MEMORY BASED QUESTIONS JEE–MAIN EXAMINATION – JANUARY 2026

(HELD ON FRIDAY 23rd JANUARY 2026) **TIME : 3:00 PM TO 6:00 PM**

CHEMISTRY

TEST PAPER WITH SOLUTION

SECTION-A

1. 3 moles of liquid A and 1 mole of liquid B are mixed to form an ideal solution. The vapour pressure of solution becomes 500 mm Hg. If 1 mole of A is further added then vapour pressure of solution increases by 20 mm Hg.

Find vapour pressure of pure B ($P°_B$) in mm Hg ?

Ans. **(200)**

Sol. $X_A = \frac{3}{4},\ X_B = \frac{1}{4}$

$P_S = P_A^o X_A + P_B^o X_B$

$500 = P_A^o \times \frac{3}{4} + P_B^o \times \frac{1}{4}$

$3P_A^o + P_B^o = 2000$ ..... (1)

Now 1 moles of A is further added so n_A = 4 mole, n_B = 1 mole

$X'_A = \frac{4}{5},\ X'_B = \frac{1}{5}$

$P_S = 520 = P_A^o \times \frac{4}{5} + P_B^o \times \frac{1}{5}$

$4P_A^o + P_B^o = 2600$ ..... (2)

By equation (2) – equation (1)

P_A^o = 600 mm Hg

P_B^o = 200 mm Hg

2. If $K_2Cr_2O_7$ (200 cm^3, x × 10^{-3} M) reacts with 0.6 M, 750 cm^3 Mohr's salt then find value of x ?

Ans. **(375)**

Sol. $K_2Cr_2O_7 + Fe^{2+} \rightarrow Cr^{3+} + Fe^{3+}$

$n_f = 6$ $n_f = 1$

$V = 200\ cm^3$ $V = 750\ cm^3$

$x \times 10^{-3}$ M 0.6 M

milli eq. of $K_2Cr_2O_7$ = milli eq. of $FeSO_4$

$6 \times x \times 10^{-3} \times 200 = 1 \times 0.6 \times 750$

$x = 375$

3. On two metal surfaces, a monochromatic light of 6 eV was incident. They have ratio of their work function and maximum KE as

$$\frac{\phi_1}{\phi_2} = \frac{1}{2},\ \frac{(KE_{max})_1}{(KE_{max})_2} = \frac{2.62}{1}$$

Then ϕ_1 and ϕ_2 values are respectively (in eV).

(1) 2.292, 4.584 (2) 4.584, 2.292

(3) 4.584, 9.168 (4) 1.146, 2.292

Ans. **(1)**

Sol. $KE_{max} = E - \phi$

$(KE_{max})_1 = 6 - \phi_1$ ..... (1)

$(KE_{max})_2 = 6 - \phi_2$ ..... (2)

By eq. (1) divide eq. (2)

$$\frac{(KE_{max})_1}{(KE_{max})_2} = \frac{2.62}{1} = \frac{6-\phi_1}{6-\phi_2}$$

$$\frac{2.62}{1} = \frac{6-\phi_1}{6-2\phi_1}$$

$15.72 - 5.24\ \phi_1 = 6 - \phi_1$

$9.72 = 4.24\ \phi_1$

$$\phi_1 = \frac{9.72}{4.24}$$

$\phi_1 = 2.292$ eV, $\phi_2 = 4.584$ eV.

4. A cell is given as

$M(s) \mid M^{n+}(aq) \| M^{+n}(aq) \mid M(s)$

For which of the following condition, E_{cell} is positive:

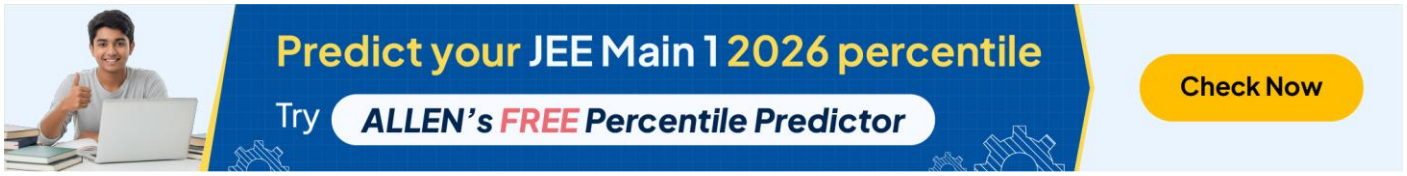
(1) $C_1 < C_2$ (If C_1 is concentration at cathode)

