

PART : CHEMISTRY

1. Which of following element is most reactive ?

- (1) Sr (2) Ca (3) Mg (4) K

Ans. (4)

Sol. According to electrochemical series.

2. $\text{XeF}_4 + \text{SbF}_5 \longrightarrow [\text{XeF}_m]^{+n} [\text{SbF}_6]^{+p}$

The value of $m + n + p + q$ is :

Ans. 11

Sol. $\text{XeF}_4 + \text{SbF}_5 \longrightarrow [\text{XeF}_3]^+ [\text{SbF}_6]^-$

$$m = 3 \quad p = 6$$

$$n = 1 \quad q = +1$$

$$m + n + p + q = 3 + 1 + 6 + 1 = 11$$

3. Which of the following halogen gives the following reaction ?



- (1) Cl_2 (2) Br_2 (3) I_2 (4) All halogen

Ans. (3)

Sol. CuI_2 is unstable, E°_{cell} for this reaction will be positive.

4. Leaching is used in the metallurgy for the following ?

- (1) Zn (2) Au (3) Pb (4) Sn

Ans. (2)

Sol. $\text{Au} + \text{O}_2 + \text{H}_2\text{O} + \text{NaCN} \longrightarrow \text{Na}[\text{Au}(\text{CN})_2] + \text{NaOH}$



5. Water gas in presence of cobalt catalyst gives.

- (1) CH_3OH (2) HCHO (3) $\text{CO}_2 + \text{H}_2$ (4) $\text{C(s)} + \text{H}_2\text{O(g)}$

Ans. (1)

Sol. $\text{CO(g)} + 2\text{H}_2\text{(g)} \xrightarrow[\text{Catalyst}]{\text{Cobalt}} \text{CH}_3\text{OH(l)}$

6. Why gypsum is added to cement ?

- (1) To slow down the process of setting. (2) To increase the process of setting.
(3) To decrease hydration of molecule. (4) To increase hydration of molecule.

Ans. (1)

Sol. The purpose of adding Gypsum is only to slow down the process of setting of the cement.

7. $2\text{IO}_3^- + \text{I}^- + \text{H}^+ \longrightarrow 6\text{I}_2 + \text{H}_2\text{O}$ (unbalanced)

On balancing the given redox reaction with simplest integer coefficient, the coefficient for I^- is

Ans. 10

Sol. $2\text{IO}_3^- + 10\text{I}^- + 12\text{H}^+ \longrightarrow 6\text{I}_2 + 6\text{H}_2\text{O}$

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8. Identify correct increasing order of electronegativity of C, P, At, Br.

- (1) $P < At < C < Br$
 (2) $At < P < C < Br$
 (3) $P < At < Br < C$
 (4) $At < P < Br < C$

Ans. (1)

Sol.

Element	C	P	Br	At
Electronegativity	2.5	2.1	2.8	2.2

9. Oxidation state of 'Cr' in chromyl chloride match with the following .

- (1) Fe^{+3} (2) V^{+4} (3) Ti^{+2} (4) Mn^{+6}

Ans. (4)

Sol. CrO_2Cl_2

$$x + 2(-2) + 2(-1) = 0$$

$$x = +6$$

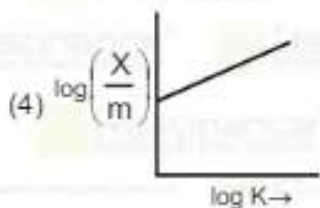
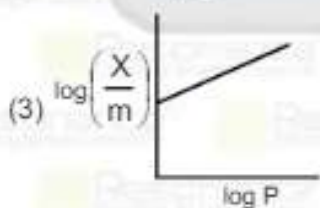
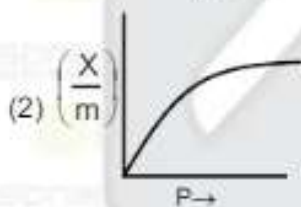
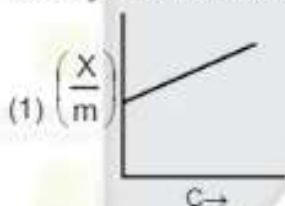
10. Among the following, which complex is octahedral, diamagnetic & most stable ?

