MEMORY BASED QUESTIONS JEE–MAIN EXAMINATION – APRIL 2026

(HELD ON SATURDAY 04th APRIL 2026) **TIME : 3:00 PM TO 6:00 PM**

CHEMISTRY

TEST PAPER WITH SOLUTION

1. Given that :

$E^{o}_{Fe^{3+}/Fe} = -0.036V$ & $E^{o}_{M^{x+}/M} = 0.15V$

A Galvanic cell is formed by using above electrodes, whose E_{cell} is 0.2047 V when reaction quotient of cell reaction is 10^{-2}. Find the value of x. [Nearest integer]

Ans. **(2)**

Sol. Anode : $Fe(s) \rightarrow Fe^{+3}(aq) + 3e^{-}$

Cathode : $M^{+x}(aq) + xe^{-} \rightarrow M(s)$

$3M^{+x} + xFe(s) \rightarrow 3M(s) + xFe^{+3}$

$E^{\circ}_{cell} = 0.15 + 0.036 = 0.186$ V

$$E_{cell} = E^{\circ}_{cell} - \frac{0.059}{3x} \log 10^{-2}$$

$$0.2047 = 0.186 - \frac{0.059}{3x}(-2)$$

$$0.0187 = + \frac{0.118}{3x}$$

$X = 2.1$

2. 20 ml of CH_3COOH solution is neutralised by 28.08 ml of NaOH. In the 20 ml of same solution 14.04 ml of same NaOH solution is poured, then pH of resultant solution will be :

(pKa of $CH_3COOH = 4.75$)

(1) 4.75 (2) 7

(3) 3.5 (4) 4.5

Ans. **(1)**

Sol. $CH_3COOH + NaOH \rightarrow CH_3COO^{-}Na^{+} + H_2O$

In the experiment 1, 28.08 ml is required for complete neutralization therefore for 14.04 ml half equivalence point will be achieved to form acidic buffer.

pH = pKa of CH_3COOH + log [Salt/acid]

pH = pKa = 4.75

3. For a given reversible reaction at 300 K :

$2N_2O_5(g) \rightleftharpoons 4NO_2(g) + O_2(g)$

If N_2O_5 is 50% dissociated at 5 bar and 300 K at equilibrium then find $|\Delta G^{\circ}|$ for the reaction ?

[Given : log 2 = 0.3, log 7 = 0.84]

Ans. **(8)**

Sol.

$2N_2O_5(g) \rightleftharpoons 4NO_2(g) + O_2(g)$

Let 1 mole

$1-\alpha \quad 2\alpha \quad \alpha/2$

$\because \alpha = 0.5$

$0.5 \quad 1 \quad 0.25$

$$K_P = \frac{\left(n_{NO_2}\right)^4 \left(n_{O_2}\right)^1}{\left(n_{N_2O_5}\right)^2} \left[\frac{P_T}{n_T}\right]^{\Delta n_g}$$

$$K_P = \frac{(1)^4 \times 0.25}{(0.5)^2} \left[\frac{5}{1.75}\right]^3$$

$$K_P = \left(\frac{20}{7}\right)^3$$

$\Delta G^{\circ} = -RT \ln K_P$

$$= -8.314 \times 300 \ln \left(\frac{20}{7}\right)^3$$

$= -7.926$ kJ

4. Which of the following have same radius according to Bohr's theory :

(A) Radius of I^{st} orbit of H-atom.

(B) Radius of I^{st} orbit of He^{+}.

(C) Radius of II^{nd} orbit of He^{+}.

(D) Radius of II^{nd} orbit of Li^{2+}.

(E) Radius of II^{nd} orbit of Be^{3+}.

