WBJEE 2026 Chemistry Solutions

Category - I

41) node (radial) = $n-l-1 = 1$ (given)
since given is p i.e $l = 1$

$\therefore n-l-1 = 1$
$n-1-1 = 1$
$n = 3$ (B)

42) $K = \frac{2.303}{t} \ln\left[\frac{a}{a-x}\right]$

$= \frac{2.303}{7.5 \times 10^3} \ln\left[\frac{400}{50}\right]$

$K = 2.77 \times 10^{-4}\ s^{-1}$
(D)

43) [A] & [B] reaches a steady state in 3 (not in 1 & 2) $\therefore$ 3 $\rightarrow$ eq^m
(C)

44) According to MOT
for O_2 which is paramagnetic has

$\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_z^2 \pi 2p_x^2 \pi 2p_y^2 \pi^* 2p_x^1 \pi^* 2p_y^1$

due to 2 unpaired electrons
O_2 is paramagnetic

but peroxide i.e O_2^{2-} that means 2 more electrons are added to π^* Antibonding Orbitals

$\sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \sigma 2p_z^2 \pi 2p_x^2 \pi 2p_y^2 \pi^* 2p_x^2 \pi^* 2p_y^2$

due to all paired electrons
i.e no unpaired electron
O_2^{2-} is diamagnetic

45) Ru is a 4d element $\therefore$
EDTA is a SFL

$Ru^{3+} \longrightarrow$ has 5 e^- and it is octahedral complex.

[|]

$\therefore$

[↑↓ | ↑↓ | ↑]

$\therefore$ 1.73 (B)

46) Z_{eff} of A in cubic lattice

$= 8 \times \frac{1}{8} = 1$

and Z_{eff} of B $= 1 \times 1 = 1$

∴ AB (B)

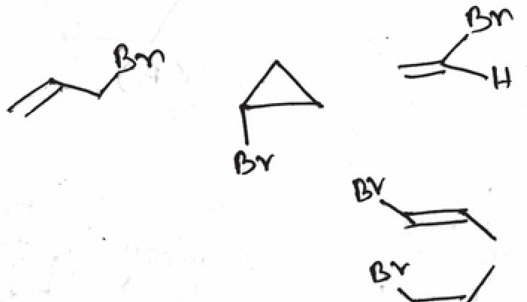
47) $\Delta T_f = K_f$ molality

$\Rightarrow \frac{1}{1000} = m$

$\Rightarrow \frac{1}{1000} = \frac{wt}{GMW\ 1kg}$ [1 lit ≡ 1kg of H_2O]

$\Rightarrow wt = \frac{180}{1000} = 0.18$ gm. (D)

48)



∴ 5 (D)

49)

i of $[Pt(NH_3)_6]Cl_4 \rightarrow 5$ (i)

" " $[Cr(NH_3)_6]Cl_3 \rightarrow 4$ (ii)

" " $[Co(NH_3)_4Cl_2]Cl \rightarrow 2$ (iii)

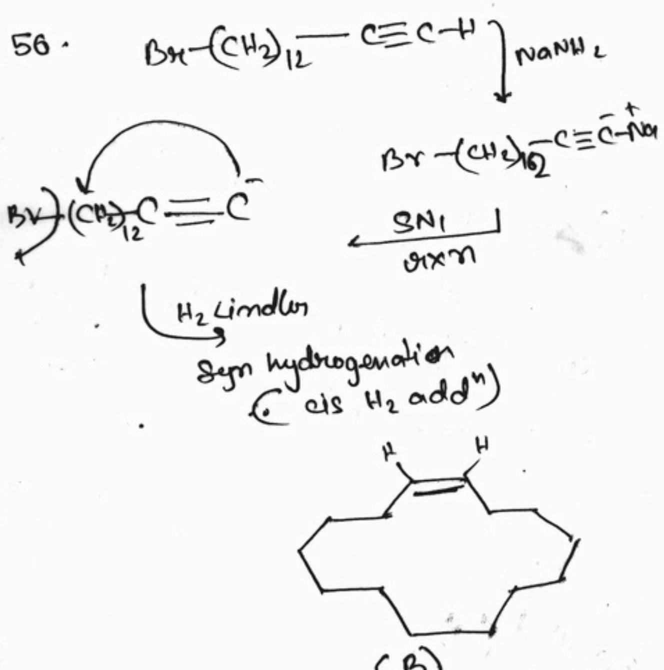
" " $K_2[PtCl_6] \rightarrow 3$ (iv)

