

JEE Main - 2018 (CBT)  
Exam Test Date: 16/04/2018

Part - B (Chemistry)

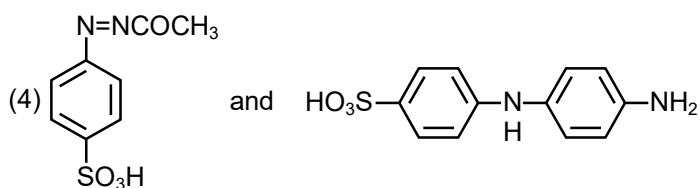
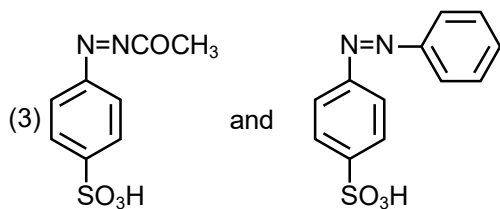
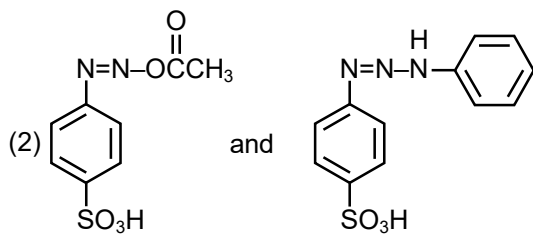
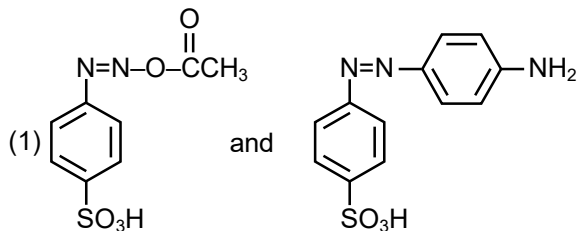
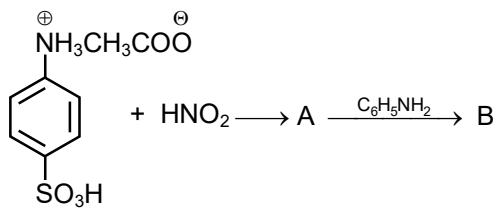
1. For standardizing NaOH solution, which of the following is used as a primary standard ?

- (1) Sodium tetraborate (2) Ferrous Ammonium Sulfate  
(3) Oxalic acid (4) dil. HCl

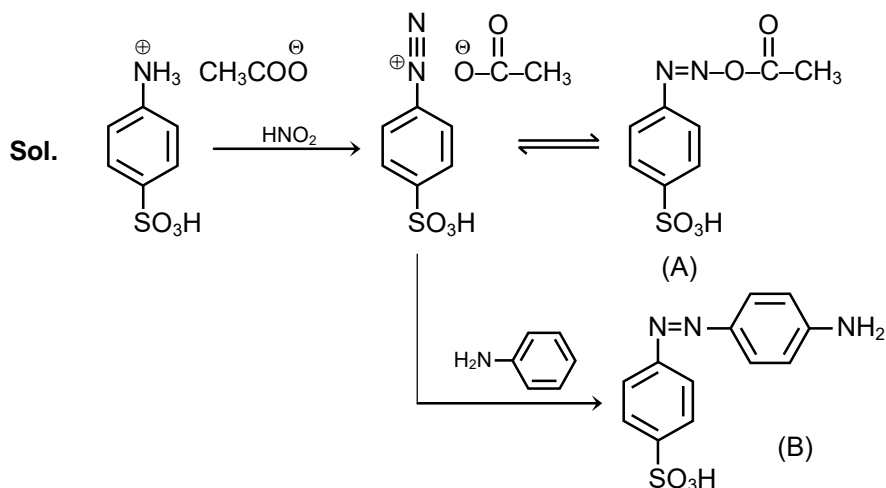
**Ans.** (3)

**Sol.** Oxalic acid is used as a primary standard for NaOH standardizing.

2. Products A and B formed in the following reactions are respectively :



Ans. (1)



3. When  $XO_2$  is fused with an alkali metal hydroxide in presence of an oxidizing agent such as  $KNO_3$  ; a dark green product is formed which disproportionates in acidic solution to afford a dark purple solution. X is :