(2) $C_2 < C_1$ (If C_1 is concentration at anode)

(3) $C_1 < C_2$ (If C_2 is concentration at anode)

(4) $C_1 > C_2$ (If C_1 is concentration at cathode)

Ans. **(4)**



Sol. $M(s) + M^{n+}(aq) \rightarrow M(s) + M^{n+}(aq.)$
(cathode) (anode)

$$E_{cell} = E^\circ_{cell} - \frac{0.059}{n}\log\frac{[M^{n+}]_{anode}}{[M^{n+}]_{cathode}}$$

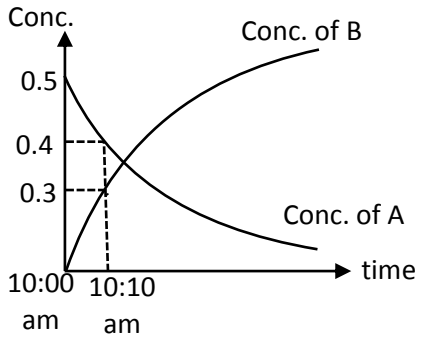
For concentration cell : $E^\circ_{cell} = 0$

$$E_{cell} = -\frac{0.059}{n}\log\frac{[M^{n+}]_{anode}}{[M^{n+}]_{cathode}}$$

For E_{cell} = +ve

$[M^{n+}]_{anode} < [M^{n+}]_{cathode}$

5. For a given reaction A → nB, a graph is given between concentration and time. Find value of n for above reaction, based on the information given in graph for 10 min.



Ans. (3)

Sol.

	A	→	nB
at 10:00 am	0.5		–
at 10:10 am	0.5–x = 0.4		nx

x = 0.1

nx = 0.3

$$n = \frac{0.3}{x} = 3$$

6. Given at 10 AM, reaction is started

(i) $A \xrightarrow{k}$ Product (1^{st} order reaction)

(ii) $BrO_3^- + 5Br^- \rightarrow 3Br_2$

At 10:10 AM, rate of disappearance of Br^- was 2×10^{-3} M/min. and concentration of A was 0.1 M, if both reactions were proceed with same rate at this time then value of k will be ?

(1) 10^{-3} min^{-1} (2) 2×10^{-3} min^{-1}

(3) 4×10^{-3} min^{-1} (4) 8×10^{-3} min^{-1}

Ans. (3)

Sol. Rate of reaction $= \frac{2\times10^{-3}}{5} = k[0.1]$

$k = 4 \times 10^{-3}$ min^{-1}

7. For given reaction

$$X_2(g) + Y_2(g) \rightleftharpoons 2Z(g)$$

Moles of X_2, Y_2 & Z are at equilibrium are 3 mole, 3 mole & 9 mole respectively. If 10 moles of Z are added at constant T then find moles of Z at restablished equilibrium.

Ans. (15)

$$X_2(g) + Y_2(g) \rightleftharpoons 2Z(g)$$

$$K_C = \frac{(9)^2}{3\times3} = 9$$

Now 10 moles of Z are added then reaction will move in backward direction.

$$X_2(g) + Y_2(g) \rightleftharpoons 2Z(g)$$

$3 + X$ $3 + X$ $19–2X$

$$K_C = \frac{(19-2X)^2}{(3+X)(3+X)} = 9$$

$$\frac{19-2X}{3+X} = 3$$

$19 – 2X = 9 + 3X$

$10 = 5X$

$X = 2$

At equilibrium ⇒ moles of Z = $19 – 2 \times 2$

= 15 moles

8. For XeO_2F_2, select the correct statements :

(A) It has see-saw shape

(B) ∠FXeF ≈ 180°

(C) ∠OXeO ≈ 180°

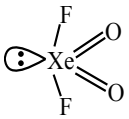
(D) Number of valence electron on Xe = 5

(1) A, B, C and D (2) A and B only

(3) B and D only (4) A & B only

Ans. (2)

Sol.