conductivity ∝ no of ion

∴ (iii) < (iv) < ii < (i)

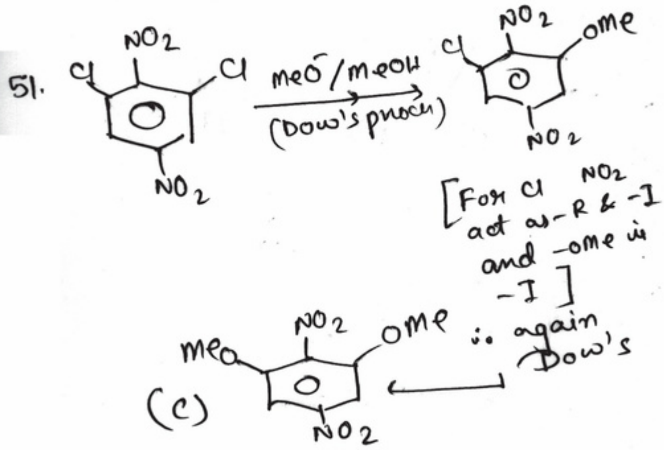
∴ (D)

50.



(B)

51.



(C)

52.) $AgNO_3$ is added to KCl

AgCl is ppt down with KNO_3 formⁿ

$AgNO_3 + KCl \longrightarrow KNO_3 + AgCl \downarrow\downarrow$

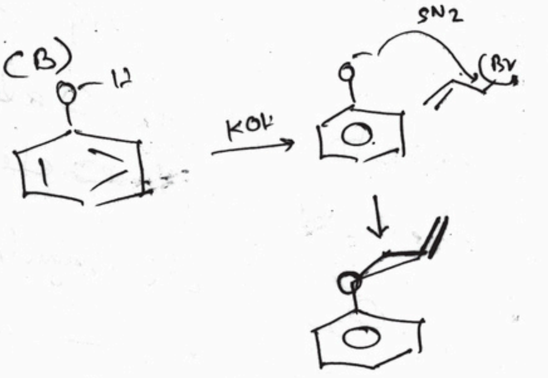
Till all Cl^- is ppted down the ions in the soln is K^+ Cl^- & NO_3^-

[~~Slow~~ Gradually Cl^- is replaced by NO_3^- ∴ no of ions remains the same ∴ conduction remains constant]

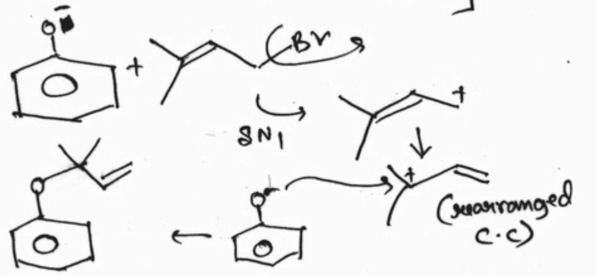
When all Cl^- is ppted down the no of ions increases. ∴ $\lambda m \uparrow\uparrow$ [Ag^+ & NO_3^- ions increases].