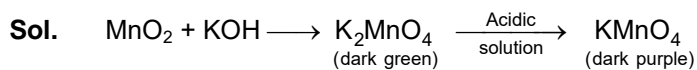
(1) Mn

(2) Cr

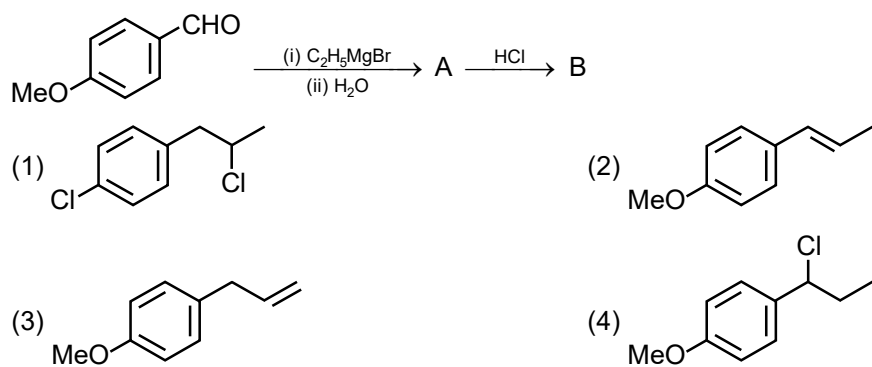
(3) V

(4) Ti

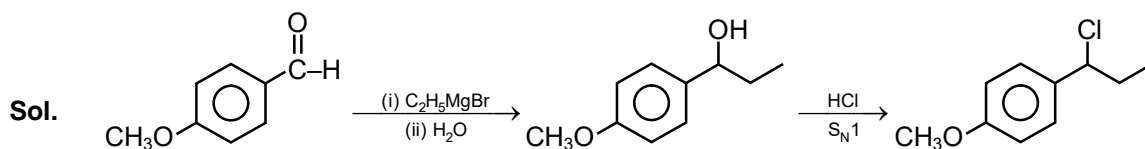
Ans. (1)



4. The major product B formed in the following reaction sequence is :

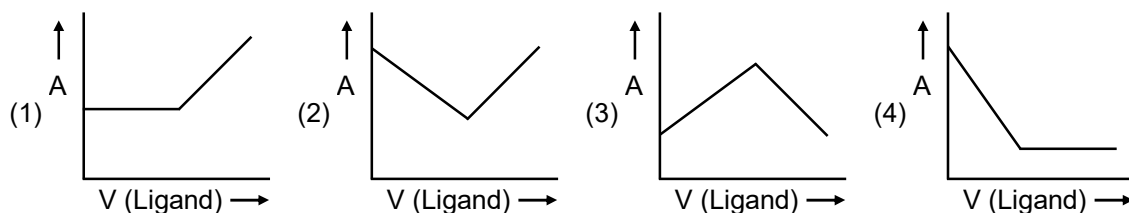


Ans. (4)



5. In a complexometric titration of metal ion with ligand

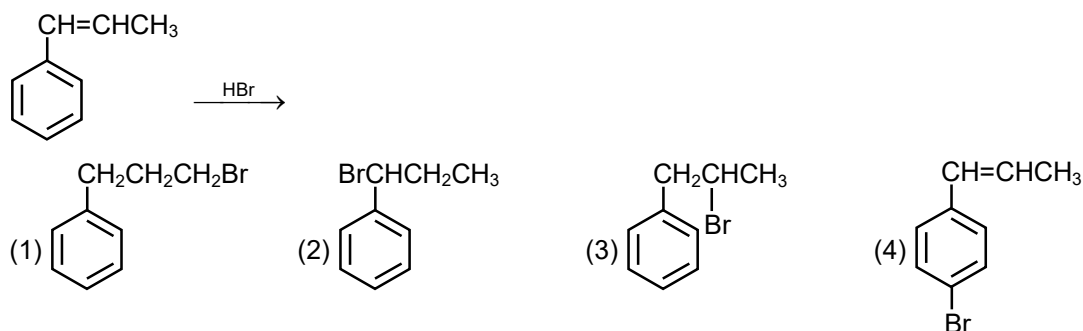
$M$  (Metal ion) +  $L$  (Ligand)  $\rightarrow$   $C$  (Complex) end point is estimated spectrophotometrically (through light absorption). If ' $M$ ' and ' $C$ ' do not absorb light and only ' $L$ ' absorbs, then the titration plot between absorbed light ( $A$ ) versus volume of ligand ' $V$ ' would look like :



