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JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-2

DATE & DAY: 06th April 2026 & Monday

PAPER-1

Duration: 3 Hrs.
Time: 03:00 PM – 06:00 PM

SUBJECT: CHEMISTRY

REGISTERED & CORPORATE OFFICE (CIN: U80302RJ2007PLC024029):
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PART : CHEMISTRY

1. $A_1^{n_1+} + n_1e^- \rightarrow A_1$

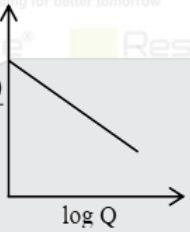
$A_2 \rightarrow A_2^{n_2+} + n_2e^-$

Select incorrect option :

(1) Overall cell reaction :

$n_2\ A_1^{n_1+} + n_1\ A_2 \rightarrow n_2\ A_1 + n_1\ A_2^{n_2+}$

(2) Electrical work done by the cell = charge × potential difference.

(3) 

(4) In the overall cell reaction the number of electrons are not present, as electron liberated at anode, are consumed at cathode.

Ans. **(3)**

Sol. $\frac{E-E^0}{RT} = -\frac{2.303}{nF}\log Q$

So graph in option (3) should be straight line passing through origin.

2. Total energy of Hydrogen like species is given as $-54.4eV/$ atom. The value of ' n ' and ' Z ' respectively are :

(1) 1,2 (2) 2,2 (3) 2,1 (4) 1,1

Ans. **(1)**

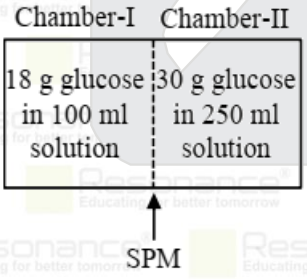
Sol. $E_n = -13.6 \times \frac{Z^2}{n^2} eV/$ atom

$$-54.4 = -13.6\left(\frac{Z^2}{n^2}\right)$$

$$\Rightarrow \frac{Z^2}{n^2} = 4$$

$$\Rightarrow Z = 2, n = 1$$

3. Consider given apparatus



Statement-I : Water will move from chamber-I to chamber-II.

Statement-II : 2.5 mg of $100 ml K_2SO_4$ solution has osmotic pressure 0.0107 bar at 300 K ($R - 0.083$ bar-L/mole-K).

Choose correct statement.

(1) Both Statement I and Statement II are correct

(2) Statement I is correct but Statement II is incorrect.

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

(4) Both Statement I and Statement II are incorrect

Ans. **(3)**

Sol. On side (I) $C_1 = 1$ molar
On side (II) $C_2 = 2/3$ molar
Hence water will flow from chamber-II to Chamber-I.
And $\left(\pi = 3 \times \frac{2.5\times10^{-3}/174}{100/1000}\right) \times 0.083 \times 300$
$= 0.0107$ bar.

4. For ' C ' molar solution of weak electrolyte A_xB_y, dissociation constant is K , then degree of dissociation of A_xB_y at equilibrium is

(1) $\left(\frac{K}{C^{x+y-1}x^xy^y}\right)^{\frac{1}{x+y}}$ (2) $\left(\frac{K\times C^{x+y-1}}{x^x-y^y}\right)^{\frac{1}{x+y}}$

(3) $\left(\frac{K\cdot x^x\cdot y^y}{C^{x+y-1}}\right)^{\frac{1}{x+y}}$ (4) $\left(\frac{K\times C^{x+y-1}}{x^x\times y^y}\right)^{x+y}$

Ans. **(1)**

Sol. $A_xB_y \rightleftharpoons xA^{y+} + yB^{x-}$
$C(1-\alpha)$ $xC\alpha$ $yC\alpha$
$K = \frac{(xC\alpha)^x(xC\alpha)^y}{C(1-\alpha)}$
As $\alpha \ll 1 \Rightarrow (1-\alpha) \simeq 1$
$K = x^xy^yC^{x+y-1}\alpha^{x+y}$
$\alpha = \left(\frac{K}{C^{x+y-1}x^xy^y}\right)^{\frac{1}{x+y}}$