See-saw

9. How many of the following complexes have unpaired electrons $[Ni(CO)_4]$, $[NiCl_4]^{2-}$, $[PtCl_4]^{2-}$, $[Pt(CN)_4]^{2-}$, $[Pt(NH_3)_2Cl_2]$

Ans. **(1)**

Sol. In $[Ni(CO)_4]$, $Ni^0 : 3d^{10}\ 4s^0\ 4p^0$

Hybridisation state : sp^3 , n = 0

In $[NiCl_4]^{2-}$, $Ni^{2+} : 3d^8\ e^{2,2}\ t_2^{2,1,1}$

Hybridisation state : sp^3 , n = 2

In $[PtCl_4]^{2-}$, $Pt^{2+} : 5d^8$ square planar

Hybridisation state : dsp^2 , n = 0

In $[Pt(CN)_4]^{2-}$ $5d^8$ square planar

Hybridisation state : dsp^2 , n = 0

In $[Pt(NH_3)_2Cl_2]$ $Pt^{2+} : 5d^8$ square planar

Hybridisation state : dsp^2 , n = 0

10. From the following :

(A) $[Co(NH_3)_6]^{3+}$: Inner orbital complex , d^2sp^3 hybridization

(B) $[MnCl_6]^{3-}$: Outer orbital complex , sp^3d^2 hybridization

(C) $[CoF_6]^{3-}$: Outer orbital complex , d^2sp^3 hybridization

(D) $[FeF_6]^{3-}$: Outer orbital complex , sp^3d^2 hybridization

(E) $[Ni(CN)_4]^{2-}$: Inner orbital complex , sp^3 hybridization

Choose the correct answer from the given options.

(1) A, B and C only (2) C and E only

(3) A, B and D only (4) C, D and E only

Ans. **(3)**

Sol. (A) $Co^{3+}\ 3d^6\ t_{2g}^{2,2,2}\ e_g^{0,0}$ d^2sp^3 Inner orbital complex

(B) $Mn^{3+}\ 3d^4\ t_{2g}^{1,1,1}\ e_g^{1,0}$ sp^3d^2 Outer orbital complex

(C) $Co^{3+}\ 3d^6\ t_{2g}^{2,1,1}\ e_g^{1,1}$ sp^3d^2 Outer orbital complex

(D) $Fe^{3+}\ 3d^5,\ t_{2g}^{1,1,1}\ e_g^{1,1}$ sp^3d^2 Outer orbital complex

(E) $Ni^{2+}\ 3d^8$ Square planar dsp^2 Inner orbital complex

11. The oxidation state of 'Cr' in the final product formed by reaction between KI and acidified $K_2Cr_2O_7$ is :

(1) +2 (2) +6

(3) +4 (4) +3

Ans. **(4)**

Sol. $K_2Cr_2O_7 + KI \xrightarrow{H^+} I_2 + Cr^{3+}$

12. Statement-I : Size of O^{2-} is smaller than F^-.

Statement-II : Second ionization energy of Na is greater than second ionization energy of Mg.

(1) Both statements are correct.

(2) Both statements are incorrect.

(3) Statement I is correct while Statement II is incorrect.

(4) Statement I is incorrect while statement II is correct.

Ans. **(4)**

Sol. Size of $O^{2-} > F^-$

IE_2 of Na > IE_2 of Mg

13. Which of the following are isobars?

(1) $^{232}_{92}U$ and $^{238}_{92}U$

(2) $^{3}_{1}H$ and $^{2}_{1}H$

(3) $^{3}_{1}H$ and $^{3}_{2}He$

(4) $^{14}_{7}N$ and $^{15}_{7}N$

Ans. **(3)**

Sol. Isobars have same mass number.