(1) A and B (2) A and E

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

Ans. **(2)**

Sol. Radius of n^{th} orbit = 0.529 Å $\frac{n^2}{Z} = a_0 \frac{n^2}{Z}$

(A) $r = a_0\left[\frac{1^2}{1}\right] = a_0$

(B) $r = a_0\left[\frac{1^2}{2}\right] = \frac{a_0}{2}$

(C) $r = a_0\left[\frac{2^2}{2}\right] = 2a_0$

(D) $r = a_0\left[\frac{2^2}{3}\right] = \frac{4a_0}{3}$

(E) $r = a_0\left[\frac{2^2}{4}\right] = a_0$

5. For the Ist order reaction

$$A \rightarrow P$$

Based on given data, find the time x (in min)

Time (minutes)	0	X	20
Concentration	0.625M	0.0625M	0.00625M

Ans. **(10)**

Sol. In I^{st} order kinetics, in equal time interval, the left amount of reactant forms G.P.

$\therefore$ x = 10 min

6. When 3.395 gm $C_2H_5OH_{(\ell)}$ is burnt completely, it liberate 101.11 kJ of heat, then find the enthalpy of formation of $C_2H_5OH_{(\ell)}$

Given ΔH_f^0 of $H_2O_{(\ell)}$ = –285.8 kJ/mol

ΔH_c^0 of graphite = –393.5 KJ/mol

(1) –274.43 KJ/mol

(2) –548.86 KJ/mol

(3) –683.5 KJ/mol

(4) –872.1 KJ/mol

Ans. **(1)**

Sol. $\underset{3.395}{C_2H_5OH(\ell)} + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(\ell)$

Moles of $C_2H_5OH(\ell) = \frac{3.395}{46} = 0.0738$ mole

Heat liberated by combustion of 1 mole $C_2H_5OH(\ell)$

$= \frac{101.11}{0.0738}$

= 1369.97 KJ/mol

$\Delta_r H^\circ$ = –1369.97 KJ/mol

ΔH_c° of graphite = ΔH_f of CO_2

$\Delta_r H^\circ = 2\times\Delta H_f^\circ(CO_2)+3\times\Delta H_f^\circ(H_2O)-\Delta H_f^\circ(C_2H_5OH)$

$-1369.97 = 2\times(-393.5)+3\times(-285.8)- \Delta H_f^\circ(C_2H_5OH)$

$\Delta H_f^\circ(C_2H_5OH)$ = –274.43 KJ/mol

7. From given data

(I) 90.8 lit of $H_2(g)$ at STP

(II) 684 gm of sucrose

(III) 2 moles of cyclohexane

Correct order of total number of atoms will be

(1) (I) > (II) > (III)

(2) (III) > (II) > (I)

(3) (II) > (III) > (I)

(4) (I) > (III) > (II)

Ans. **(3)**

Sol. (I) moles of $H_2 = \frac{90.8}{22.7} = 4$ moles

Moles of atom of H = 8 moles

(II) $C_{12}H_{22}O_{11}$

$n_{sucrose} = \frac{684}{342} = 2$

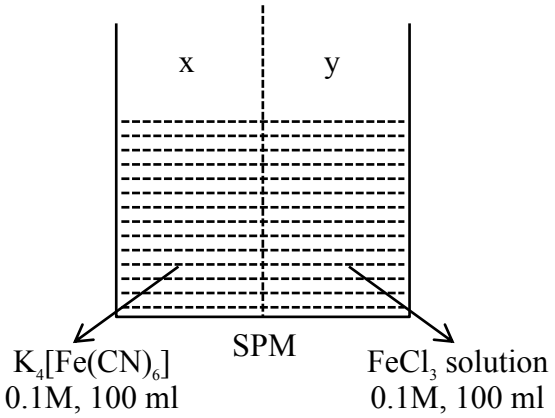
moles of atoms = 45 × 2 = 90 moles

(III) moles of atoms in C_6H_{12}

= 2 × 18

= 36 moles

8.



Which of the following is correct for above figure

(1) y is hypotonic solution

(2) Both compartment will have blue colour

(3) To perform reverse osmosis, any pressure can be applied on x-side

(4) Solute can pass through semi-permeable membrane.

