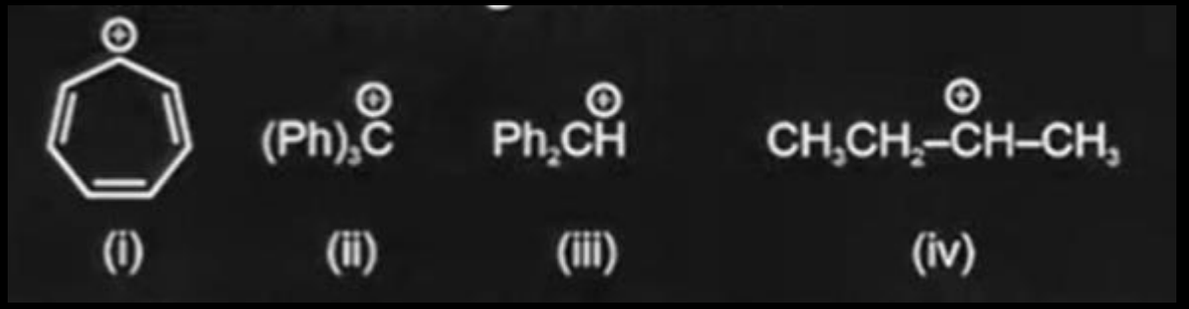
#Q. Consider the following carbocations



The correct increasing order of stability of these carbocations is:

A i < ii < iii < iv

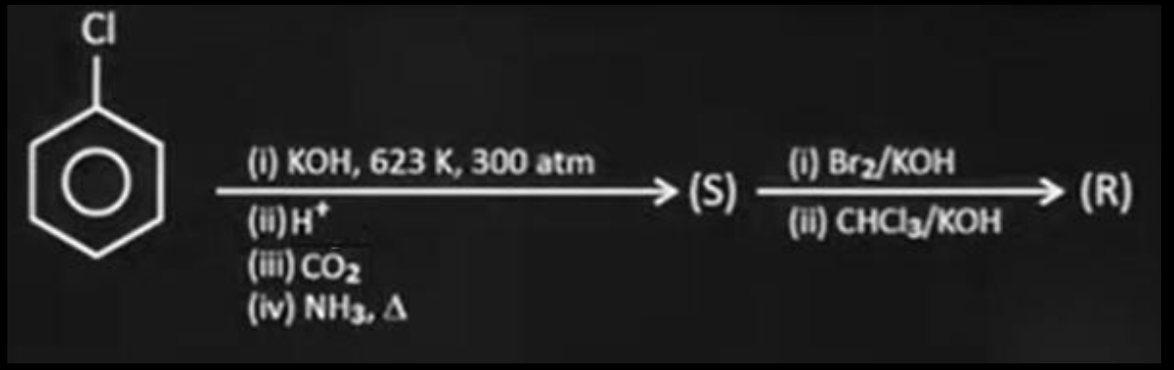
B iv < iii < ii < i

C iv < iii < i < ii

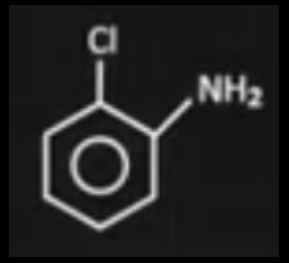
D ii < iii < iv < i

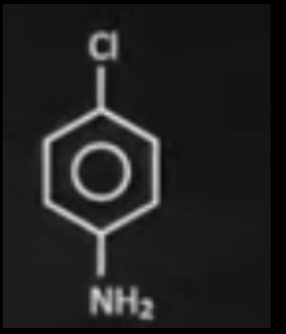
Ans. (B)

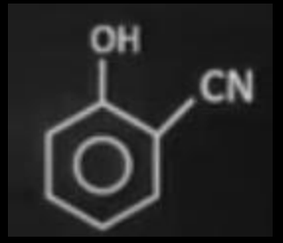
#Q. In the given reaction sequence:

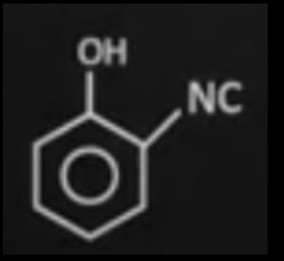


What is (R)

A 

B 

C 

D 

Ans. (D)

#Q. Which of the following pair have square pyramidal shape?

(A) SbF_5, BrF_5

(B) BrF_5, $XeOF_4$

(C) PCl_5, Sb_6F_5

(D) PCl_5, $XeOF_4$

Ans. (B)

#Q. Which of the following set of quantum numbers have same energy?

