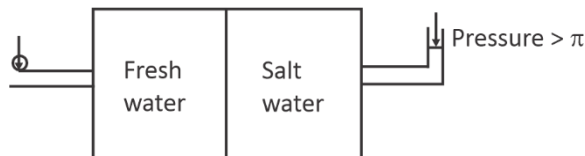




5. Observe the following diagram.



For reverse osmosis, which of the following can be used for porous membrane?

- (1) Cellulose acetate      (2) Porous silicate  
(3) Silicone                  (4) Glass membrane

**Answer (1)**

**Sol.** Cellulose acetate is used as semipermeable membrane for reverse osmosis.

6. One mole of an ideal gas expands from  $10 \text{ dm}^3$  to  $20 \text{ dm}^3$  through isothermal reversible process. Find  $\Delta U$ ,  $q$  &  $w$

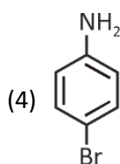
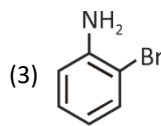
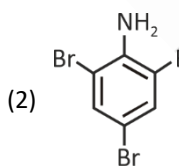
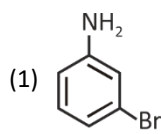
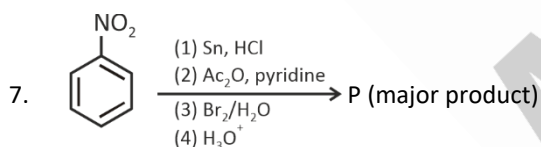
- (1)  $\Delta U = 0$ ,  $q = 0$ ,  $w = 0$       (2)  $\Delta U = 0$ ,  $q \neq 0$ ,  $w \neq 0$   
(3)  $\Delta U \neq 0$ ,  $q = 0$ ,  $w \neq 0$       (4)  $\Delta U \neq 0$ ,  $q \neq 0$ ,  $w = 0$

**Answer (2)**

**Sol.** For an ideal gas undergoing isothermal reversible process  $\Delta U = 0$  (As  $\Delta T = 0$ )

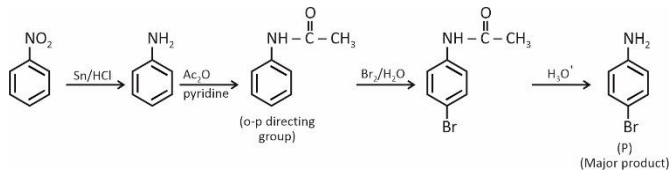
But  $q \neq 0$

$w \neq 0$



**Answer (4)**

**Sol.**

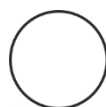


8. Which of the following is correct option regarding  $1s$  orbital

- (1) It is symmetrical      (2) It is non-symmetrical  
(3) It is directional      (4) It has two radial nodes

**Answer (1)**

**Sol.**



$1s$  Orbital  $\Rightarrow$  Symmetrical, non-directional, zero radial node.

9. Total number of stereoisomers possible for complexes  $[\text{Cr}(\text{Cl}_3)(\text{Py})_3]$  and  $[\text{CrCl}_2(\text{C}_2\text{O}_4)_2]$  respectively are

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

**Answer (1)**

**Sol.**  $[\text{CrCl}_3(\text{Py})_3]$ , this complex is type of  $[\text{Ma}_3\text{b}_3]$ , where  $a$  and  $b$  are monodentate ligands.

There are two possible geometrical isomer facial isomers and meridional and both are optically inactive.

Total number of stereoisomers = 2

$[\text{CrCl}_2(\text{C}_2\text{O}_4)_2]^{3-}$ , this complex is of type  $[\text{Ma}_2(\text{AA})_2]$



(1)



Optically active

(2)

Total stereoisomers = 3

## THE LEGACY OF SUCCESS CONTINUES

JEE Main (Session-1) 2025

4 STATE  
TOPPERS

70+ 100 PERCENTILERS  
(max. 1000, 10000)