5. For a reaction rate constant (k) is given by
$k = Ae^{-\frac{2800}{T}}$
Calculate activation energy (E_a)
(1) 23.28KJ/mol (2) 56KJ/mol (3) 232.8KJ/mol (4) 5600KJ/mol

Ans. **(1)**

Sol. As $\frac{E_a}{R} = 2800$
$E_a = \frac{2800 \times 8.314}{1000}$ KJ/mol
$E_a = 23.28$KJ/mol

6.

Column-I (Isothermal process)		**Column-II**	
(P)	Reversible expansion	(i)	$q = 0$
(Q)	Reversible cyclic process	(ii)	$q = nRT\ell n\left(\frac{V_2}{V_1}\right)$
(R)	Irreversible compression	(iii)	$W = -P_{ext}[V_2 - V_1]$
(S)	Free expansion	(iv)	$\frac{q_{rev}}{T} = 0$

Select the correct option.
(1) P-(ii) ; Q-(iv) ; R-(iii); S-(i)
(2) P-(iii) ; Q-(ii) ; R-(iv); S-(i)
(3) P-(iv) ; Q-(i) ; R-(ii); S-(iii)
(4) P-(i) ; Q-(iii) ; R-(ii); S-(iv)

Ans. **(1)**

Sol. (P) For isothermal process, $\Delta U = 0$

$W = -nRT\ell n\left(\frac{V_2}{V_1}\right)$ so $q = nRT\ell n\left(\frac{V_2}{V_1}\right)$

(Q) Cyclic process, change in state function (S) so change in entropy must be zero.

(R) Irreversible process $W = -P_{ext}[V_2 - V_1]$

(S) Free expansion which is isothermal must be adiabatic, so $q = 0$

7. If the Bohr's radius of H -atom is 52.9 pm and radus of H like species is 70.53 pm , then chemical species and orbit number are respectively

(1) $Li^{+2}, 3$ (2) $Li^{+2}, 2$ (3) $He^{+}, 3$ (4) $He^{+}, 2$

Ans. **(2)**

Sol. $r_{species} = a_0\frac{n^2}{Z}$

$70.53 = 52.9\left(\frac{n^2}{Z}\right)$

$\frac{n^2}{Z} = \frac{70.53}{52.9} = 1.33 = \frac{4}{3}$

(1) $Li^{+2}, 3 \Rightarrow \frac{n^2}{Z} = \frac{9}{3} = 3$

(2) $Li^{+2}, 2 \Rightarrow \frac{4}{3} = 1.33$

(3) $He^{+}, 3 \Rightarrow \frac{9}{2} = 4.5$

(4) $He^{+}, 2 \Rightarrow \frac{4}{2} = 2$

8. **Statement I :** Of the following compounds SO_2, SO_3, H_2S, SF_4; only three compounds have complete octet.

Statement II : For the given set of compounds $[SF_4, BrF_5, ClF_3]; [NH_3, BrF_5, SF_4]; [H_2O, IF_5, XeF_4]$ only one set of compound has one lone pair on all central atoms.

(1) Both Statement I and Statement II are correct

(2) Statement I is incorrect but Statement II is correct.

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

(4) Both Statement I and Statement II are incorrect

Ans. **(2)**

Sol. SO_2, SO_3, H_2S, SF_4 all compounds have complete octet.

IF_5, NH_3, BrF_5, SF_4 have one lone pair on central atom

ClF_3, XeF_4 have two lone pair on central atom.