(D)

53.) (B)

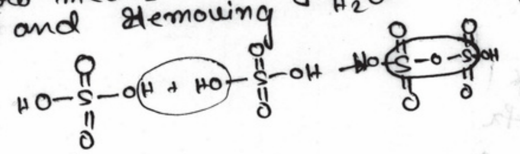


[Since no Lewis acid cat]



54.) factual (D)

pyro means adding 2 acids and removing H_2O



55.) $\lambda = \frac{h}{\sqrt{2mK}}$

$= 896\,nm$

∴ no option matching (bonus)

56.)

(Anti aromatic)

∴ don't want to loose H_2O

(B)

57.

$Na_2SO_4 \longrightarrow 2Na^+ + SO_4^{2-}$

c	0	0
c(1−α)	2cα	cα

$i = \frac{c - c\alpha + 2c\alpha + c\alpha}{c}$

$= 1 + 2\alpha$ (d)

58.)

∴ sp^3d^3

$\neq sp^3d^2$

(A)

59.) factual (B) Cu^{2+}

60.) $B_2H_6 + N_2 \longrightarrow B_3N_3H_6$

(A)

61) For heat engines,

Efficiency, $\eta = 1 - \frac{T_2}{T_1}$

Given, $T_1 = 130°c$

for maximum efficiency,

T_2 = minimum.

$T_{2_A} = 20°c$

$T_{2_B} = 40°c$

$T_{2_C} = 50°c$

$\therefore$ A has maximum efficiency.

(A)

62) 100ml of 0.01M CH_3COOH and 200 ml of 0.02 M CH_3COONa are mixed.

Moles of $CH_3COOH = \frac{1}{10} \times \frac{1}{100} = 10^{-3}$

Moles of $CH_3COONa = \frac{1}{5} \times \frac{1}{50} = 4 \times 10^{-3}$

Total volume = 100+200 = 300 mL.

After mixing,

$[CH_3COOH] = \frac{10^{-3}}{0.3} = \frac{1}{3} \times 10^{-2}$ M

$[CH_3COONa] = \frac{4\times10^{-3}}{0.3} = \frac{4}{3} \times 10^{-2}$ M.

By Henderson-Hasselbalch equation,

$pH = pka + \log \frac{[CH_3COONa]}{[CH_3COOH]}$

$= 4.74 + \log \frac{\frac{4}{3}\times10^{-2}}{\frac{1}{3}\times10^{-2}}$

$= 4.74 + 2\log 2$

$= 5.34.$

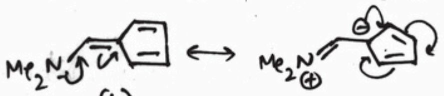
After mixing, water,

$[CH_3COOH]$ and $[CH_3COONa]$ decreases by equal proportion. So, $\frac{[CH_3COOH]}{[CH_3COONa]}$ remains equal.

$\therefore$ pH remains 5.34.

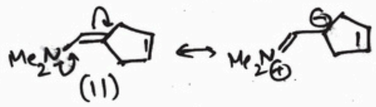
(D)

63) Basicity $\propto$ Availability of lone pair.



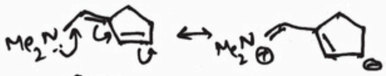
(I)

forms aromatic ring. Lone pair is leastavailable.



(II)

Resonance only in 3 atoms.



(III)

Resonance among 5 atoms.

Order of basicity:

$\therefore$ I < III < II. (A)

64) Compound X is KI.

$4KI + 2CuSO_4 \rightarrow 2CuI\downarrow + I_2 + 2K_2SO_4$.
(white)

$I_2 + KI \rightarrow KI_3\downarrow$
(brown)

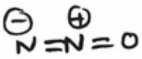
On adding hypo,

$I_2 + 2Na_2S_2O_3 \rightarrow Na_2S_4O_6 + 2NaI$

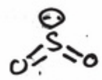
CuI gives the white ppt.