Ans. (1)

Sol. On x-side: **i = 5** On y-side: **i = 4**

So $\pi_x > \pi_y$

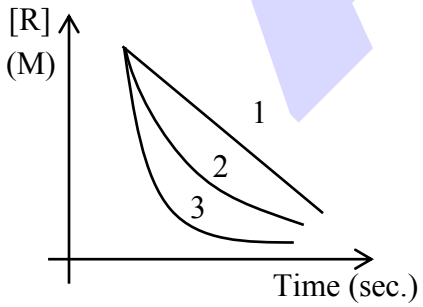
(A) x → hypertonic, y-hypotonic

(B) only solvent molecule passes, so no blue colour

(C) pressure applied should be more than $\Delta(\pi)$ but not any pressure

(D) only solvent molecule passes through SPM.

9. For the reaction : R → P



I. Curve 1 will be observed when order of reaction is 1.

II. If curve 2 & curve 3 are observed for 1st order then rate constant for 3rd curve will be greater than rate constant for 2nd curve.

III. Decomposition of HI on gold surface represent curve (1).

Select the option representing correct set of statements :-

(1) I, II, III (2) I, II

(3) II, III (4) I, III

Ans. (3)

Sol. (I) curve (1) will be for zero order reaction

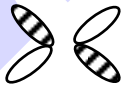
(II) $K_3 > K_2$

(III) Zero order

10. Assume internuclear axis to be z-axis, the correct molecular orbital representation of π* antibonding molecular orbital of overlapping between two 'p' orbitals will be :

(1) 

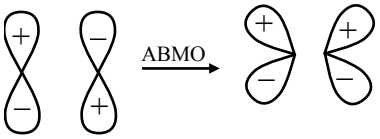
(2) 

(3) 

(4) 

Ans. (3)

Sol. For internuclear axis 'z'



11. If first ionization enthalpy of Mg is 738 kJ/mol then second ionization enthalpy of Mg in kJ/mol will be :

(1) –640 kJ/mol (2) –527 kJ/mol

(3) 658 kJ/mol (4) 1450 kJ/mol

Ans. (4)

Sol. Since successive ionization energy increases thus $IE_2 > IE_1$

12. Element 'M' of group 13 has same electronegativity as Ge.

Consider the statements

(A) M^{+3} is good oxidizing agent

(B) M^{+3} is good reducing agent

(C) $E^0_{M^{3+}/M} > 0$

(D) M^{+3} is more stable than $M^{\oplus}$

Which of the following is correct?

(1) A & D

(2) A & C

(3) B & D

(4) A & D

Ans. **(2)**

Sol. EN based on Pauling scale of Ge = 1.8 in group 13 ; EN of Tℓ = 1.8

Element 'M' is Tℓ

$\Rightarrow$ $T\ell^{3+}$ is a good oxidizing agent

$\Rightarrow$ $E°(T\ell^{3+}/T\ell) = +1.26$ V

$\Rightarrow$ $T\ell^{+1}$ is more stable than $T\ell^{3+}$

13. Consider the following elements.

Hf [z = 72] ; Yb [z = 70] ; Lu [z = 71]

Gd [z = 64] ; Eu [z = 63] ; Tm [z = 69]

Dy [z = 66] ; Er [z = 68]

A : [Hf, Yb]

B : [Gd, Eu]

C : [Lu, Tm]

D : [Er, Dy]

The pair which contains same number of 'f' electrons.

(1) A and B (2) B and C

(3) C and D (4) A and D

Ans. **(1)**

Sol. Hf – $[Xe]4f^{14}\ 6s^2\ 5d^2$

Yb – $[Xe]4f^{14}\ 6s^2$

Lu – $[Xe]4f^{14}\ 5d^1\ 6s^2$

Gd – $[Xe]4f^7\ 5d^1\ 6s^2$

Eu – $[Xe]4f^7\ 6s^2$

Tm – $[Xe]4f^{13}\ 6s^2$

Dy – $[Xe]4f^{10}\ 6s^2$

Er – $[Xe]4f^{12}\ 6s^2$

14. Which of the following ion forms a precipitate on addition of NH_4OH and H_2S.

(1) Pb^{2+}

(2) Mn^{2+}

(3) Cu^{2+}

(4) Fe^{3+}

Ans. **(2)**

Sol. All should give ppt. but according to group reagent answer should be (2)