- (1) $K_3[Co(CN)_6]$ (2) $[Ni(NH_3)_6]Cl_2$ (3) $[Co(H_2O)_6]Cl_2$ (4) $Na_3[CoCl_6]$

Ans. (1)

Sol. $K_3[Co(CN)_6] \longrightarrow$ diamagnetic, d^2sp^3 & most stable.

11. Identify total number of correct graph from following.



Ans. (2)

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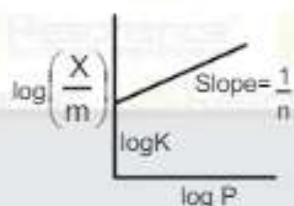
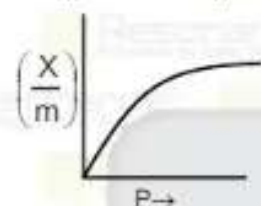
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Sol. From Freundlich adsorption isotherm

(a) for adsorption of gas

$$\frac{X}{m} = K(P)^{\frac{1}{n}}$$

$$\log \frac{X}{m} = \log K + \frac{1}{n} \log P.$$



12. (i) $[\text{MnF}_6]^{4-}$
 (ii) $[\text{Fe}(\text{CN})_6]^{3-}$
 (iii) $[\text{Co}(\text{NH}_3)_6]^{3+}$

Correct order of spin only magnetic moment for the following complexes is :

- (1) $i > ii > iii$ (2) $iii > ii > i$ (3) $i = ii = iii$ (4) $ii > i > iii$

Ans. (1)

- Sol. (i) $[\text{MnF}_6]^{4-}$, sp^3d^2 , $n = 5$
 (ii) $[\text{Fe}(\text{CN})_6]^{3-}$, d^2sp^3 , $n = 1$
 (iii) $[\text{Co}(\text{NH}_3)_6]^{3+}$, d^2sp^3 , $n = 0$

13. Statement – I : Li & Mg do not form superoxide.

Statement – II : Li^+ size is more than Mg^{+2} .

Select the correct option :

- (1) Both Statements are true.
 (2) Statement-I is true & Statement-II is false
 (3) Both statements are false
 (4) Statement-I is false & Statement-II is true.

Ans. (1)

Sol. $r_{\text{Li}^+} \longrightarrow 0.76 \text{ \AA}$

$r_{\text{Mg}^{+2}} \longrightarrow 0.72 \text{ \AA}$

14. % covalent character in compound is increased by :

- (i) Increase in polarization power of cation.
 (ii) Increase in polarization power of anion
 (iii) Extent of distortion of anion
 (iv) Increase in polarization of anion

Ans. (3) (i), (iii), (iv)

Sol. Theory based.

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15. How many of the following statement are correct on the basis of Arrhenius equation ?

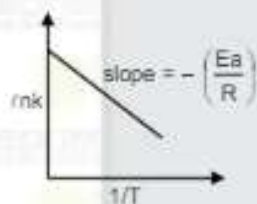
- (1) On increasing temperature activation energy decrease.
- (2) There is no relation between rate constant and activation energy
- (3) On decrease in activation energy rate of reaction is increases.
- (4) The graph between $\ln k$ vs $\frac{1}{T}$ is straight line.

Ans. (2)

Sol. Arrhenius equation

$$k = Ae^{-\frac{E_a}{RT}}$$

$$\ln k = \ln A - \left(\frac{E_a}{R}\right) \frac{1}{T}$$



graph $\ln k$ vs $\frac{1}{T}$

On increasing temperature or decreasing activation energy rate of reaction is increasing and rate constant increases exponentially.

16. Which cell representation is correct for the reaction given below ?

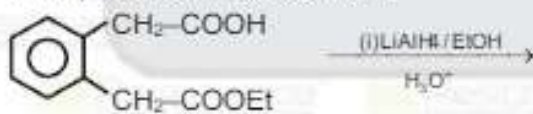


- (1) Pt | $H_2(g)$ | HCl(aq) | AgCl | Ag(s)
- (2) Pt | $H_2(g)$ | HCl(aq) | AgCl(s) | Pt
- (3) Ag | AgCl(s) | HCl(aq) | $H_2(g)$ | Pt
- (4) Pt | AgCl(s) | HCl(aq) | $H_2(g)$ | Pt

Ans. (1)

Sol. Theory based.