14. Consider the following changes :

$SnO_2 \rightarrow SnO$ ΔG_1^0

$PbO_2 \rightarrow PbO$ ΔG_2^0

Select the correct option

(1) $\Delta G_1^0 > 0$, $\Delta G_2^0 > 0$ (2) $\Delta G_1^0 > 0$, $\Delta G_2^0 < 0$

(3) $\Delta G_1^0 < 0$, $\Delta G_2^0 < 0$ (4) $\Delta G_1^0 < 0$, $\Delta G_2^0 > 0$

Ans. **(2)**

Sol. $\rightarrow$ Pb^{2+} is more stable than Pb^{4+} (inert pair effect)

$\Rightarrow \Delta G_2^0 < 0$

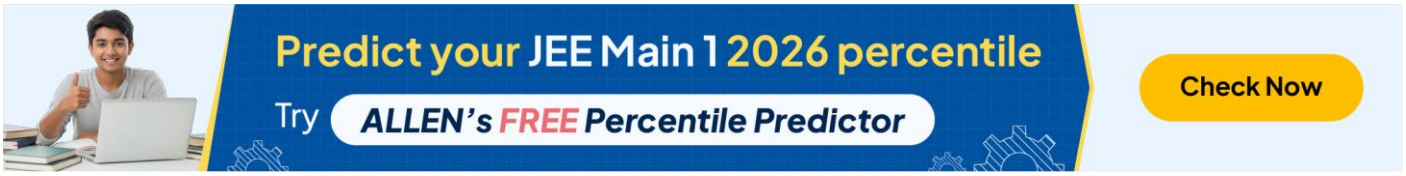
$\Rightarrow \Delta G_1^0 > 0$. As Sn^{4+} is more stable than Sn^{2+}

15. Electronegativity difference between a group 15 element and P is less than electronegativity difference between another group 15 element and P. Those group 15 elements respectively are :

(1) Bi, N (2) Sb, As

(3) Sb, Bi (4) N, As

Ans. **(1)**



Sol.

	EN
N	3.0
P	2.1
As	2.0
Sb	1.9
Bi	1.9

16. Iodoform test can differentiate :
(1) Anisole and Acetone
(2) Acetic acid and Aniline
(3) Ethanol and Acetone
(4) Methanol and benzoic acid

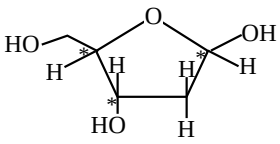
Ans. **(1)**

Sol. Acetone Me–CO–Me will show Iodoform due to methylketo group Me–CO–Me

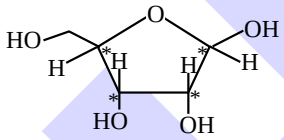
17. Both DNA and RNA are chiral molecules. The chirality in DNA and RNA arises due to the presence of :
(1) D-sugar component
(2) Phosphodiester linkage
(3) L-sugar component
(4) Nitrogenous bases

Ans. **(1)**

Sol.



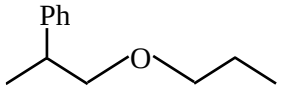
2-Deoxyribose

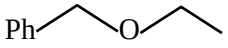


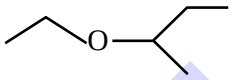
D-ribose

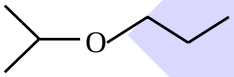
18. $\underset{(P)}{\text{Organic compound}} \xrightarrow[(ii)\,Aq.\,NaOH]{(i)\,excess\,of\,HI} Q + R$

Q and R both gives Iodoform test,
Which among the following is (P) from the given organic compound?

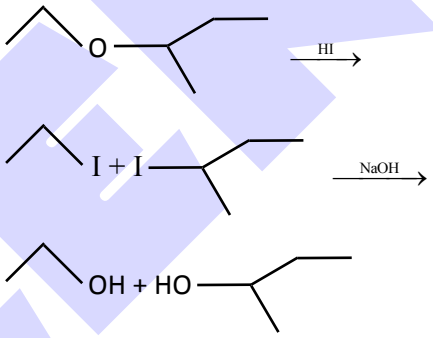
(1) 

(2) 

(3) 

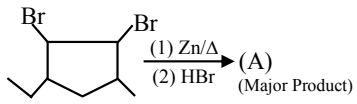
(4) 

Ans. **(3)**

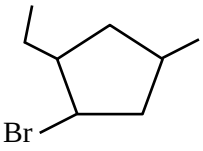
Sol. 