9. Consider the following ionization energy order

(A) $IE_1: Cr > Mn$

(B) $IE_2: Cr < Mn$

(C) $IE_1: Cr < Mn$

(D) $IE_2: Cr > Mn$

Correct order among the following :

(1) A and B

(2) B and C

(3) C and D

(4) A and D

Ans. **(3)**

Sol. $Cr - [Ar]3d^5 4s^1$

$Mn - [Ar]3d^5 4s^2$

$IE_1 - Mn > Cr$

$IE_2 - Mn < Cr$

10. ' X ' is the nitrogen containing compound which is added to freshly prepared $FeSO_4$ and dilute H_2SO_4 to form a brown ring complex ' Y '.
Identify X and Y .
(1) $NO; [Fe(NO)]SO_4$
(2) $N_2O; [Fe(N_2O)]SO_4$
(3) $NO_2; [Fe(NO_2)]SO_4$
(4) $N_2O_4; [Fe(N_2O_4)]SO_4$

Ans. **(1)**

Sol. $NO + FeSO_4 \xrightarrow{\text{dil. } H_2SO_4} [Fe(NO)]SO_4$

11. **Statement I :** The bond angle order in OF_2, H_2O, OCl_2 is $OF_2 < H_2O < OCl_2$
Statement II : SiF_4, SnF_4 and PbF_4 are all ionic compounds.
Which of the following option is correct.
(1) Both Statement I and Statement II are correct
(2) Statement I is incorrect but Statement II is correct.
(3) Statement I is correct but Statement II is incorrect.
(4) Both Statement I and Statement II are incorrect

Ans. **(3)**

Sol.

Specie	Bond angle
OCl_2	111°
H_2O	104.5°
OF_2	103°

SiF_4 is covalent.

12. For the given coordination compounds.
(A) $[Ni(NH_3)_6]^{2+}$ is $sp^3\ d^2$, octahedral and paramagnetic.
(B) $[Ni(CO)_4]$ is sp^3, tetrahedral and paramagnetic.
(C) $[Ni(CN)_4]^{2-}$ is dsp^2, square planar and diamagnetic.
(D) $[NiCl_4]^{2-}$ is sp^3, tetrahedral and paramagnetic.
The correct set of coordination compounds against the mentioned properties is
(1) A, B and D
(2) B, C and D
(3) A, C and D
(4) A, B and C

Ans. **(3)**

Sol. $[Ni(CO)_4]$ is sp^3, tetrahedral and diamagnetic

13. In a period, ionization energy of left most element is ___ and $|\Delta H_{eg}|$ value of right most element is ___ .
[Except noble gases]
(1) lowest, lowest
(2) lowest, highest
(3) highest, highest
(4) highest, lowest

Ans. **(2)**

Sol. Left most element in a period will be of group 1 which will have lowest IE, while right most element will be of group 17 which will have highest $|\Delta H_{eg}|$.

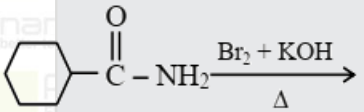
14. How many of the following reaction(s) product formed can also be prepared by Garbiel phthlimide synthesis :

(i) $Ph-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2+KOH}$

(ii) $Ph-CH_2-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2+KOH}$

(iii) $CH_3-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2+KOH}$

(iv) $CH_3-\overset{\overset{O}{\|}}{C}-NH-CH_3 \xrightarrow[\Delta]{Br_2+KOH}$

(v)  $\xrightarrow[\Delta]{Br_2+KOH}$

(1) i, ii, iii (2) ii, iii, iv (3) ii, iii, v (4) i, iii, v

Ans. **(3)**

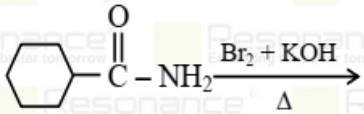
Sol. (i) $Ph-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2+KOH} Ph-NH_2$

(ii) $Ph-CH_2-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2+KOH} Ph-CH_2-NH_2$