1000+ 99 PERCENTILERS  
& ABOVE

4000+ 95 PERCENTILERS  
& ABOVE

100  
Percentile  
in  
Physics  
& Maths



**Shreyas Lohiya**  
PSID: 00003389699

100  
Percentile  
in  
Physics



**Harsh Jha**  
PSID: 00014863322

100  
Percentile  
in  
Physics  
& Chemistry



**Devya Rustagi**  
PSID: 00014768785

99.99  
Percentile



**Amogh Bansal**  
PSID: 00014769016



**Chirag Falor**  
4 Year Classroom  
1 AIR (Male.)  
JEE (Adv.)  
2020



**Tanishka Kabra**  
4 Year Classroom  
1 AIR-16 CBZ  
JEE (Adv.)  
2022



**Sanvi Jain**  
4 Year Classroom  
1 AIR-34 CBZ  
JEE (Adv.)  
2024

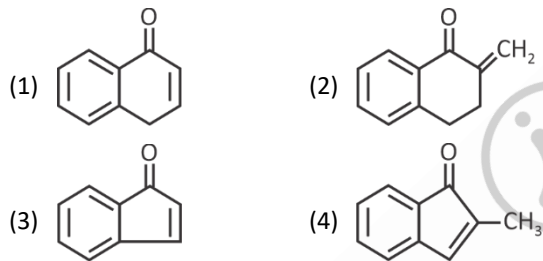
10. In lead storage battery during charging oxidation state of lead show changes at anode from  $x_1$  to  $y_1$  at cathode from  $x_2$  to  $y_2$   
Find value of  $x_1, y_1, x_2, y_2$

- (1)  $x_1 = +2, y_1 = 0$   
 $x_2 = +2, y_2 = +4$       (2)  $x_1 = +4, y_1 = 0$   
 $x_2 = +2, y_2 = +4$   
(3)  $x_1 = 0, y_1 = +2$   
 $x_2 = +4, y_2 = +2$       (4)  $x_1 = +2, y_1 = 0$   
 $x_2 = +4, y_2 = 0$

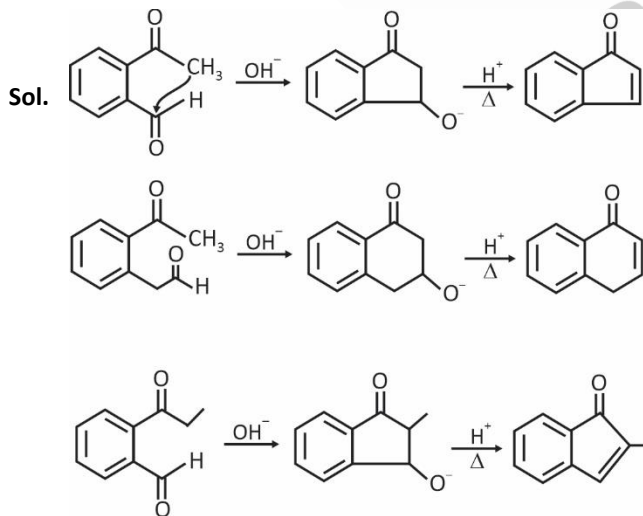
**Answer (1)**

**Sol.** On changing the lead storage battery  $PbSO_4(s)$  at anode is converted into  $Pb$  and  $PbSO_4(s)$  at cathode is converted into  $PbO_2$ .

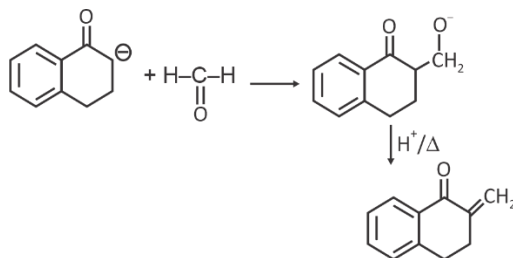
11. Which of the following compound is not a product of intramolecular aldol condensation reaction?



**Answer (2)**



$\therefore$  option (2) cannot be formed by intramolecular aldol condensation



12. Consider the reaction  $A + B \rightarrow \text{Product}$

$$R = k[A]^m[B]^n$$

When conc. of A & B taken are  $A_1$  &  $B_1$  respectively, then rate of reaction is  $R_1$ . When conc. of A & B taken are  $2A_1$  &  $\frac{B_1}{2}$ , then rate of reaction is  $R_2$ . Find  $\frac{R_2}{R_1}$ ?