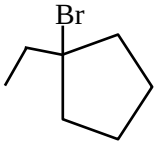
Both products Q & R gives idoform test.

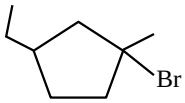
19.

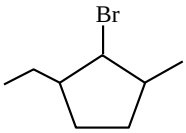


Identify (A) ?

(1) 

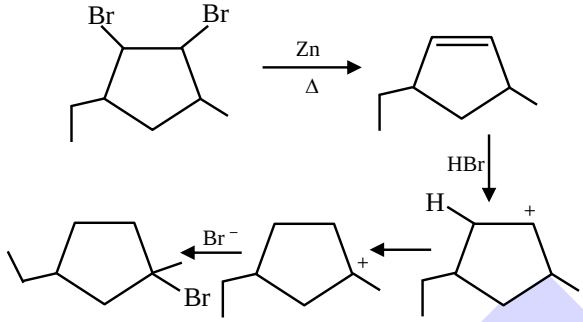
(2) 

(3) 

(4) 

Ans. (3)

Sol.



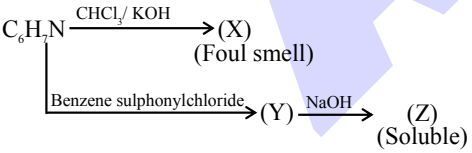
20. 0.245 gm of an unknown organic compound gave 0.5453 gm of AgCl through Carious method. Calculate % of Cl in unknown compound.

Ans. (55.06)

Sol. $$\% \text{ Cl} = \frac{\left(\frac{.5453}{143.5}\right)\times 35.5}{.245}\times 100$$

% of Cl = 55.06

21.



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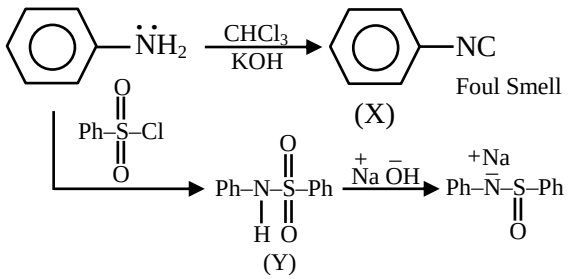
Number of different H-atoms in (Y)

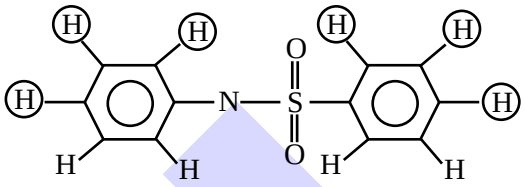
(1) 4 (2) 7

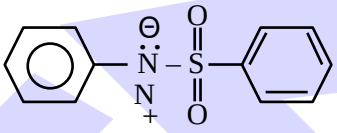
(3) 12 (4) 13

Ans. (2)

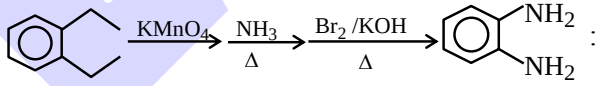
Sol.







22. Statement-I :



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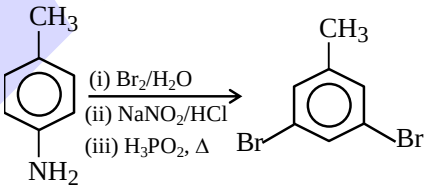
Statement-II :