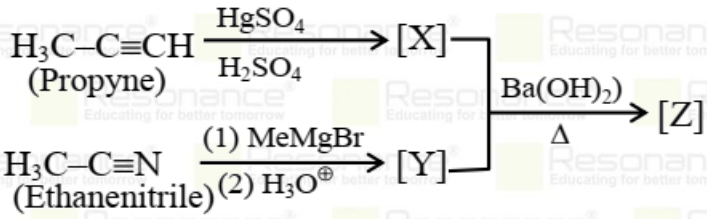
(iii) $CH_3-\overset{\overset{O}{\|}}{C}-NH_2 \xrightarrow[\Delta]{Br_2+KOH} CH_3-NH_2$

(iv) $CH_3-\overset{\overset{O}{\|}}{C}-NH-CH_3 \xrightarrow[\Delta]{Br_2+KOH}$

1° amine is not formed

(v)  $\xrightarrow[\Delta]{Br_2+KOH}$

15. Give IUPAC name of the final product Z.

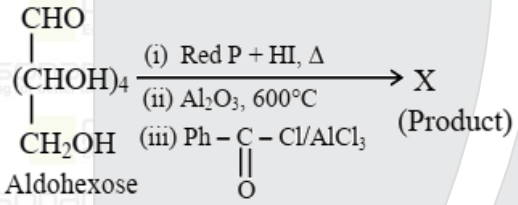


(1) Mesityl oxide
(2) 4-Methylpent-3-en-2-one
(3) 4,4-Dimethylbut-3-en-2-one
(4) 2-Methylpent-2-en-4-one

Ans. **(2)**

Sol. X and Y is propanone which undergoes aldol condensation reaction and gives 4-Methylpent-3-en-2-one (Z) as final product

16.

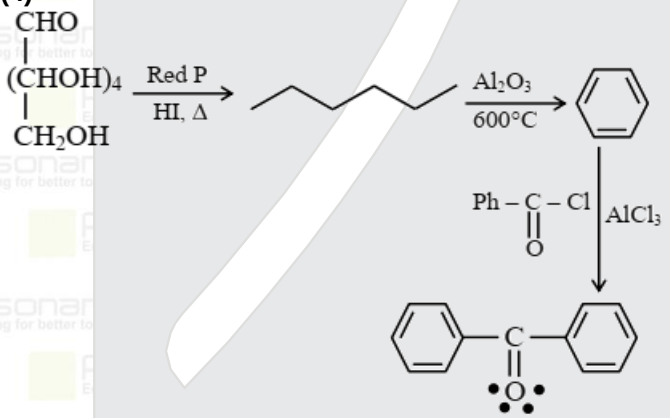


Count the total number of e^- present in lone pair and π bond

(1) 12 (2) 14 (3) 16 (4) 18

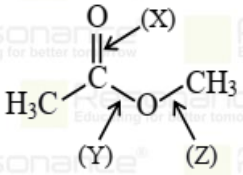
Ans. **(4)**

Sol.



Total number of lone pair electrons and π electrons in final product $= 18$

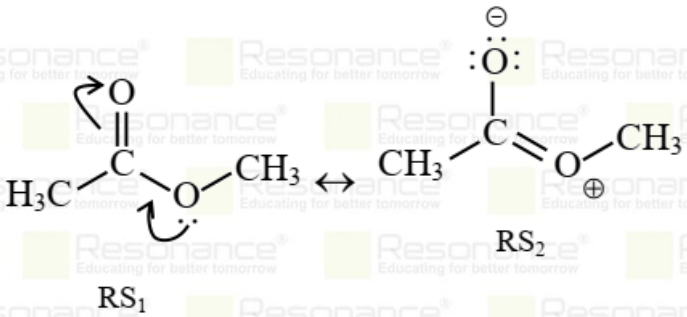
17. Compare the bond length X, Y and Z in the following compound



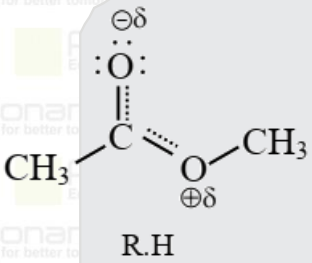
(1) $X = Y = Z$
(2) $X = Y < Z$
(3) $X < Y < Z$
(4) $X < Y = Z$

Ans. **(3)**

Sol.



