

# JEE-Main-27-01-2024 (Memory Based)

## [EVENING SHIFT]

### Chemistry

**Question:** Which of the following cannot act as an oxidising agent?

**Options:**

- (a)  $\text{MnO}_4^-$
- (b)  $\text{SO}_4^{2-}$
- (c)  $\text{N}_3^-$
- (d)  $\text{BrO}_3^-$

**Answer:** (c)

**Solution:**  $\text{N}_3^-$

**Question:** The quantity which changes with temperature:

**Options:**

- (a) Mole fraction
- (b) Mass Percentage
- (c) Molarity
- (d) Molality

**Answer:** (c)

**Solution:** Molarity is dependent on temperature. As the temperature increases, water expands, so the solution's volume therefore increases

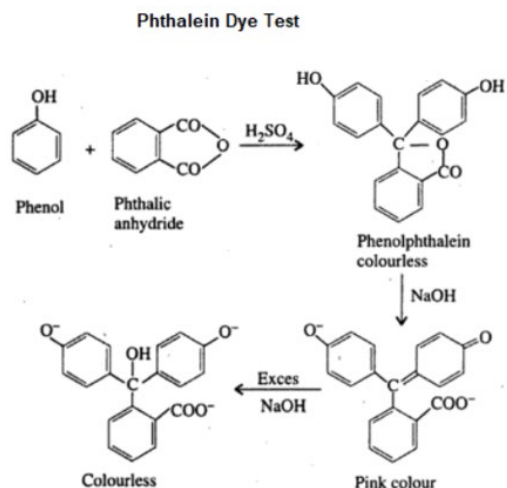
**Question:** Phenolic group can be identified by a positive

**Options:**

- (a) Lucas test
- (b) Carbylamine test
- (c) Phthalein test
- (d) Tollen's test

**Answer:** (c)

**Solution:**



**Question:** Find the longest wavelength in Paschen series terms of R

**Options:**

- (a)  $144/7R$
- (b)  $123/2R$
- (c)  $170/R$
- (d)  $16/R$

**Answer: (a)**

**Solution:**

$$\frac{1}{\lambda} = R \left( \frac{1}{3^2} - \frac{1}{4^2} \right) = R \frac{7}{144}$$

**Question:** First order reaction 99.9 % completion and half life ratio?

**Options:**

- (a) 10
- (b) 5
- (c) 20
- (d) 4

**Answer: (a)**

**Solution:**

$$t = \frac{2.303}{k} \log \frac{a}{a-x}$$

$$(i) t_1 = \frac{2.303}{k} \log \frac{100}{100-99.9} \text{ (for 99.9% completion)}$$

$$= \frac{2.303}{k} \log \frac{100}{0.1}$$

$$= \frac{2.303}{k} \times 3$$

$$(ii) t_2 = \frac{2.303}{k} \log \frac{100}{100-50} \text{ (for 50% completion)}$$

$$= \frac{2.303}{k} \log 2$$

$$\frac{t_1}{t_2} = \frac{3}{0.3010} \approx 10$$

**Question:** S1:  $Ce^{4+}$  is stable because of noble gas configuration

S2:  $Ce^{4+}$  is good R. A. as it can go to +3 O.S.

**Options:**

- (a) Statement I is incorrect but statement II is correct
- (b) Both statement I and II are correct
- (c) Both statement I and II are incorrect
- (d) Statement I is correct but statement II is incorrect

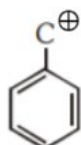
**Answer: (d)**

**Solution:** Statement I is correct but statement II is incorrect

**Question:** Which of the following not undergo  $S_N1$ ?

**Options:**

- (a)  $C = C^{\oplus}$
- (b)  $2^\circ C^{\oplus}$
- (c)



(d)  $C = C - C^{\oplus}$

**Answer: (a)**

**Question:**  $C_2H_6$  newman projection find incorrect information

**Options:**

- (a) Infinite conformers
- (b) Interconvertible
- (c) Dihedral angle in staggered  $60^\circ$
- (d) Eclipsed is more stable.

**Answer: (d)**

**Solution:** Staggered form is more stable

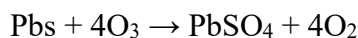
**Question:** 1 mole of Pbs reacts with x mol of  $O_3$  to give y moles of  $O_2$  then  $x + y$ ?

**Options:**

- (a) 8
- (b) 9
- (c) 4
- (d) 6

**Answer: (a)**

**Solution:**



$$x = 4 \quad y = 4$$

$$x + y = 8$$

**Question:** Which structure of protein is intact after coagulation of egg white on boiling?

**Options:**

- (a) Primary
- (b) Secondary
- (c) Tertiary
- (d) Quaternary

**Answer: (a)**

**Solution:** Denaturation of protein causes structural change in secondary & tertiary structure of protein but primary structure remain unchanged.