17. Final product of the reaction ?



- (1)
- (2)
- (3)
- (4)

Ans. (1)



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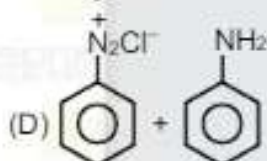
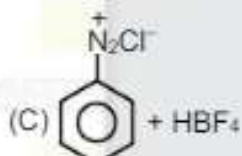
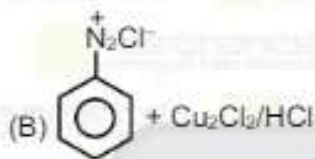
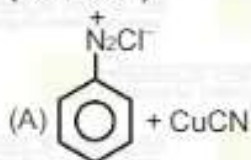
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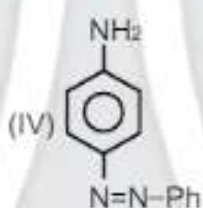
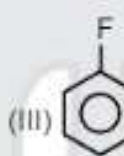
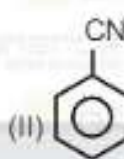
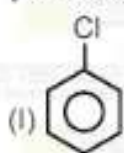
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18. Column-I
(Reaction)



Column-II
(Product)



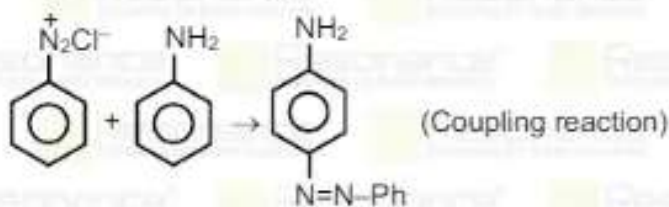
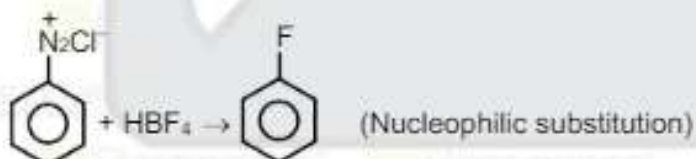
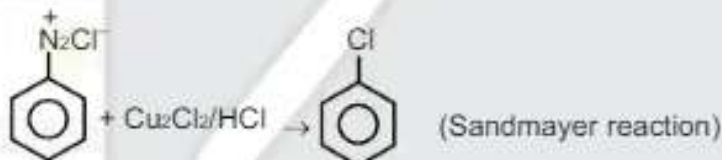
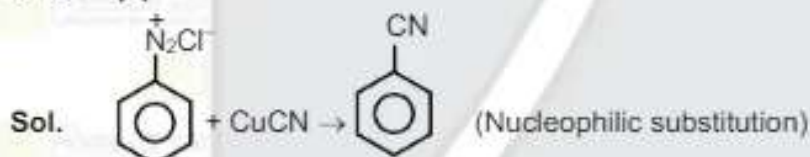
(1) A-I; B-II; C-III; D-IV

(3) A-III; B-I; C-IV; D-II

(2) A-II; B-I; C-III; D-IV

(4) A-II; B-III; C-I; D-IV

Ans. (2)



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- | 19. Column-I
(Element) | Column-II
(Prescribed concentration) |
|----------------------------|---|
| (A) SO_4^{2-} | (I) 5 ppm |
| (B) NO_3^- | (II) 2 ppm |
| (C) F^- | (III) 50 ppm |
| (D) Zn^{2+} | (IV) 500 ppm |
| (1) A-III; B-IV; C-II; D-I | (2) A-IV; B-III; C-II; D-I |
| (3) A-I; B-II; C-III; D-IV | (4) A-II; B-I; C-III; D-IV |

Ans. (2)

20. Sulphur containing amino acid are
Lysine, Lucine, Aspartic acid, Cystain, Methionine

a b c d e

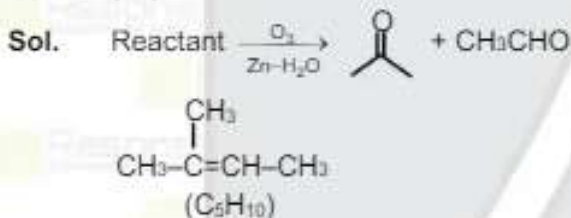
- (1) a, b, c (2) a, c, d (3) d, e (4) a, d, e

Ans. (3)

Sol. NCERT based factual question.