(a) n = 2, l = 2, m = +1
(b) n = 2, l = 1, m = –1
(c) n = 3, l = 2, m = 0
(d) n = 3, l = 2, m = 1

A. a, b

B. b, c

C. c, d

D. a, c

Ans. (C)

#Q. 70% by mass solution of HNO_3 is taken having density 1.41 gm/ml. Calculate molarity (Rounded off to nearest integer).

(NCERT Page No. – 26, Q. No. – 1.6 Chapter – 1 Class – XI)

Ans. 16

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#Q. Match the following column and choose the correct option.

Column – I		Column –II	
A.	$H_2O_2 \rightarrow H_2O + O_2$	1.	Combustion reaction
B.	$NaH \rightarrow Na + H_2$	2.	Disproportionation
C.	$CH_4 + O_2 \rightarrow CO_2 + H_2O$	3.	Decomposition reaction
D.	$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$	4.	Displacement reaction

A A–2, B–1, C–3, D–4

B A–3, B–2, C–4, D–1

C A–2, B–3, C–1, D–4

D A–3, B–2, C–1, D–4

Ans. (D)

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#Q. Which of the following has same energy in absence of electrtic and magnetic field for hydrogen atom?

(NCERT Atomic Structure Page NO.- 60 Class – XI)

A 2s, 3p

B 3s, 2p

C 2s, 2p

D 3s, 4p

Ans. (C)

#Q. Among the following the incorrect order of atomic radius is:

(A) B > Al > Mg > F

(B) Al > B > N > F

(C) Mg > Al > Be > O

(D) Mg > Be > N > F

Ans. (A)

#Q. A compound contains 14.4% carbon, 1.2% Hydrogen and 84.4% Chlorine, Calculate empirical formula mass of compound. (Molar mass of C = 12, H = 1, Cl = 35.5)

Ans. 84

#Q. Which of the following given violet colour in Borax bead test?

A. Cr^{3+}

B. Mn^{2+}

C. Co^{3+}

D. Fe^{2+}

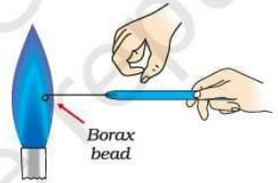

Fig. 7.5 : Removing borax bead

Table 7.9 : Inference from the borax bead test

Heating in oxidising (non-luminous) flame		Heating in reducing (luminous) flame		Inference
Colour of the salt bead		Colour of the salt bead		
In cold	In hot	In cold	In hot	
Blue	Green	Red opaque	Colourless	Cu^{2+}
Reddish brown	Violet	Grey	Grey	Ni^{2+}
Light violet	Light violet	Colourless	Colourless	Mn^{2+}
Yellow	Yellowish brown	Green	Green	Fe^{3+}

66

Ans. (B)

#Q. 1g of a non–electrolyte solute (MW = 256 g/mol) dissolved in 50g of solvent, freezing point of solution lowered by 0.40 K. calculate the Molal depression constant of solvent.

Ans. 5

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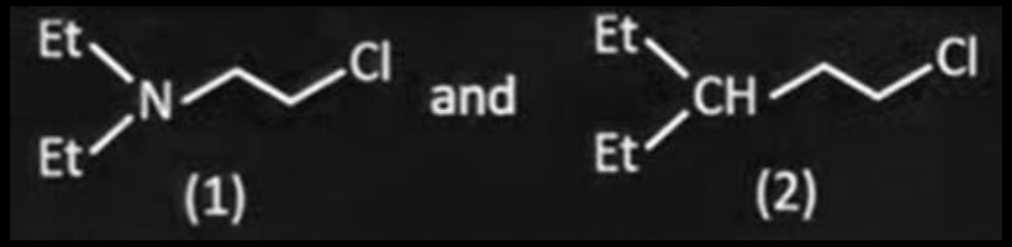
#Q.



Statement 1 : Compound (2) show faster alkaline hydrolysis compared to (1).
Statement 2 : Compound (1) show substitution via neighbouring group participation.

A Statement – I and Statement – II both are correct

B Statement – I and Statement – II both are incorrect

C Statement – I correct Statement – II is incorrect

D Statement – I incorrect Statement – II is correct

Ans. (D)

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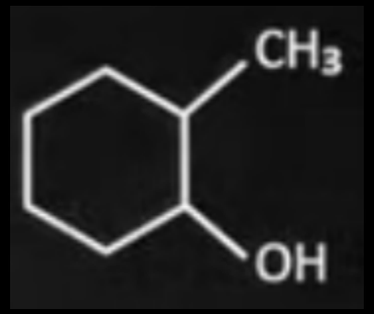
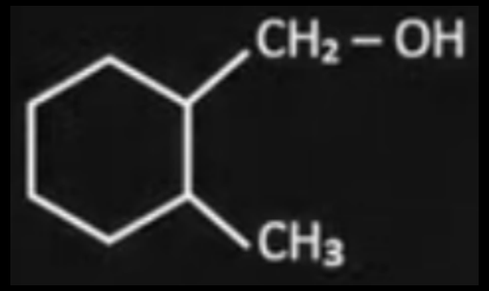
#Q.