NH_4OH and H_2S are used for analysis of group IV cations [Ni^{2+}, Co^{2+} , Mn^{2+} , Zn^{2+}]

15. Consider the following complex compounds

(A) $[Ni(NH_3)_6]^{2+}$

(B) $[NiCl_4]^{2-}$

(C) $[Ni(en)_3]^{2+}$

The number of unpaired electrons in A, B and C respectively and order of frequency of absorbed radiation among A, B and C is :

(1) 2, 2, 2 and C > A > B

(2) 0, 2, 2 and A > B > C

(3) 2, 2, 0 and A > C > B

(4) 2, 2, 2 and C > B > A

Ans. **(1)**

Sol. (A) Ni^{2+} $3d^8$ SFL $t_{2g}^{2,2,2}$ $e_g^{1,1}$ n = 2

(B) Ni^{2+} $3d^8$ tetrahedral $e^{2,2}$ $t_2^{2,1,1}$ n = 2

(C) Ni^{2+} $3d^8$ SFL $t_{2g}^{2,2,2}$ $e_g^{1,1}$ n = 2

Ligand strength : en > NH_3 > Cl.

16. If |x| represents the difference in maximum oxidation state possible for Mn in its oxide and in its fluoride.

Among the following ions, which ions contain unpaired electrons equal to |x|.

(A) Zn^{+2}

(B) Fe^{+2}

(C) Co^{+2}

(D) V^{+2}

(E) Sc^{+3}

(1) A and E

(2) C and D

(3) B and C

(4) B and D

Ans. **(2)**

Sol. Oxide of Mn in highest O.S. = Mn_2O_7 [Mn^{+7}]

Fluoride of Mn in highest O.S. = MnF_4 [Mn^{+4}]

$\Rightarrow$ Difference in O.S. = |x| = 3

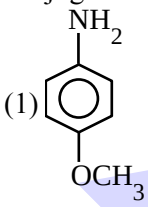
Zn^{2+} & Sc^{+3} $\Rightarrow$ 0 unpaired e^-

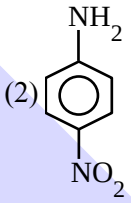
Fe^{+2} $\Rightarrow$ 4 unpaired e^-

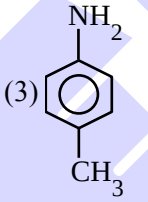
Co^{+2} $\Rightarrow$ 3 unpaired e^-

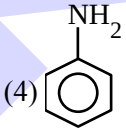
V^{+2} $\Rightarrow$ 3 unpaired e^-

17. Which of the following compound has most stable conjugate acid?

(1) 

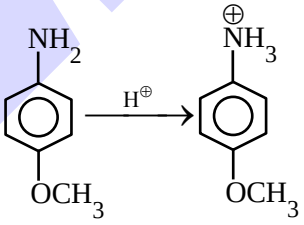
(2) 

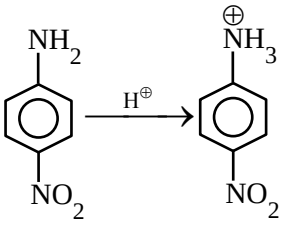
(3) 

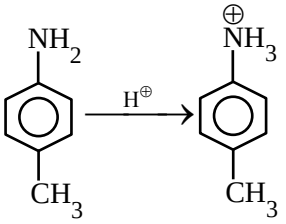
(4) 

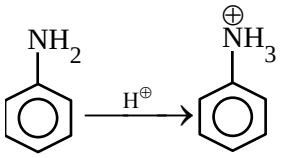
Ans. **(A)**

Sol.

