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JEE (MAIN) 2026

MEMORY BASED QUESTIONS & TEXT SOLUTION

SHIFT-1

DATE & DAY: 02nd April 2026 & Thursday

PAPER-1

Duration: 3 Hrs.
Time: 09:00 – 12:00 IST

SUBJECT: CHEMISTRY

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

1. Relation between $t_{1/2}$ & $t_{100\%}$ for zero order & Ist order reaction respectively is:

(1) $t_{100\%} = 2 \times t_{1/2} : t_{100\%} = 2 \times t_{1/2}$ (2) $t_{100\%} = 2 \times t_{1/2} : t_{100\%} = t_{1/2}$

(3) $t_{100\%} = 2 \times t_{1/2} : t_{100\%} = \infty$ (4) $t_{100\%} = \infty : t_{100\%} = 2 \times t_{1/2}$

Ans. **(3)**

Sol. Zero -order

$t_{100\%} = \frac{a}{k}; t_{1/2} = \frac{a}{2k}$

Ist order

$t_{100\%} = \infty$

$t_{1/2} = \frac{\ell n 2}{k}$

2. 18 g of steam reacted with iron to from Fe_3O_4, how much iron will be consumed.

(1) 21 gm (2) 42 gm (3) 84 gm (4) 10.5 gm

Ans. **(2)**

Sol. $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2O$

$n_{steam} = \frac{18}{18} = 1$

n_{Fe} required $= \frac{3}{4}$

mass of Fe required $= \frac{3}{4} \times 56 = 42gm$

3. Angular momentum of the electron in a hydrogen atom is $\frac{3\,h}{2\pi}$ then find total energy of electron (in eV/atom)

(1) -1.51 (2) -122.4 (3) -40.8 (4) -4.53

Ans. **(1)**

Sol. Angular Momentum $= \frac{nh}{2\pi} = \frac{3\,h}{2\pi}$ $n = 3$

Energy of electron $= -13.6\frac{Z^2}{n^2}eV/\text{ atom} = \frac{-13.6 \times 1}{3^2}eV = -1.51eV$

4. Given $K_{SP}(Ag_2C_2O_4) = 32X$

$K_{SP}(AgBr) = 4Y$

Find ratio of solubility of the given salts in pure water

(1) $\frac{X^{1/3}}{\sqrt{2Y}}$ (2) $\frac{2X^{1/3}}{\sqrt{2Y}}$ (3) $\frac{2X^{1/3}}{\sqrt{Y}}$ (4) $\frac{X^{1/3}}{\sqrt{Y}}$

Ans. **(4)**

Sol. For $Ag_2C_2O_4$

$4\,S_1{}^3 = 32X$

$\Rightarrow S_1 = 2X^{1/3}$

For AgBr

$S_2{}^2 = 4Y$

$\Rightarrow S_2 = 2Y^{1/2}$

Ratio $\left(\frac{S_1}{S_2}\right) = \frac{X^{1/3}}{\sqrt{Y}}$

5. $19.5 gm FCH_2COOH$ is dissolved in 500 gm water due to which depression in freezing point is found to be $1°C$. Calculate K_a of FCH_2COOH.
$\{K_f$ of water $= 1.86\ K - kg/$ mole, $m = M\}$
(1) 2.8×10^{-3} (2) 2.8×10^{-2} (3) 1.4×10^{-3} (4) 5.6×10^{-3}

Ans. **(1)**

Sol. $\Delta T_f = iK_f m$

no. of moles $= \frac{19.5}{78} = \frac{1}{4}$ mole

$$1 = i \times 1.86 \times \frac{1/4}{1/2}$$

$$i = \frac{2}{1.86}$$

$$i = 1 + (n-1)\alpha$$

$$i = 1 + \alpha$$

$$\alpha = \frac{2}{1.86} - 1 = 0.075$$

$$K_a = C\alpha^2$$

$$= \frac{1}{2} \times (0.075)^2$$

$$= 0.00281 = 2.8 \times 10^{-3}$$

6. Consider following reaction :

$Fe(OH)_2 + 2e^- \longrightarrow Fe(s) + 2OH^-\ E° = -0.88\ V$

$AgBr(s) + e^- \longrightarrow Ag(s) + Br^-(aq) E° = 0.07\ V$

Select the correct statement.