Compound A is:

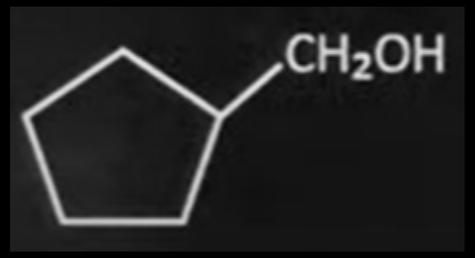
A



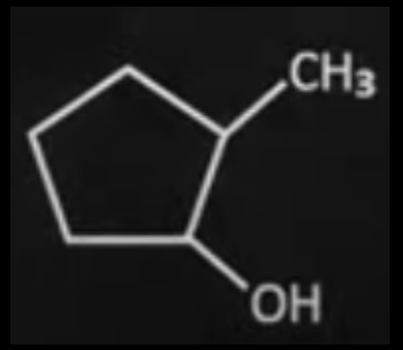
B



C



D



Ans. (A)

#Q. Which of the following reaction(s)/test(s) can be used to distinguish acetaldehyde and acetone?

(1) Iodoform Test (2) Cannizaro reaction (3) Aldol condensation

(4) Fehling's Test (5) Tollen's Test (6) Clemmensen's Reduction

A. 4, 5 only

B. 1, 2, 3 & 6 only

C. 2, 3 & 6 only

D. 2, 3, 4 & 5 only

Ans. (A)

#Q. Which of the following compounds have the same number of lone pair on central atom as ClF_3.

(A) XeF_5^-

(B) XeF_2

(C) BrF_5

(D) I_3^-

Ans. (A)

#Q. Statement 1 : For titration of oxalic acid using $KMnO_4$ warming of acid solution is required whereas in case of Ferrous Ammonium sulphate, it is done at room temperature.
Statement 2 : Fe^{2+} converts to Fe^{3+} ions during titration.

A Statement – I and Statement – II both are correct

B Statement – I and Statement – II both are incorrect

C Statement – I correct Statement – II is incorrect

D Statement – I incorrect Statement – II is correct

Ans. (A)

B. Ionic equation

Reduction half reaction : $MnO_4^- + 5e^- + 8H^+ \longrightarrow Mn^{2+} + 4H_2O] \times 2$

Oxidation half reaction : $C_2O_4^- \longrightarrow 2CO_2 + 2e^-] \times 5$

$$2\,MnO_4^- + 5C_2O_4^{2-} + 16H^+ \longrightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$$

In these equations, MnO_4^- is reduced to Mn^{2+} and $C_2O_4^{2-}$ is oxidised to CO_2. The oxidation number of carbon in $C_2O_4^{2-}$ changes from +3 to +4.

In these titrations, potassium permanganate acts as a self-indicator. Initially colour of potassium permanganate is discharged due to its reduction by oxalic acid. After complete consumption of oxalate ions, the end point is indicated by the appearance of a light pink colour produced by the addition of a little excess of unreacted potassium permanganate. Further, during the titration of oxalic acid against potassium permanganate, warming of oxalic acid solution (50°–60°C) along with dilute H_2SO_4 is required. This is essential because the reaction takes place at higher temperature. During the titration, first manganous sulphate is formed which acts as a catalyst for the reduction of $KMnO_4$ by oxalic acid. Therefore, in the beginning the reaction rate is slow and as the reaction proceeds, the rate of the reaction increases.

2

(b) Ionic equation

Reduction half reaction : $MnO_4^- + 5e^- + 8H^+ \longrightarrow Mn^{2+} + 4H_2O$

Oxidation half reaction : $Fe^{2+} \longrightarrow Fe^{3+} + e^-] \times 5$

$$MnO_4^- + 5Fe^{2+} + 8H^+ \longrightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$$

#Q. How many of the following ions have some value of spin only magnetic moment?

Ni^{2+}, V^{2+}, Ti^{2+}, Sc^{3+}, Ti^{3+}

Ans. 2

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#Q. Consider the following element in In, TI, Al and Pb the most stable oxidation states of elements with highest and lowest first Ionisation enthalpies, respectively are:

A +4 and +1

B +2 and +3

C +4 and +3

D +1 and +4

Ans. (B)