(C)

65)

N_2O :  (Linear shape)

ClF_2^- :  (Linear shape)

SO_2 :  (Bent shape)

I_3^+ :  (Bent shape)

$\therefore$ Linear structures : N_2O & ClF_2^-

(A)

66) From van der Waal's equation,

$$\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT \quad -(i)$$

Given equation,

$$\left(P + \frac{a}{4V^2}\right)\left(V - \frac{b}{2}\right) = \frac{RT}{2} \quad -(ii)$$

Comparing (i) & (ii),

$n = \frac{1}{2}$

∴ $\frac{1}{2}$ mole of real gas (D)

67) $CH_3CH_2CH_2-O^-$ (I)

In polar protic solvent, (I) is H-bonded to solvent. So, its lone pair availability is less.

$CH_3CH_2CH_2-S^\ominus$ (II)

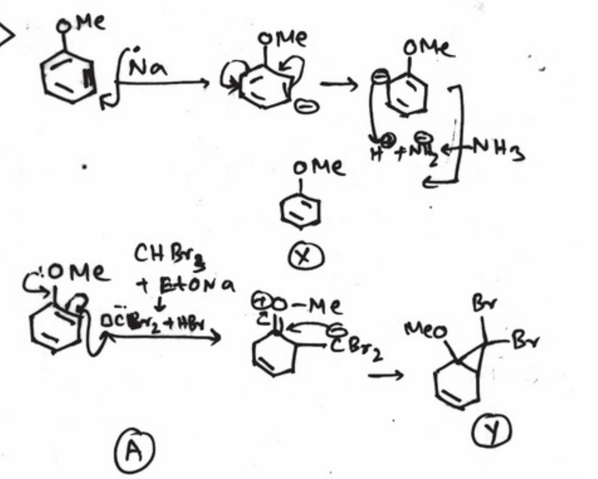
Electronegativity of S is less. So, its H-bonding is less and tendency to donate electron is higher.

$CH_3-CH_2-\overset{O}{\overset{\|}{C}}-O^\ominus$ (III)

$-\overset{O}{\overset{\|}{C}}-O^-$ has delocalised electron pair due to resonance. So, lone pair is least available in (III) for donation.

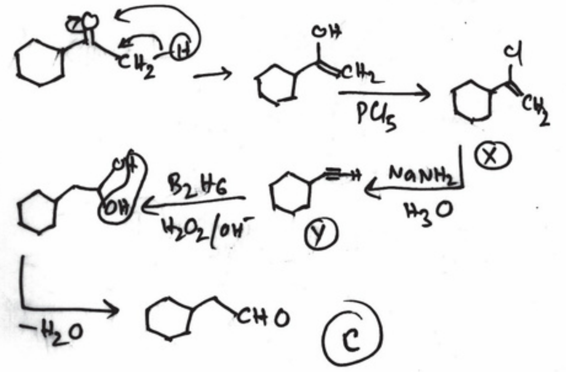
∴ II > I > III (D)

68)



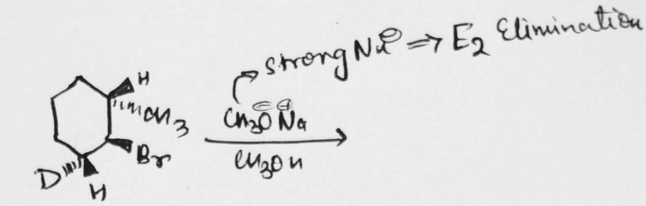
(A)

69)



(C)

70)

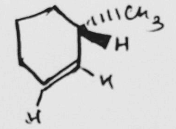


E_2 elimination is 1 step

∴ it always prefers anti

Even though D has less preference than H

∵ it is in anti position, the product will be



CATEGORY-2

71) $RO-CH_2-C\equiv C-H \xrightarrow{NaNH_2} RO-CH_2-C\equiv C^\ominus Na^\oplus$

$RO-CH_2-C\equiv C^\ominus Na^\oplus$ + $\underset{I}{CH_2}-\underset{Br}{CH_2}$

(∵ I is a better leaving group than Br)

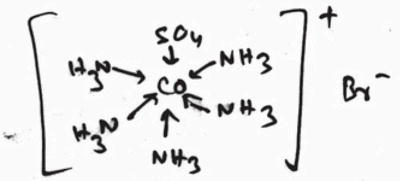
$RO-CH_2-C\equiv C-CH_2-CH_2-Br$.