(1) $E^o_{cell} = -0.95\ V$

(2) E^o_{cell} is an extensive property

(3) Fe is getting reduced

(4) Net cell reaction

$$Fe(s) + 2OH^-(aq) + 2AgBr(s) \longrightarrow Fe(OH)_2 + 2Ag(s) + 2Br^-(aq)$$

Ans. **(4)**

Sol. $E^o_{cell} = E^o_{R(\text{ cathode })} - E^o_{R(\text{ anode })}$

$= 0.07 - (-0.88) = 0.95\ V$

7. Match the column and select correct option:-

(i) Vit. B_1	(P) Ascorbic acid
(ii) Vit. B_2	(Q) Riboflavin
(iii) Vit. B_6	(R) Thiamine
(iv) Vit. C	(S) Pyridoxine

(1) (i) $\rightarrow$ R, (ii) $\rightarrow$ Q, (iii) $\rightarrow$ S, (iv) $\rightarrow$ P

(2) (i) $\rightarrow$ Q, (ii) $\rightarrow$ R, (iii) $\rightarrow$ S, (iv) $\rightarrow$ P

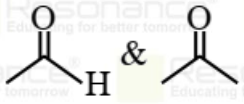
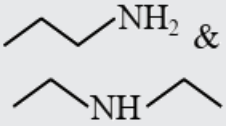
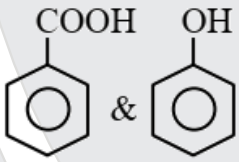
(3) (i) $\rightarrow$ R, (ii) $\rightarrow$ Q, (iii) $\rightarrow$ P, (iv) $\rightarrow$ S

(4) (i) $\rightarrow$ S, (ii) $\rightarrow$ Q, (iii) $\rightarrow$ R, (iv) $\rightarrow$ P

Ans. **(1)**

Sol. Theory based

8. Match correctly with the reagents given in columnI with organic compounds given in column-II.

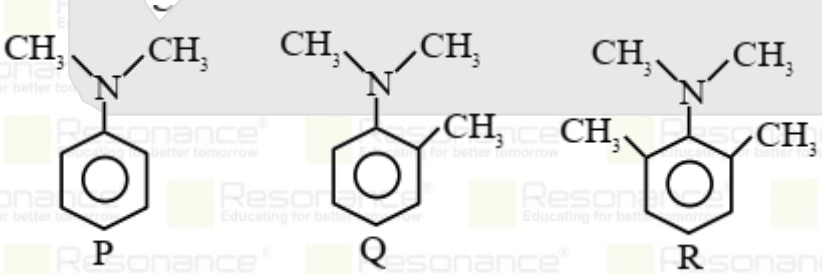
	Column-I (Name of test)		Column-II (Pair of compounds)
(i)	Neutral $FeCl_3$ test	(P)	
(ii)	Isocyanide test $CHCl_3 + KOH/\Delta$	(Q)	
(iii)	Ammonical silver nitrate test	(R)	
(iv)	$NaHCO_3$ test	(S)	

(1) (i)-Q, (ii)-R, (iii)-P, (iv)-S (2) (i)-P, (ii)-Q, (iii)-R, (iv)-S
(3) (i)-R, (ii)-S, (iii)-Q, (iv)-P (4) (i)-S, (ii)-R, (iii)-Q, (iv)-P

Ans. **(1)**

Sol. (i) Phenol gives violet colour with neutral $FeCl_3$ not ethanol.
(ii) 1° amine gives positive test with $CHCl_3/KOH$ not 2° amine.
(iii) Aldehyde gives positive test with ammonical silver nitrate not ketone.
(iv) Benzoic acid release CO_2 with $NaHCO_3$ not phenol.