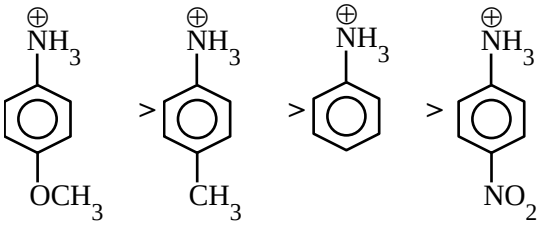








Stability order of conjugated acid :

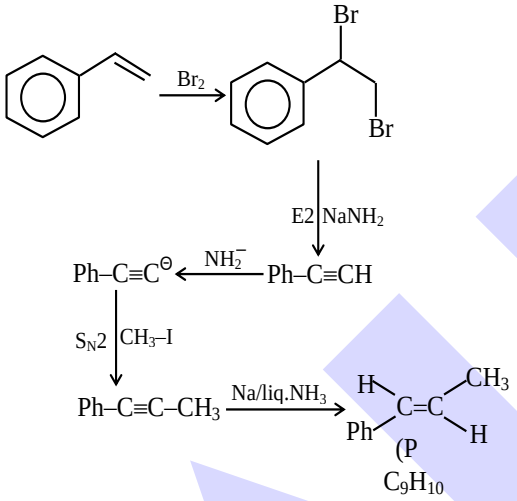


18. Styrene $\xrightarrow[(iii)\,CH_3-I \\ (iv)\,H_2/Na/liq.NH_3]{(i)\,Br_2/CHCl_3 \\ (ii)\,NaNH_2(Excess)}$ (P)

Molar mass of product (P) is gives

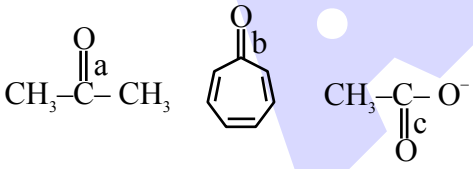
Ans. (118)

Sol.



Molar mass of P = 118 gm

19.



Compare C–O bond length?

(1) b > a > c

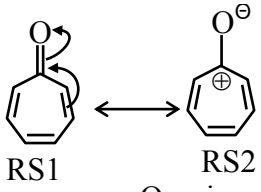
(2) b > c > a

(3) a > b > c

(4) c > a > b

Ans. (2)

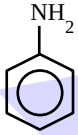
Sol.



Quasi aromatic

C–O bond length is maximum in compound (b) because RS2 of this compound has aromatic character.

20. Match the column-I with column-II

Column-I		Column-II	
(A)		(P)	Hinsberg reagent
(B)		(Q)	Tollen's reagent
(C)		(R)	Lucas reagent
(D)		(S)	Phthalein dye test

(1) A-P, B-Q, C-S, D-R

(2) A-R, B-S, C-Q, D-P

(3) A-S, B-R, C-P, D-Q

(4) A-P, B-R, C-Q, D-S

Ans. (A)

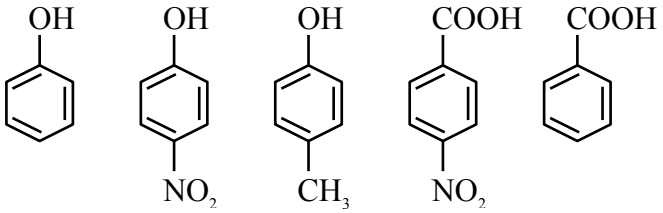
Sol. Aniline gives +ve test with Hinsberg reagents.

Benzaldehyde gives +ve test with Tollen's reagent

Phenol gives +ve Phthalein dye test

Isopropanol gives +ve Lucas test.

21. Compare acidic strength of following :



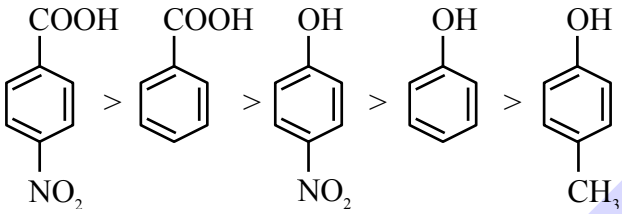
I II III IV V

(1) II > IV > V > III > I
(2) IV > V > III > I > II
(3) IV > V > II > I > III
(4) IV > II > I > V > III

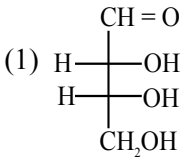
Ans. **(3)**

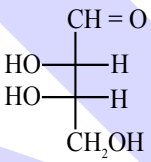
Sol.