RS1 RS2



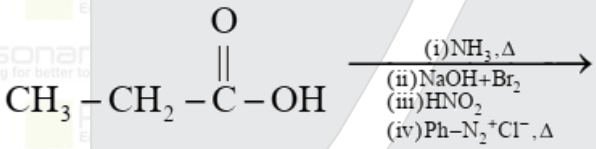
R.H

RS1 is more stable than RS2

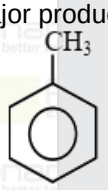
∴ contribution of RS1 is more than RS2 in it's R.H.

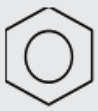
∴ Order of bond length x < y < z

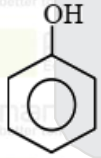
18.

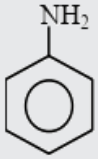


Major product P is :

(1) 

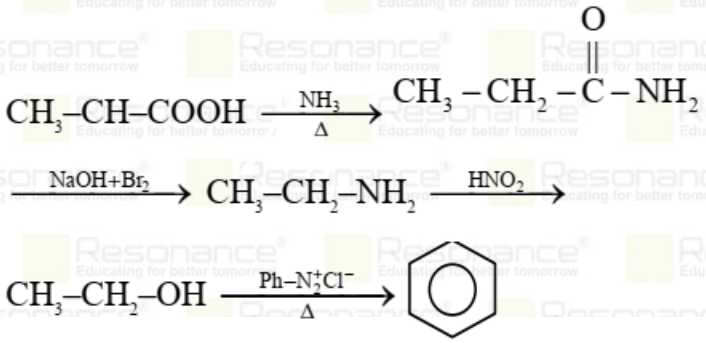
(2) 

(3) 

(4) 

Ans. (2)

Sol.



19. C_4H_9Br (Optically active) $\xrightarrow[\Delta]{\text{Alc. KOH}}$ (A) (Major product) $\xrightarrow{Br_2/CCl_4}$

(B) $\xrightarrow[(ii)NaNH_2/\Delta]{(i)\text{Alc. KOH}}$ (C) $\xrightarrow[\Delta]{HgSO_4,\ dil.H_2SO_4}$ (D)

Which of the following test will give confirmation of functional group in (D)

(1) Haloform test

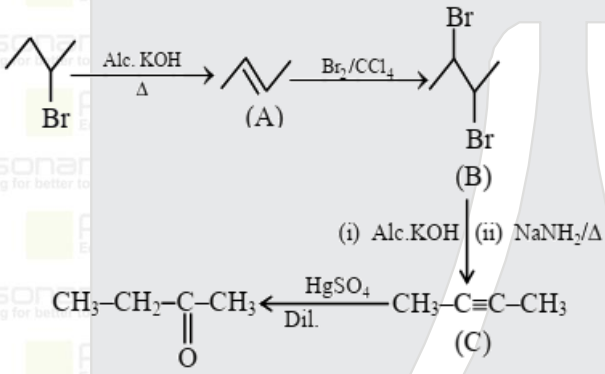
(2) Benedict test

(3) Lucas test

(4) Tollen's test

Ans. **(1)**

Sol.



Final product gives + ve haloform test

20. **Statement- I :** Mixture of Sugar and NaCl is separated by using ethanol because of difference in their solubility.

Statement-2 : Rose essence from rose petals is separated by steam distillation because of its higher volatility and insolubility in H_2O.

(1) Both Statement I and Statement II are correct

(2) Statement I is correct but Statement II is incorrect.

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

(4) Both Statement I and Statement II are incorrect

Ans. **(1)**

Sol. Theory based

21. **Statement** $-\mathbf{I}: Ph-O-CH_2-Ph \xrightarrow{HI}$

Product is mixture of benzyl alcohol & iodobenzene.