**Question:** The molecular formula of second homologue in the homologous series of monocarboxylic acid is

**Options:**

- (a)  $CH_3COOH$
- (b)  $CH_3CH_2COOH$
- (c)  $CH_3CH(CH_3)COOH$
- (d)  $CH_3CH_2CH_2COOH$

**Answer: (a)**

**Solution:** 1st homologue  $HCOOH$

2nd homologue  $CH_3COOH$

**Question:** The technique used for purification of steam volatile water immiscible substance is:

**Options:**

- (a) Fractional Distillation
- (b) Distillation under reduced pressure
- (c) Steam Distillation
- (d) Simple Distillation

**Answer: (c)**

**Solution:** Steam distillation method is used to separate substances which are steam volatile and are immiscible with water. However, the impurities should not be steam volatile in order to purify the substance by steam distillation.

**Question:** In which of the options all the elements have  $d^{10}$  configuration in their ground state

**Options:**

- (a) Cu, Zn, Cd, Ag
- (b) Cd, Au, Hg, Ni
- (c) Sc, Ti, Fe, Zn
- (d) Fe, Cr, Co, Ni

**Answer: (a)**

**Solution:**

Zn -  $3d^{10} 4s^2$

Cu -  $3d^{10} 4s^1$

Cd -  $4d^{10} 5s^2$

Ag -  $4d^{10} 5s^1$

**Question:** Number of non - polar molecules

$H_2O$ ,  $CH_4$ ,  $SO_2$ ,  $CHCl_3$ ,  $PF_3$ ,  $NH_3$ ,  $SO_2$ ,  $HF$

**Answer: 2**

**Solution:** Number of non - polar molecules = 2

$CH_4$ ,  $CO_2$

**Question:** How many of them have  $d^2sp^3$  Hybridisation?

(a)  $[Co(NH_3)_6]^{3+}$

(b)  $[PtCl_6]^{2-}$

(c)  $SF_6$

(d)  $BrF_2^-$

**Answer: 2**

**Solution:**

(a)  $[Co(NH_3)_6]^{3+}$

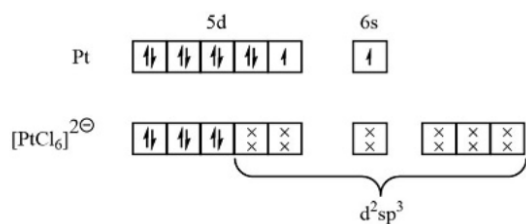
(b)  $[PtCl_6]^{2-}$

$Co^{3+} - 3d^6$

In presence of  $NH_3$  ligand pairing of electron takes place

$[Co(NH_3)_6]^{3+}$  have  $d^2sp^3$  Hybridisation

$Pt^{4+} - 5d^6$

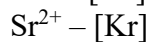
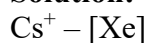


**Question:** How many have noble gas configuration?

- (a)  $\text{Fe}^{2+}$   
 (b)  $\text{Cs}^+$   
 (c)  $\text{Sr}^{2+}$   
 (d)  $\text{Pb}^{2+}$

**Answer: 2**

**Solution:**



Both have noble gas configuration.

**Question:** In a standard Hydrogen Electrode,  $\text{pH} = 3$

What is the EMF of the electrode in this case?

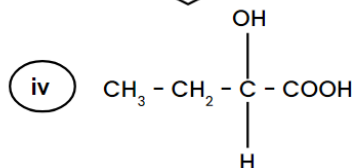
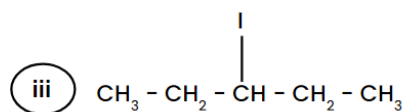
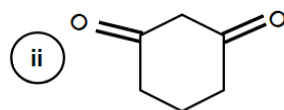
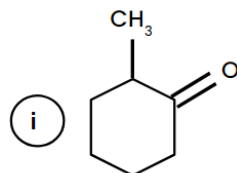
**Solution:**

$$E_{\text{H}^+ / \text{H}_2} = -0.0591 \text{ pH} \quad \because -\log [\text{H}^+] = \text{pH}$$

$$= -0.0591 \times 3$$

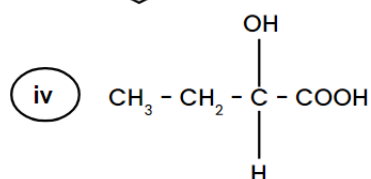
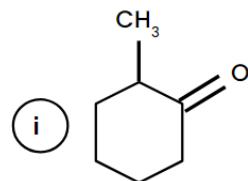
$$= -0.1773$$

**Question:** How many compound(s) given below have chiral carbon ?



**Answer: 2**

**Solution:**



**Question:** What volume of 3M NaOH solution can be formed using 84g of NaOH

**Solution:**

$$\text{Moles of NaOH} = \frac{84}{40} = \frac{21}{10} = 2.1$$

$$M \times V = 2.1$$

$$3 \times V = 2.1$$

$$V = 0.7 \text{ ltr} = 700 \text{ ml}$$