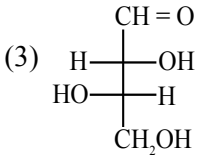
Order of acidic strength

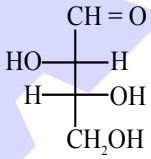


22. Product of D-aldotetroses with conc. HNO_3 gives optically inactive dicarboxylic acid. Which among the following will be D-Aldotetrose in the given structures?

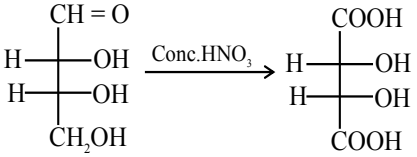
(1) 

(2) 

(3) 

(4) 

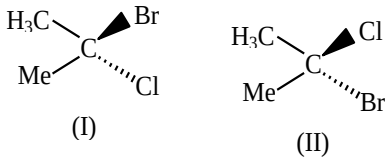
Ans. **(1)**

Sol. 

D-Aldotetrose

Optically inactive Dicarboxylic acid

23. Relationship between following pair of compounds?



(I) (II)

(1) Enantiomer (2) Identical
(3) Diastereomer (4) Constitutional isomer

Ans. **(2)**

Sol. Theory based

24. Match the column-I with column-II

Column-I		Column-II	
(i)	Friedel craft reaction	(P)	Electrophilic substitution
(ii)	Williamson's ether synthesis	(Q)	Nucleophilic substitution
(iii)	Chlorination of alkane in presence of sunlight	(R)	Free radical substitution
(iv)	$Br_2/CHCl_3$	(S)	Electrophilic addition

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

Ans. **(4)**

Sol. Theory based

25. Compound (X) has mole mass 76, 2×10^{-3} mole of x gives 0.4813 gm $BaSO_4$ as ppt. What is the % of S in compound (X). Mention answer in 10^{-1} form.

Ans. **(435)**

Sol. $$\% \text{ of S} = \frac{\text{Mass of S}}{\text{Mass of BaSO}_4} \times \frac{m}{w} \times 100$$

m = gm of $BaSO_4$ ppt
w = gm of Organic compound
$w = 2 \times 10^{-3} \times 76 = 0.152$ gm

$$\% \text{ of S} = \frac{32}{233} \times \frac{0.4813}{0.152} \times 100 = 43.487$$

In form of 10^{-1}
$= 43.487 \times 10^{-1} = 434.87 \approx 435$

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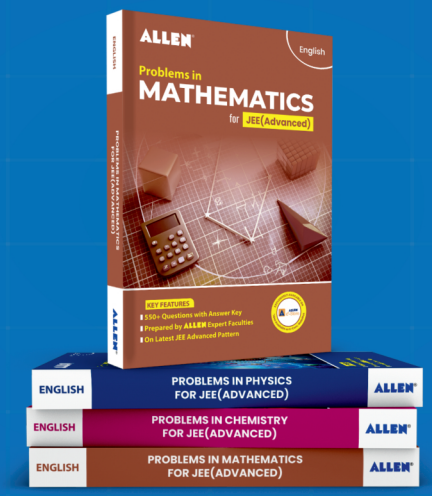

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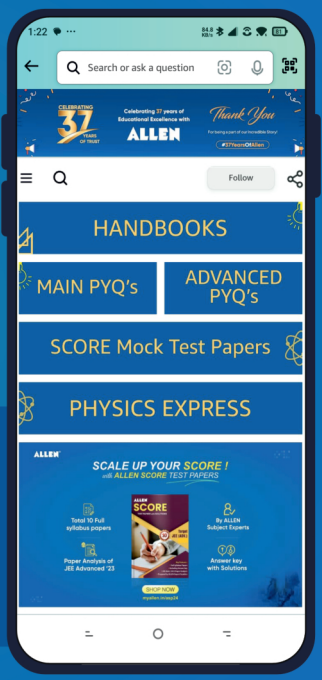

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