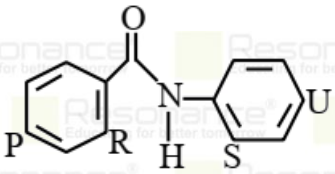
9. Write the correct order of rate of reaction of following compounds with PhN_2Cl



(1) P > Q > R (2) P > R > Q (3) $Q > P > R$ (4) $R > P > Q$

Ans. **(1)**

Sol. Rate of ESR ∝ nucleophilicity of benzene ring Order of nucleophilicity P > Q > R.

10. 

Most preferred site for electrophilic substitution in above example?

(1) Predominantly at U (2) S and R

(3) Predominantly at R (4) R and S

Ans. **(1)**

Sol. U is predominant site towards attack of electrophile because of +M nature of nitrogen.

11. Which of the following order is correct for priority of functional group in IUPAC nomenclature ?

(1) $-\mathrm{CHO} > -\mathrm{COOR} > -\mathrm{CO}- > -\mathrm{CN} > \equiv > -\mathrm{NH_2}$

(2) $-\mathrm{CONH_2} > -\mathrm{CN} > -\mathrm{CHO} > -\mathrm{CO}- > -\mathrm{NH_2} > \equiv$

(3) $-\mathrm{CONH_2} > -\mathrm{COOR}- > -\mathrm{CN} > -\mathrm{CHO} > -\mathrm{CO}- > \equiv$

(4) $-\mathrm{COOR} > -\mathrm{CN} > -\mathrm{CONH_2} > -\mathrm{CHO} > -\mathrm{CO}- > \equiv$

Ans. **(2)**

Sol. Theory based

12. **Statement-I :** Benzyl chloride reacts faster than ethyl chloride towards $\mathrm{SN^1}$.

Statement-II : Positive charge on ethyl will be unstable.

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

(2) Statement-I and statement-II both are incorrect.

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

(4) Statement-I incorrect but statement-II is correct.

Ans. **(1)**

Sol. Rate of $\mathrm{SN^1} \propto$ Stability of carbocation Order of stability of carbocation :

$\mathrm{Ph} - \overset{\oplus}{\mathrm{C}}\mathrm{H_2} > \mathrm{CH_3} - \overset{\oplus}{\mathrm{C}}\mathrm{H_2}$

13. Statement-I : 1, 2, 3-trihydroxy propane can be separated from water by using simple distillation.

Statement-II : Azeotropic mixture cannot be separated by using fractional distillation.

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

(2) Statement-I and statement-II both are incorrect.

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

(4) Statement-I incorrect but statement-II is correct.

Ans. **(4)**

Sol. Glycerol is separated by distillation under reduced pressure.

14. Statement-I : The correct increasing order of bond length among the following is $\mathrm{O_2^{\oplus}} < \mathrm{O_2} < \mathrm{O_2^-} < \mathrm{O_2^{2-}}$

Statement-II : The correct order of number of unpaired electrons is $\mathrm{O_2^{2-}} < \mathrm{O_2} < \mathrm{O_2^-} < \mathrm{O_2^+}$

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

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

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

(4) Both Statement-I and Statement-II are incorrect

Ans. **(2)**

Sol.

Species	Bond order	unpaired electrons
$O_2^{\oplus}$	2.5	1
O_2	2	2
O_2^{-}	1.5	1
O_2^{2-}	1	0

15. Statement-I : The correct order of Ionization energy is $Na > Mg > Al > Ar$

Statement-II : Among the following elements Sc, Ca and Mg, Ca has highest 3^{rd} Ionisation Energy

(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 Correct order are

Ans. **(4)**

Sol. Statement I IE : $Ar > Mg > Al > Na$

Statement II IE : $Mg > Ca > Sc$

16. Cation of salt A when treated in flame gives apple green colour. When salt A is heated with Chromate solution gives yellow precipitate & when salt is heated with conc HNO_3 & Ammionium molybdate it gives canary yellow ppt. Salt A contains :

(1) Ba^{+2} and PO_4^{3-} (2) Ca^{+2} and SO_4^{2-} (3) Ba^{+2} and SO_4^{2-} (4) Sr^{+2} and PO_4^{3-}

Ans. **(1)**

Sol. (i) Ba^{+2} gives apple green colour while Ca^{+2} and Sr^{+2} gives brick red and crimson red in flame test.