- (1)  $2^{m+n}$       (2)  $2^{n-m}$   
(3)  $2^{m-n}$       (4) 1

**Answer (3)**

**Sol.**  $R_1 = k[A_1]^m[B_1]^n$

$$R_2 = k[2A_1]^m\left[\frac{B_1}{2}\right]^n$$

$$\frac{R_2}{R_1} = \frac{[2A_1]^m\left[\frac{B_1}{2}\right]^n}{[A_1]^m[B_1]^n} = \frac{2^m}{2^n} = 2^{m-n}$$

13. The complex ion having crystal field stabilization energy is zero and value of spin only magnetic moment is 5.92 BM.

- (1)  $[FeF_6]^{4-}$   
(2)  $[Mn(SCN)_6]^{4-}$   
(3)  $[Co(NH_3)_6]^{3+}$   
(4)  $[Fe(CN)_6]^{3-}$

**Answer (2)**

**THE LEGACY OF SUCCESS CONTINUES**

JEE Main (Session-1) 2025

4 STATE TOPPERS

70+ 100 PERCENTILERS

1000+ 99 PERCENTILERS

4000+ 95 PERCENTILERS

100 Percentile in Physics & Maths



**Shreyas Lohiya**  
PSID: 00003389699

100 Percentile in Physics & Chemistry



**Harsh Jha**  
PSID: 00014863322

100 Percentile in Physics & Chemistry



**Devya Rustagi**  
PSID: 00014768785

99.99 Percentile



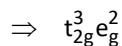
**Amogh Bansal**  
PSID: 00014769016

**OUR JEE CHAMPIONS**



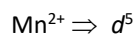
**Sol.** Complex having  $d^5$  configuration with weak field ligand has CFSE = 0

with  $Mn^{2+}$ ,  $SCN^-$  is weak field ligand



$$CFSE = [3 \times (-0.4) + 2 \times (0.6)] \Delta_0$$

$$= 0$$



$n = 5$  (unpaired electron)

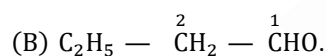
$$\mu = \sqrt{n(n+2)} \text{ BM}$$

$$= \sqrt{5 \times 7} \text{ BM}$$

$$= \sqrt{35} \text{ BM}$$

$$= 5.92 \text{ BM}$$

14. Statement-I: (A)  $C_2H_5 - \overset{2}{CH} = \overset{1}{CH} - CHO$  has higher dipole moment than



Statement-II : C1 - C2 bond length in (A) is longer than (B)

In the light of above statements, choose the correct option:

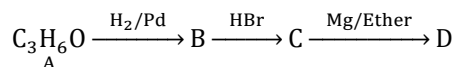
- (1) Both Statement-I and Statement-II are correct
- (2) Both Statement-I and Statement-II are incorrect
- (3) Statement-I is correct but Statement-II is incorrect
- (4) Statement-I is incorrect but Statement-II is correct

**Answer (3)**

**Sol.** Due to resonance in (A) C1-C2 has partial  $\pi$ -bond character, hence shorter bond length than that in (B).

Due to resonance  $C_2H_5 - \overset{2}{CH} = \overset{1}{CH} - CHO \rightleftharpoons C_2H_5 - \overset{2}{CH} - \overset{1}{C} = \overset{1}{O}$  electron flow is in one direction hence higher dipole moment.

15. In following sequence of reaction. A is converted to D

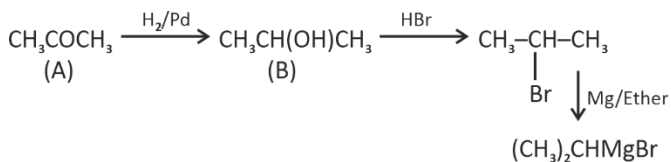


D is treated with A followed by hydrolysis to give 2,3-dimethyl-butan-2-ol. Then identify A, B, C.

