CHEMISTRY

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 97

Chemistry

1. The spinel structure consists of an array of O^{2-} ions in fcc arrangement. Gereral formula of spinel is AB_2O_4. Cations of A occupy 1/8th the tetrahedral voids and cations of B ions occupy half of the octahedral voids. If oxide ions are replaced by $X^{-8/3}$ ions then number of an ionic vacancy per unit cell will be

A. 1

B. 2

C. 3

D. 4

Answer: A

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2. Exess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. Which of the following statement is incorrect for this reaction ?
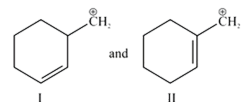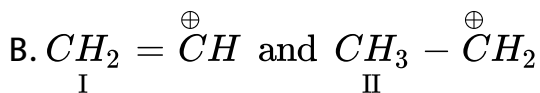
A. Evolved I_2 is reduced

B. CuI_2 is formed

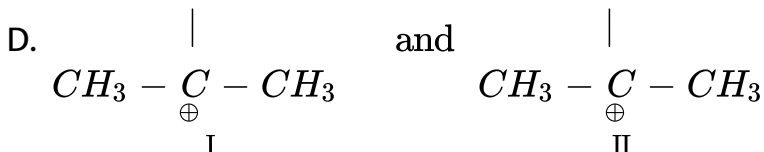C. $Na_2S_2O_3$ is oxidised

D. Cu_2I_2 is formed

Answer: B

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3. In each of the following pairs of ions in which I ion is more stable than II

A. $C_6H_5 - \overset{\oplus}{C}H_2 \underset{I}{}$ and $CH_2 \underset{II}{=} CH - \overset{\oplus}{C}H_2$

B. $CH_2 \underset{I}{=} \overset{\oplus}{C}H$ and $CH_3 - \overset{\oplus}{C}H_2 \underset{II}{}$

C.

D.

$$\begin{array}{ccc} CH_3 - CH - CH_3 & & CH_3 - N - CH_3 \\ | & \text{and} & | \\ CH_3 - \overset{\oplus}{C} - CH_3 & & CH_3 - \overset{\oplus}{C} - CH_3 \\ \quad I & & \quad II \end{array}$$

Answer: A

4. The hybridisation of the central atom will change when

A. NH_3 combines with H^+

B. H_3BO_3 combines with OH^-

C. NH_3 forms NH_2^-

D. H_2O combines with H^+

Answer: B

5. $V_1\,mL$ of $NaOH$ of normality X and $V_2\,mL$ of $Ba(OH)_2$ of mormality Y are mixed together. The mixture is completely neutralised by $100\,mL$ of $0.1NHCl$. If $V_1/V_2 = \dfrac{1}{4}$ and $\dfrac{X}{Y} = 4$, what fraction of the acid is neutralised by $Ba(OH)_2$?

A. 0.5

B. 0.25

C. 0.33

D. 0.67

Answer: A

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6. If $\Delta G°[HI(g) = -1.7kJ]$, the equilibrium constant for the reaction $2HI(g) \Leftrightarrow H_2(g) + I_2(g)$ at $25°C$ is

A. 24

B. 2

C. 3.6

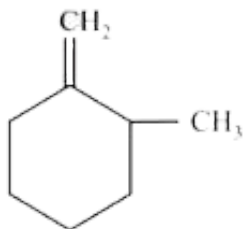D. 0.5

Answer: C

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7. 1 - Bromo -2, 2 - dimethylcyclohexane on treatment with methanol gives
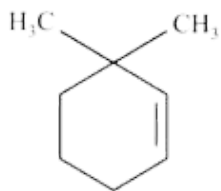
A.
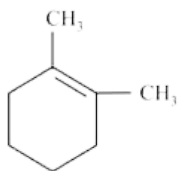
B.