Statement - II: $Ph-O-CH_2-Ph, O-CH_2$ bond cleavage takes place during reaction with HI .

(1) Statement-I is incorrect and statement-II is correct

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

(3) Both statements are correct

(4) Both statements are incorrect.

Ans. **(1)**

Sol. $Ph–O–CH_2–Ph \xrightarrow{HI} Ph–OH + I–CH_2–Ph$

Phenol Benzyl Iodide

22. For a certain decomposition

$X_2Y_{4(g)} \rightleftharpoons 2XY_{2(g)}$

Degree of dissociation of X_2Y_4 is 75% at 1 bar and 600 K . Find $|\Delta G^\circ|$ of reaction in kJ/mol^{-1}

Given $\begin{vmatrix} \ell n6 = & 1.7918 \\ \ell n7 = & 1.9459 \\ R = & 8.314 Jmol^{-1}\ K^{-1} \end{vmatrix}$

Ans. **(8)**

Sol. $k_p = \frac{4P_o\alpha^2}{1-\alpha^2} = \frac{36}{7}$

$\Delta G^\circ = -RT\ell nk_p$

$|\Delta G^o| = 8.314 \times 600 \ln\left(\frac{36}{7}\right)$

$= 8169.5\ J\ mol^{-1}$

$= 8.169\ kJ/mol$

23. $0.2M, 500ml MnO_4^-$ solution is treated with 1.5 M , $500ml KI solution in basic medium.$ I_2 required ' X ' M, 300ml hypo solution. The value of ' X ' is -

Ans. **(1)**

Sol. gm equivalent of $MnO_4^- = 0.2 \times \frac{500}{1000} \times 3 = 0.3$ gm equivalent of $KI = 1.5 \times \frac{500}{1000} \times 1 = 0.75$ gm equivalent of MnO_4^- =gm equivalent of hypo $0.3 = x \times \frac{300}{1000} \times 1$

$X = 1$

24. If excess of $AgNO_3$ is added to $0.05M, 100ml$ of Tetraaquadichlorochromium(III) chloride complex aqueous solution, then the number of moles of AgCl precipitated is $x \times 10^{-3}$ moles. Find ' x '

Ans. **(5)**

Sol. $[Cr(H_2O)_4Cl_2]Cl + AgNO_3 \rightarrow AgCl\downarrow + [Cr(H_2O)_4Cl_2]NO_3$

$\Rightarrow$ 1 mole of complex will precipitate 1 mole of AgCl .

$\Rightarrow$ Given moles of complex $= M \times V = (0.05 \times 100 \times 10^{-3})$ moles

$\Rightarrow$ Moles of $AgCl = 5 \times 10^{-3}$ moles

$\Rightarrow x = 5$

25. 1 mol of alkane (X) for complete combustion required 8 mol of oxygen. When it is brominated in presence of sun light it gives only one product. How many primary carbons are present in alkane (X)?

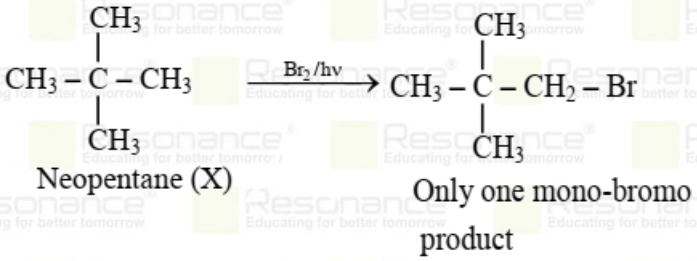
Ans. **(4)**

Sol. $C_nH_{2n+2} + \left(\frac{3n+1}{2}\right)O_2 \rightarrow nCO_2 + (n+1)H_2$

$\frac{3n+1}{2} = 8$

$3n + 1 = 8 \times 2$

$n = 5 (\therefore C_5H_{12})$



Neopentane (X)

Only one mono-bromo product

Number of primary carons $= 4$