(ii) $Ba^{+2} + CrO_4^{2-} \rightarrow \underset{\text{Yellow ppt}}{BaCrO_4}$

(iii) $PO_4^{3-} + \text{Conc } HNO_3 + (NH_4)_2MoO_4(NH_4)_3[P(Mo_3O_{10})_4] \rightarrow \underset{\text{Canery yellow ppt}}{\downarrow}$

17. Find the correct match.

Column-I (Complex compound)	**Column-II (Δ_0 (CFSE) cm^{-1})**
(i) $[Cr(CN)_6]^{3-}$	(P) 17000
(ii) $[Cr(H_2O)_6]^{3+}$	(Q) 15000
(iii) $[Cr(en)_3]^{3+}$	(R) 12000
(iv) $[CrF_6]^{3-}$	(S) 20,000

(A) (i) → P ; (ii) → Q ; (iii) → S ; (iv) → R

(B) (i) → S ; (ii) → Q ; (iii) → P ; (iv) → R

(C) (i) → R ; (ii) → P ; (iii) → Q ; (iv) → S

(D) (i) → P; (ii) → R; (iii) → Q; (iv) → S

Ans. **(B)**

Sol. CFSE is proportional to strength of ligand followed by chelation.

CN^- is stronger than en

$CN^- >$ en $> H_2O > F^-$

18. For first order reaction, rate constant at $27^\circ C$ and $t^\circ C$ are 1.5×10^3 and 4.5×10^3 respectively. If activation energy of the reaction is $60 KJmol^{-1}$, then $(R = 8.3 Jmol^{-1}\ K^{-1}) \ell n 3 = 1.1$
Find temperature ' t '(in $^\circ C$).

Ans. **(41)**

Sol. $\ell n\left(\frac{K_2}{K_1}\right) = \frac{E_a}{R}\left[\frac{T_2 - T_1}{T_1\, T_2}\right]$

$$\ell n\left(\frac{4.5 \times 10^3}{1.5 \times 10^3}\right) = \frac{60 \times 10^3}{8.3}\left[\frac{T_2 - 300}{300.T_2}\right]$$

$$\ell n 3 = \frac{60 \times 10^3}{8.3}\left[\frac{T_2 - 300}{300.T_2}\right]$$

$\Rightarrow T_2 = 314.35\ K$

$\Rightarrow t = 41.2^\circ C$

19. One mole of an alkane on complete combustion required 8 mole of O_2, find out sum of carbon and hydrogen atoms in one molecule of the alkane.

Ans. **(17)**

Sol. $C_n H_{2n+2} + \left(\frac{3n+1}{2}\right) O_2 \rightarrow nCO_2 + (n+1)H_2O$

$$1\left(\frac{3n+1}{2}\right)\quad \frac{3n+1}{2} = 8 \Rightarrow 3n + 1 = 16$$

$$\Rightarrow 3n = 15$$

$$n = 5$$

So alkane is $C_5H_{12} \Rightarrow 17$

20. For a reversible adiabatic process involving ideal gas if initial pressure and volume are 8 bar and $0.15\ m^3$ respectively and final pressure is 1 bar.
Calculate |work done| (in Kilo Joule) $[C_v = 2R, C_p = 3R]$