C.
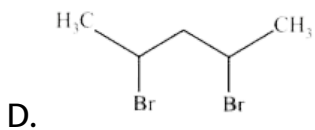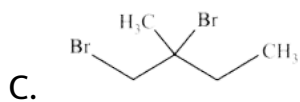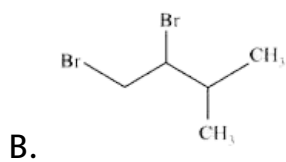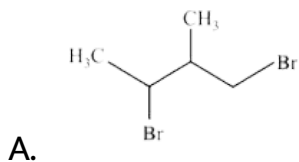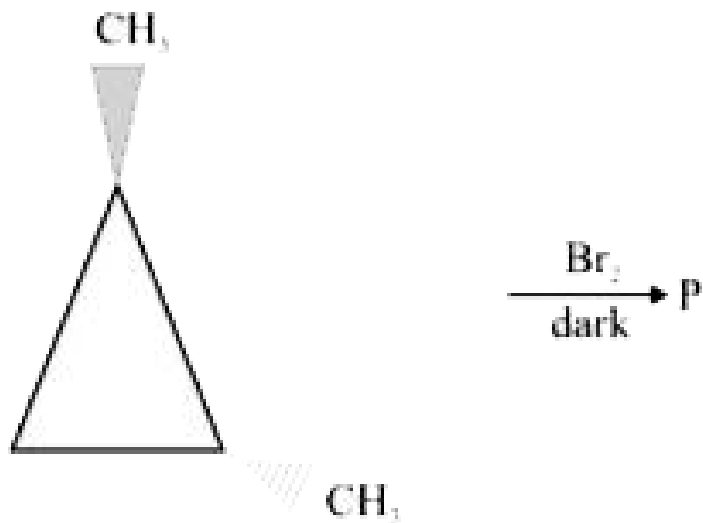
D. all of these

Answer: D

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8. The major product P of the following reaction is

CH₃

$$\xrightarrow[\text{dark}]{\text{Br}_2} \text{P}$$

CH₃

A.

B.

C.

D.
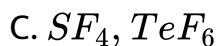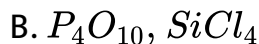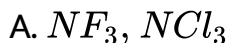
Answer: D

9. In which of the following compounds hydrolysis tkes plcae through S_{N1} and S_{N2} mechanism respectively?

A. NF_3, NCl_3

B. $P_4O_{10}, SiCl_4$

C. SF_4, TeF_6

D. $SiCl_4, SiF_4$
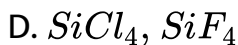
Answer: A

10. The voltage of the cell consisting of $Li(s)$ and $F_2(g)$ electrodes is 5.92 V at standard condition at 298 K. What is the voltage if the electrolyte consists of 2 M LiF.

$\left(\ln 2 = 0.693, \ R = 8.314 \ JK^{-1}mol^{-1} \ \text{and} \ F = 96500 \ C \ mol^{-1} \right)$

A. 5.90 V

B. 5.937 V

C. 5.88 V

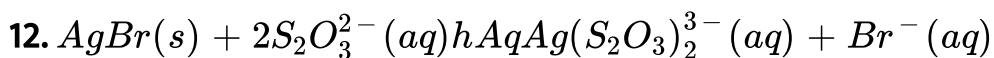D. 4.9 V

Answer: C

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11. The voltage the characteristics is not common between $[Cu(en)_2]^{2+}$ and $[Ni(dmg)_2]$?

A. Geometry of complexes

B. Hybridisation of central metal cation

C. Magnetic behaviour

D. Number of stereoisomers

Answer: C

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12. $AgBr(s) + 2S_2O_3^{2-}(aq)hAqAg(S_2O_3)_2^{3-}(aq) + Br^-(aq)$

Given

$K_{sp}(AgBr) = 5 \times 10^{-13}, K_f Ag(S_2O_3)_2^{3-} = 5 \times 10^{13}$

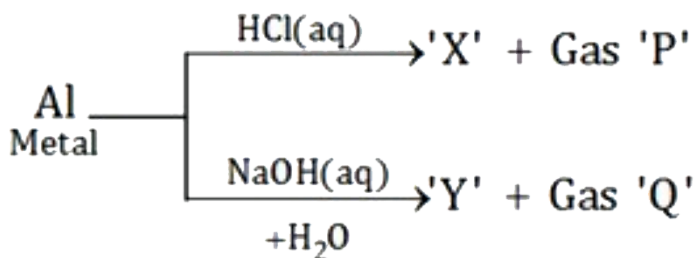What is the molar solubillity of AgBr in 0.1 M $Na_2S_2O_3$?