X: $NaNH_2$

Y: $I-CH_2-CH_2-Br$.

(B)

72) $[Co(NH_3)_5SO_4]Br$



Coordination No: 6

$\overset{3+}{Co}\ \overset{0}{(NH_3)_5}\ SO_4^{2-}\ Br^-$

Oxidation No: +3

Co : [Ar] $3d^7\ 4s^2$

Co^{3+} : [Ar] $3d^6\ 4s^0$

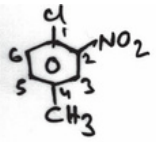
No. of d-electrons : 6 .

Co^{3+} in presence of strong field ligand has d^2sp^3 hybridization.

∴ No. of unpaired d-electrons : 0

(A)

73)



Alphabetically,
1-chloro-4-methyl-2-nitro benzene

(B)

74) $H_2O_2 + 2KI \longrightarrow I_2 + KOH.$

Molar Mass of $I_2 = 127g \times 2 = 254g$

Given mass of $I_2 = 1.27g$

Moles of I_2 liberated $= \frac{1.27}{254} = \frac{1}{200}$

Moles of I_2 = Moles of $H_2O_2 = \frac{1}{200}$

Volume of $H_2O_2 = 5cm^3 = 0.005\,L = \frac{1}{200}\,L.$

Molarity of $H_2O_2 = \frac{\frac{1}{200}}{\frac{1}{200}} = 1M.$

Strength of H_2O_2 (in g/L) = Molarity × Molar Mass

= 1M × 34

= 34 g/L.

Percentage Strength $= \frac{34g}{1000mL} \times 100$

= 3.4% (D)

75) For first order reaction,

$$K = \frac{2.303}{t} \log\left(\frac{a}{a-x}\right)$$

$$t = \frac{2.303}{K} \log\left(\frac{a_i}{a_t}\right)$$

$$\frac{t_{1/8}}{t_{1/10}} = \frac{\frac{2.303}{K}\log\left(\frac{a}{a/8}\right)}{\frac{2.303}{K}\log\left(\frac{a}{a/10}\right)} = \frac{3\log 2}{\log 10}$$

= 0.9 (A)

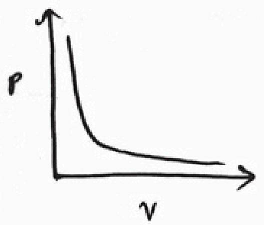
CATEGORY – 3

76) According to boyle's law, T = constant

Using Ideal gas equation

$PV = \boxed{nRT} \rightarrow$ is constant

$\therefore PV =$ constant $\rightarrow$ rectangular hyperbola

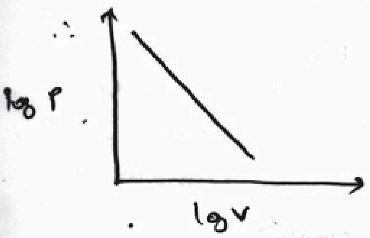


$\rightarrow$ Taking log both sides

$\log P + \log V = \log C$

$\boxed{y + x = c} \rightarrow$ format

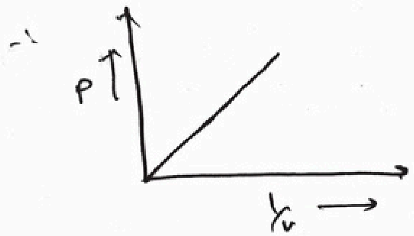
$\therefore$



And taking V on right side

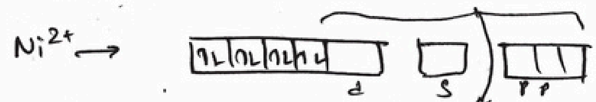
$P = \frac{C}{V} \rightarrow y = mx$ format