Ans. **(120)**

Sol. $P_1 V_1^\gamma = P_2 V_2^\gamma$

$8 \times (0.15)^{3/2} = 1 \times (V_2)^{3/2}$

$(2^3)^{2/3} \times (0.15) = V_2$

$V_2 = 0.6\ m^3$

$w = \frac{P_2\, V_2 - P_1\, V_1}{\gamma - 1} = \frac{1 \times 0.6 - 8 \times 0.15}{\left(\frac{3}{2} - 1\right)} = \frac{0.6 - 1.2}{1/2}$

$w = -1.2\ bar - m^3 = -1.2 \times 10^5\ J = -120 KJ$

21. For reaction $A \rightleftharpoons B$

$\Delta G^\circ = 105 - 35 \log\ T$

Find the transition temperature (in $^\circ C$) of the above reaction at 1 bar

Ans. **(727)**

Sol. $\Delta G^\circ = 0$

$105 - 35 \log\ T = 0$

$\log T = 3$

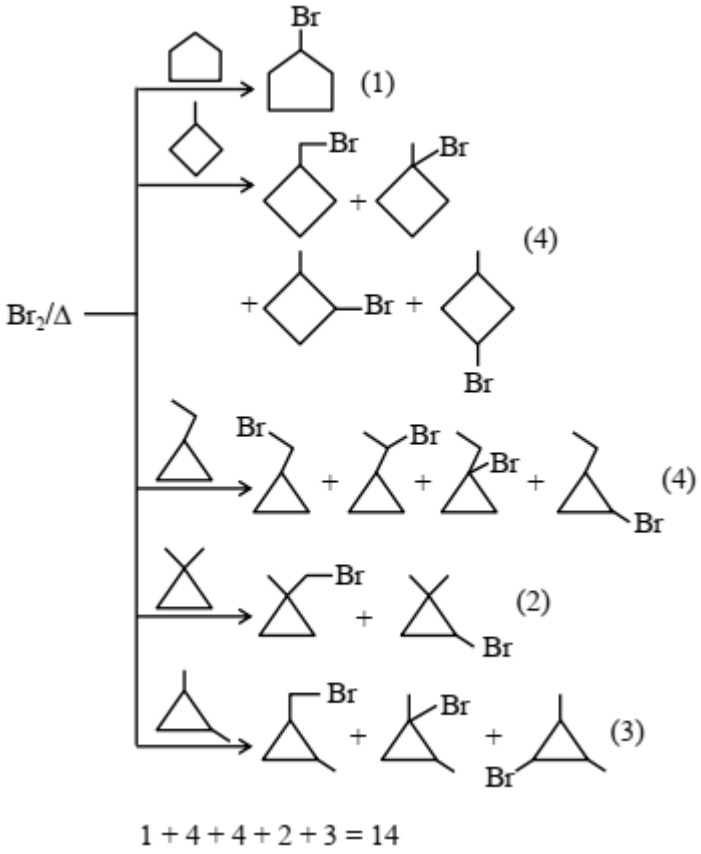
$T = 1000\ K$

$T = 727^\circ C$

22. Organic compound C_5H_{10} does not give Baeyer's reagent test. Calculate total number of structural monobromo isomers when react with $Br_2/h\nu$.

Ans. **(14)**

Sol.



$1+4+4+2+3=14$

23. 5.33 gram of $CrCl_3 \cdot 6H_2O(1:3$ electrolyte $)$ is passed through cation exchanger. The resulting solution is then treated with an excess of $AgNO_3$, leading to formation of 8.61 gran of precipitate. Calculate :

$$\frac{\text{number of moles of complex reacted}}{\text{number of moles of } AgCl \text{ precipitated}} \times 100$$

Ans. **(33)**

Sol. $[Cr(H_2O)_6]Cl_3 + \underset{\text{excess}}{AgNO_3} \rightarrow \underset{\text{ppt}}{3AgCl(s)}$

$$\frac{\text{no. of moles of complex reacted}}{\text{no. of moles of } AgCl \text{ precipitated}} \times 100 = \frac{1}{3} \times 100 = 33.3$$