- (1) A =  $CH_3COCH_3$   
B =  $CH_3-CH(OH)CH_3$   
C =  $CH_3-CH(Br)CH_3$
- (2) A =  $CH_3CH_2CHO$   
B =  $CH_3CH_2CH_2OH$   
C =  $CH_3CH_2CH_2Br$
- (3) A =  $CH_2=CH-CH_2OH$   
B =  $CH_3CH_2CH_2OH$   
C =  $CH_3CH_2CH_2Br$
- (4) A = Cyclopropanol  
B = Cyclopropanone  
C = Bromo propane

**Answer (1)**

**Sol.**



## THE LEGACY OF SUCCESS CONTINUES

JEE Main (Session-1) 2025

4 STATE  
TOPPERS

70+ 100 PERCENTILERS  
max. 1 (rank 1 below)

1000+ 99 PERCENTILERS  
& ABOVE

4000+ 95 PERCENTILERS  
& ABOVE

100  
Percentile  
in  
Physics  
&  
Maths



**Shreyas Lohiya**  
PSID: 00003389699

100  
Percentile  
in  
Physics



**Harsh Jha**  
PSID: 00014863322

100  
Percentile  
in  
Physics  
&  
Chemistry



**Devya Rustagi**  
PSID: 00014768785

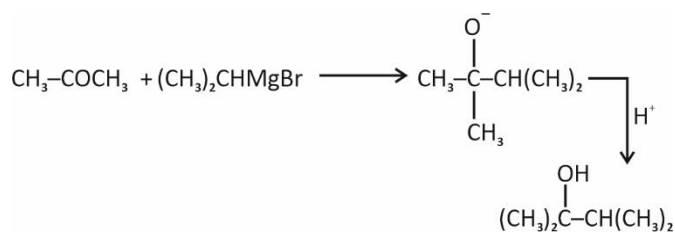
99.99  
Percentile



**Amogh Bansal**  
PSID: 00014769016

OUR JEE CHAMPIONS





16. The activation energy of forward reaction and backward reaction is 100 kJ/mole and 180 kJ/mole respectively. Find the correct statement if catalyst is added under same condition of temperature.

- (1) Catalyst does not change  $\Delta G$  of reaction
- (2) Catalyst can make non-spontaneous reaction spontaneous
- (3) Catalyst changes  $\Delta H$  of reaction
- (4) Enthalpy of reaction ( $\Delta H$ ) is 280 kJ/mole

**Answer (1)**

**Sol.** Catalyst does not change  $\Delta H$  of reaction. It only alters activation energy.

Catalyst cannot make non-spontaneous reaction spontaneous

$$\begin{aligned} \Delta H &= (E_a)_f - (E_a)_b \\ &= (100 - 180) \text{ kJ/mol} \\ &= -80 \text{ kJ/mol} \end{aligned}$$

17.  $\text{KMnO}_4$  oxidises others in acidic medium, Difference between two oxidation states of Mn is x. Neutral  $\text{FeCl}_3$  reacts with oxalate ion to form a complex compound having y number of d-electrons. Find x + y.

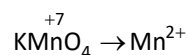
- (1) 5
- (2) 10

(3) 6

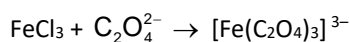
(4) 8

**Answer (2)**

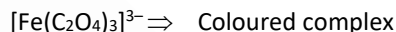
**Sol.** When  $\text{KMnO}_4$  oxidises others in acidic medium difference between the two oxidation states of Mn is 5.



$$\therefore x = 5$$



Fe is in +3 oxidation state.



$$\therefore y = 5$$

18.

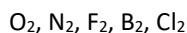
19.

20.

### SECTION - B

**Numerical Value Type Questions:** This section contains 5 Numerical based questions. The answer to each question should be rounded-off to the nearest integer.

21. In the following, the number of molecules which are paramagnetic are :



**Answer (2)**

## THE LEGACY OF SUCCESS CONTINUES

JEE Main (Session-1) 2025

4 STATE  
TOPPERS

70+ 100  
PERCENTILERS  
(PHYSICS & CHEMISTRY)

1000+ 99  
PERCENTILERS  
& ABOVE

4000+ 95  
PERCENTILERS  
& ABOVE

100  
Percentile  
in  
Physics  
& Chemistry



**Shreyas Lohiya**  
PSID: 00003389699

100  
Percentile  
in  
Physics



**Harsh Jha**  
PSID: 00014863322

100  
Percentile  
in  
Physics  
& Chemistry



**Devya Rustagi**  
PSID: 00014768785

99.99  
Percentile



**Amogh Bansal**  
PSID: 00014769016

OUR JEE CHAMPIONS