A. 0.5 M

B. 0.25 M

C. 0.045 M

D. None of these

Answer: C

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$$\text{Al Metal} \begin{cases} \xrightarrow{\text{HCl(aq)}} \text{'X'} + \text{Gas 'P'} \\ \xrightarrow{\text{NaOH(aq)} + H_2O} \text{'Y'} + \text{Gas 'Q'} \end{cases}$$

13.

The incorrect statement regarding above reactions is

A. Al shows amphoteric character
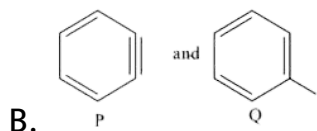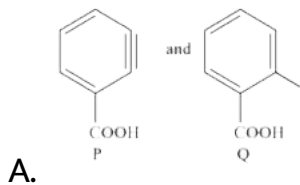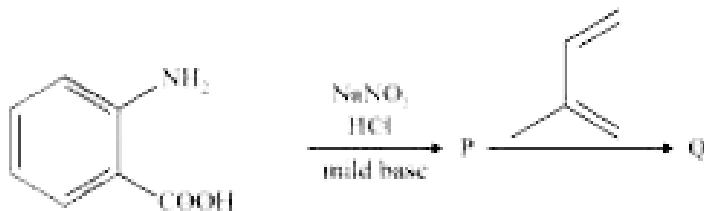
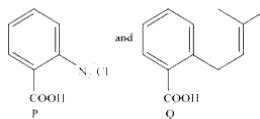B. Gas 'P' and 'Q' are different

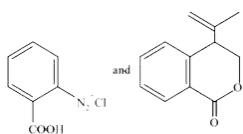C. Both X and Y are water soluble

D. Gas Q in inflammable

Answer: B

14. In the reaction shown below, identify the correct combination of te intermediate P and the product Q.

A.

B.

C.

D.

Answer: B

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15. For adsorption of a gas on a solid, the plot of $\log (x/m)$ vs $\log P$ is linear with a slope equal to [n being a whole number]:
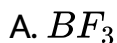
A. K

B. log K

C. n

D. $\dfrac{1}{n}$

Answer: D

16. One of the hydrolysed product of the following compound does not react with silica of glass vessel:

A. BF_3

B. ClF_5
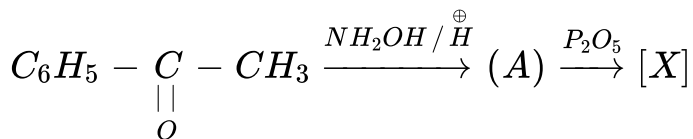
C. XeF_2

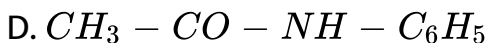D. SF_4

Answer: A

17. In the reaction sequence

$$C_6H_5 - \underset{\underset{O}{||}}{C} - CH_3 \xrightarrow{NH_2OH \, / \, \overset{\oplus}{H}} (A) \xrightarrow{P_2O_5} [X]$$

[X] will be

A.
$$C_6H_5 - \underset{\underset{N-OH}{||}}{C} - CH_3$$

B. CH_3COOH

C. $C_6H_5 - NH_2$

D. $CH_3 - CO - NH - C_6H_5$

Answer: D

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2 mol
A_2
1L

4 mol
B_2
3L
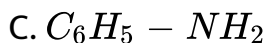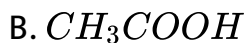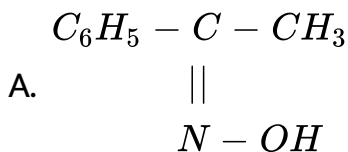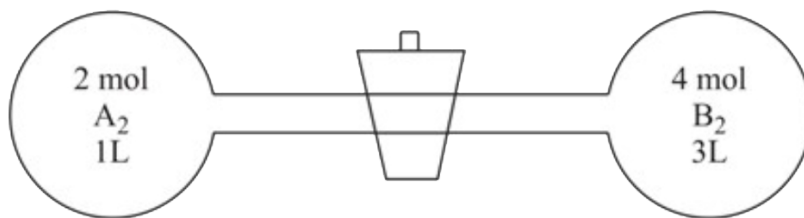
18.