$\therefore$



Correct Answer $\rightarrow$ A, B, C

77) In option A we have CN^- strong field ligand therefore pairing takes place



$\therefore dsp^2$ hybridisation

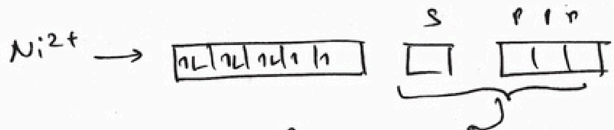
hence square planar

In option B we have "CO" strong field ligand therefore pairing takes place

$\therefore sp^3$ hybridised

hence tetrahedral

In option C we have "Cl^-" weak field ligand therefore pairing does not take place



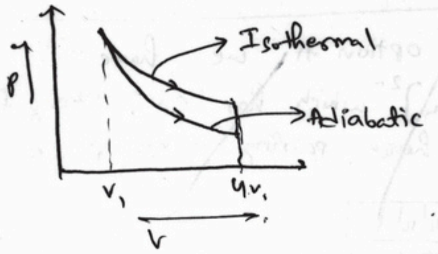
$\therefore sp^3$ hybridised

hence tetrahedral

In option D we have CrO_4^{2-} which has d^0 configuration therefore d^3s hybridised $\therefore$ tetrahedral structure

hence the correct answers are $\{B, C, D\}$

78) In option A → we have to compare magnitude of work done therefore comparing graphs we get



∴ $|W|_{isothermal} > |W|_{Adiabatic}$

In option B → As in process B internal energy of the system is utilized to do work temperature falls hence temperature becomes less than 400K → Reason → 1st law of thermodynamics

In option C → As process A is isothermal $\Delta U = nC\Delta T$ → $\Delta T = 0$ and hence $\Delta U = 0$ but in process B it will be non-zero → reason $\boxed{\Delta U = Q + W}$

In option D → In process A heat will be equal to the amount of work done magnitude-wise $\boxed{-W = Q}$ and its given that process B is adiabatic hence $Q = 0$

∴ The correct answers are → A, B, C, D

79) In option - A → Yes Starch is composed of repeating α-D-Glucose units with 2 types of linkages → 1,4 and 1,6 linkage

In option - B → Both Nylon 6 and Nylon 6,6 are condensation polymers as water molecule is removed from each unit

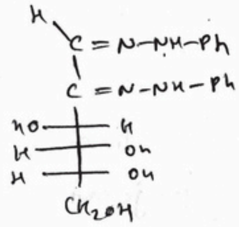
In option - C → Yes Isoprene is the monomer unit of natural rubber

In option - D → Bakelite is obtained from the reaction between phenol and formaldehyde not acetaldehyde

Therefore the correct answers are A, C

80) In option - A → Yes it exhibits ring-chain isomerism and it exsists in 2 forms pyranose and furanose.

In option - B → Yes it forms osazone with phenyl-hydrazine classic osazone formation reaction used to convert Glucose to fructose