21. Find out molar mass of reactant in which 1 mole O_3 give propanone and ethanal...

Ans. (70)



22. **Assertion:** Butane-2-ol has higher boiling point than ethoxyethane.

Reason: Due to Extensive H-bonding.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
 (3) Assertion is true but Reason is false.
 (4) Assertion is false but Reason is true.

Ans. (1)

Sol. Due to intermolecular hydrogen bonding in Butane-2-ol, association of molecule increases which increase attraction between molecules and boiling point increase.

23. If organic hydrocarbon 0.5 gm is given having carbon 60% than what is weight of CO_2 formed by combustion of this organic compound. Report your answers ($___ \times 10^{-1}$ gm).

Ans. (11)

Sol. $60 = \frac{12}{44} \times \frac{\text{wt. of CO}_2}{0.5} \times 100$






$$\text{wt. of CO}_2 = \frac{60 \times 44 \times 0.5}{12 \times 100} = 1.1$$

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24. Column-I (Information)
- (A) First popular Artificial sweetener
(B) Sweetener stable at room temp.
(C) Sweetener not stable at room temp.
(D) Trichloro derivative of sucrose
- (1) A-I; B-II; C-III; D-IV
(2) A-II; B-III; C-IV; D-I
(3) A-IV; B-II; C-III; D-I
(4) A-III; B-I; C-IV; D-II
- Column-II (Sweetener)
- (I) Sucralose
(II) Saccharin
(III) Aspartame
(IV) Alitame

Ans. (2)

Sol. NCERT based factual question.

25. Match the column :

List-I

(Reagents used)

(A) CuSO_4 /sodium tartarate

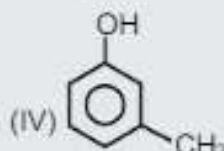
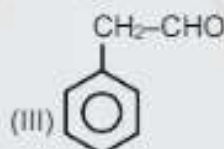
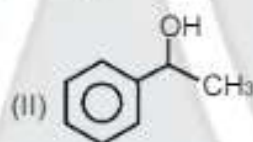
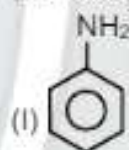
(B) Sodium hypochlorite

(C) Neutral FeCl_3

(D) CHCl_3/KOH

List-II

(Functional groups at which used)



(1) A-III; B-II; C-IV; D-I

(2) A-II; B-I; C-IV; D-III

(1) A-I; B-II; C-III; D-IV

(2) A-III; B-II; C-I; D-IV

Ans. (1)

Sol. CuSO_4 /sodium tartarate \rightarrow Fehling solution used to identify aldehyde functional group.

Sodium hypochlorite \rightarrow Used to find out compound showing haloform test positively.

Neutral FeCl_3 \rightarrow Use to identify Phenol & Derivative.

CHCl_3/KOH \rightarrow React with 1° amine and this is known as carbyl amine test.

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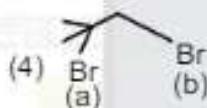
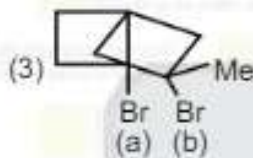
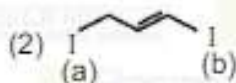
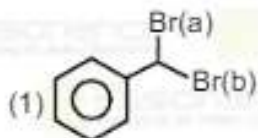
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26. Comment upon the reactivity of halogen for SN¹ reaction.



(1) (i)-a; (ii)-a; (iii)-b; (iv)-a

(2) (i)-a; (ii)-b; (iii)-b; (iv)-a

(3) (i)-a; (ii)-a; (iii)-a; (iv)-a

(4) (i)-a; (ii)-a; (iii)-b; (iv)-b

Ans. (1)






Sol. The reactivity of halogen for SN¹ reaction depend upon stability of carbocation.

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