When A_2 and B_2 are allowed to react, the equilibrium constant of the reaction at $27°C$ is found $(K_C = 4)$. $A_2(g) + B_2(g) \Leftrightarrow 2AB(g)$
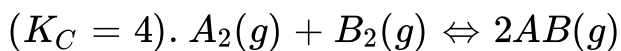
What will be the equilibrium concentration of AB?

A. 1.33 M

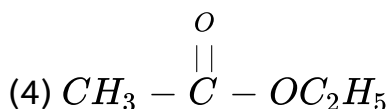B. 2.66 M

C. 0.66 M

D. 0.33 M

Answer: C

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19. Arrange reactivity of given compounds in decreasing order for hydrolysis reaction?

(1) $CH_3 - \overset{\overset{\displaystyle O}{||}}{C} - NH_2$

(2) $CH_3 - \overset{\overset{\displaystyle O}{||}}{C} - Cl$

(3) $CH_3 - \overset{\overset{\displaystyle O}{||}}{C} - O - \overset{\overset{\displaystyle O}{||}}{C} - CH_3$

(4) $CH_3 - \overset{\overset{\displaystyle O}{||}}{C} - OC_2H_5$
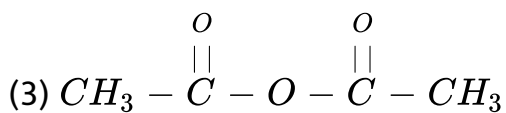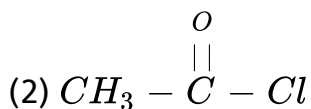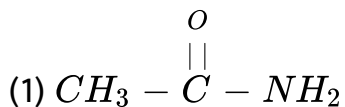
Select the correct answer from the codes given below:

A. 1, 2, 3, 4

B. 2, 3, 4, 1

C. 2, 3, 1, 4

D. 1, 4, 2, 3

Answer: B

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20. In the reaction

$$xA \rightarrow yB, \log\left\{ -\frac{d[A]}{dt} \right\} = \log\left\{ +\frac{d[B]}{dt} \right\} + 0.3 \text{ Then, } x:y$$

is

A. $2:1$

B. $1:2$

C. $3:1$

D. $3:10$

Answer: A

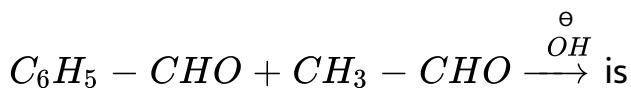**21.** Number of aldol products in the given reaction

$$C_6H_5 - CHO + CH_3 - CHO \xrightarrow{\overset{\ominus}{OH}} \text{is}$$

22. The atomic structure of He^+ arises due to transition from n_2 to n_1 level. If $n_1 + n_2$ is 3 and $n_2 - n_1$ is 1. Find the λ in nm of transition for this series in He^+ in nm.

23. An alloy of Pb-Ag weighing $1.08g$ was dissolved in dilute HNO_3 and the volume made to 100 mL.A ? Silver electrode was dipped in the solution and the emf of the cell dipped in the solution and the emf of the cell set-up as

$Pt(s), H_2(g)|H^+(1M)||Ag^+(aq.)|Ag(s)$ was $0.62V$. If E°_{cell} is $0.80V$, what is the percentage of Ag in the alloy ? (At $25°C, RT/F = 0.06$)

24. Consider the following ligands NH_2^- , acac, OH^-, Gly, O_2^- , Phen, DMG, NO_2^- , CO_3^{2-} , Cl^- , CH_3COO^- , en, SO_4^{2-}. Then calculate vlaue of "P+Q-R-S" here

P: total number of ligands which act as bridging as well as monodentate only.

Q: Total number of flexidentate ligands.

R: Total number of bidentate ligands only

S: Total number of unsymmetrical bidentate ligands.

25. The root mean square speed of N_2 molecules in sample at temperature T is 'x'. If the temperature is doubled, then nitrogen molecules dissociate into atoms, the root mean square speedof nitrogen atoms becomes n times of 'x' find the value of n here?