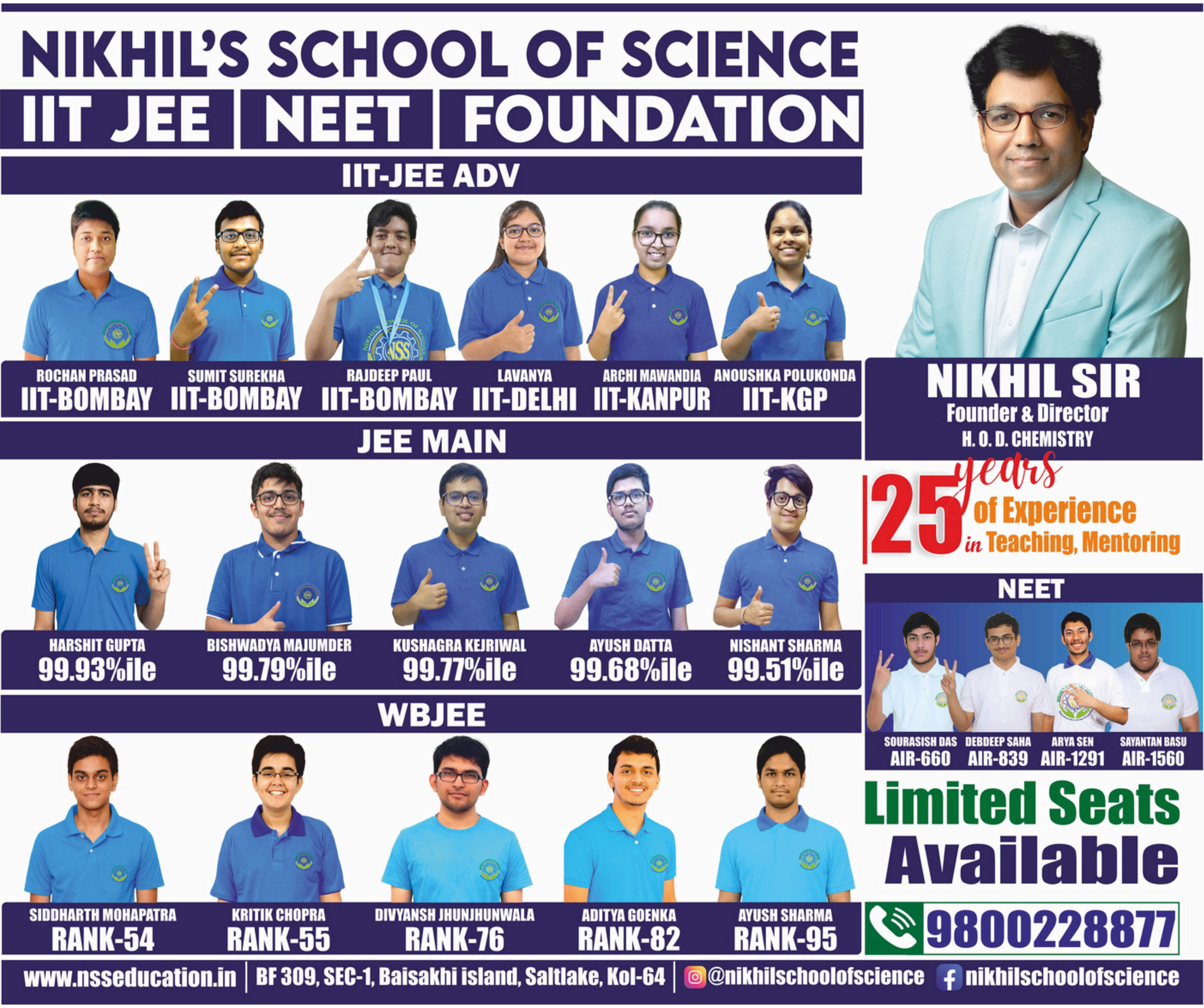


Osazone

In option - C → No there are total 16 stereoisomers of the given structure as there are 4 chiral center hence using the formula 2^n ↳ $2^4 = 16$ stereoisomers

In option - D → Yes it responds to tollen's reagent due to the availability of (aldehyde) group

Therefore correct options → A, B, D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LAVANYA IIT-DELHI
ARCHI MAWANDIA IIT-KANPUR
ANOUSHKA POLUKONDA IIT-KGP
JEE MAIN
HARSHIT GUPTA 99.93%ile
BISHWADYA MAJUMDER 99.79%ile
KUSHAGRA KEJRIWAL 99.77%ile
AYUSH DATTA 99.68%ile
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