(1) Statement-I and Statement-II both are correct

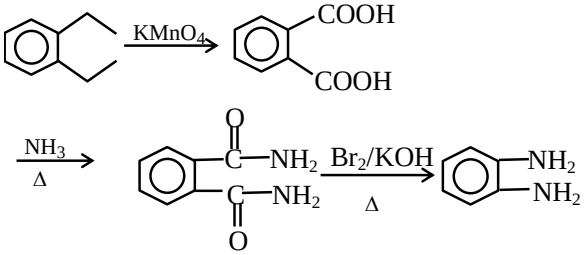
(2) Statement-I is incorrect Statement-II is correct

(3) Statement-I is correct Statement-II is incorrect

(4) Statement-I and Statement-II both incorrect

Ans. (1)

Sol. Statement-I



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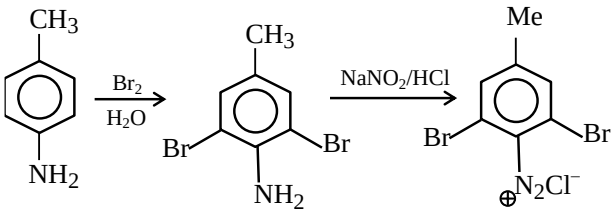
Statement-II



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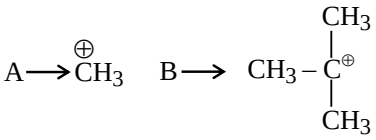
23. Consider the following



Statement-I : B is more stable due to 9αH

Statement-II : A is less stable due to 3αH

(1) Statement-I and Statement-II both are correct

(2) Statement-I is incorrect Statement-II is correct

(3) Statement-I is correct Statement-II is incorrect

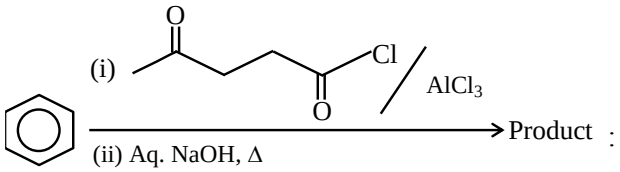
(4) Statement-I and Statement-II both incorrect

Ans. (3)

Sol. Tertiary butyl carbocation has 9 αH

Methylcarbocation has zero αH

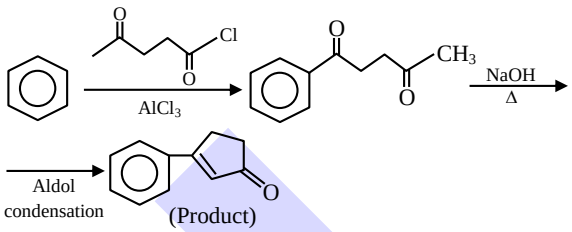
24.



Calculate total number of mass percentage of oxygen in the product

Ans. (10.13)

Sol.



Molecular mass of product = 158

Mass % of oxygen = $\frac{16}{158} \times 100 = 10.13\%$

25. Correct statement is :

(A) NaOCl when reacted with KI gives KOI

(B) KOI is best reducing agent

(C) Methanoic acid gives iodoform test

(D) Isopropyl alcohol gives iodoform test

(E) $H_3C–CH=CH–\overset{\overset{O}{\|}}{C}–CH_3$ gives iodoform test

(1) A,B, C only

(2) B, D only

(3) D, E only

(4) B, C, D only

Ans. (3)

Sol. Isopropyl alcohol and $H_3C–CH=CH–\overset{\overset{O}{\|}}{C}–CH_3$ gives positive Iodoform test.

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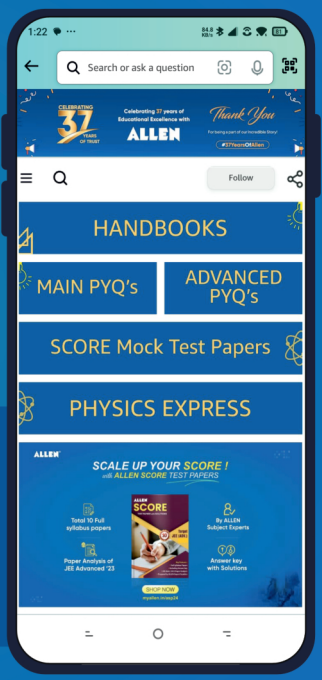

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