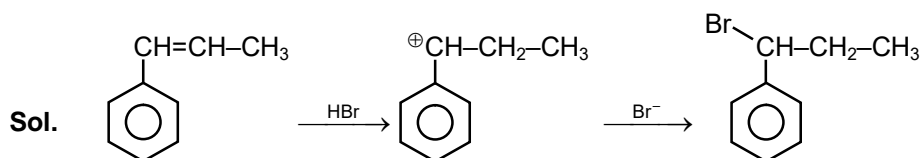
Ans. (1)

Sol. Initially ligand consumed by metal due to formation of complex. So absorbed light ( $A$ ) remain constant, after complex formation is completed, extra volume of ligand solution increases ligand concentration and also increases absorbed light.

6. The major product of the following reaction is :



Ans. (2)



7. Among the following, the **incorrect** statement is :

- (1) Cellulose and amylose has 1,4-glycosidic linkage.
- (2) Lactose contains  $\beta$ -D-galactose and  $\beta$ -D-glucose.
- (3) Maltose and lactose has 1,4-glycosidic linkage.
- (4) Sucrose and amylose has 1,2-glycosidic linkage.

Ans. (4)

Sol. In amylose 1,4-glycosidic linkage is present.

8. In the extraction of copper from its sulphide ore, metal is finally obtained by the oxidation of cuprous sulphide with :

- (1)  $\text{SO}_2$                       (2)  $\text{Fe}_2\text{O}_3$                       (3)  $\text{Cu}_2\text{O}$                       (4)  $\text{CO}$

Ans. (3)

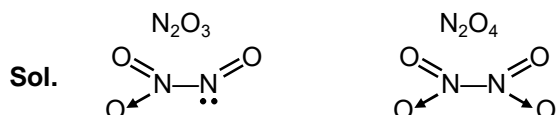
Sol.  $\text{Cu}_2\text{S} + 2\text{Cu}_2\text{O} \longrightarrow 6\text{Cu} + \text{SO}_2$

9. Among the oxides of nitrogen :

$\text{N}_2\text{O}_3$ ,  $\text{N}_2\text{O}_4$  and  $\text{N}_2\text{O}_5$  ; the molecule(s) having nitrogen-nitrogen bond is/are :

- (1)  $\text{N}_2\text{O}_3$  and  $\text{N}_2\text{O}_4$       (2)  $\text{N}_2\text{O}_4$  and  $\text{N}_2\text{O}_5$       (3)  $\text{N}_2\text{O}_3$  and  $\text{N}_2\text{O}_5$       (4) Only  $\text{N}_2\text{O}_5$

Ans. (1)

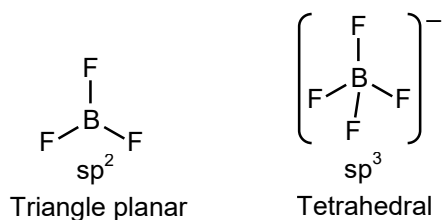


10. Which of the following conversions involves change in both shape and hybridisation ?

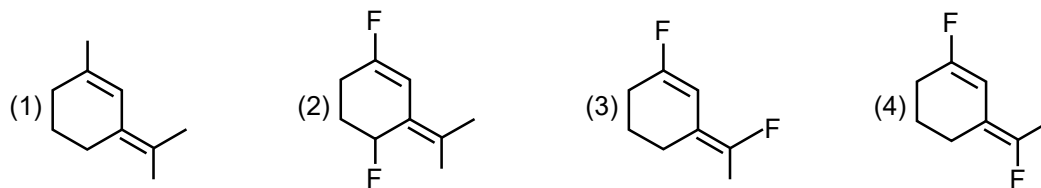
- (1)  $\text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+$       (2)  $\text{BF}_3 \rightarrow \text{BF}_4^-$       (3)  $\text{CH}_4 \rightarrow \text{C}_2\text{H}_6$       (4)  $\text{NH}_3 \rightarrow \text{NH}_4^+$

Ans. (2)

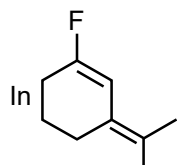
Sol.  $\text{BF}_3 \longrightarrow \text{BF}_4^-$



11. The most polar compound among the following is :



Ans. (3)

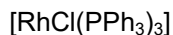
Sol. In , the bond dipole vector of C-F bond is not subtractive.

12. In Wilkinson's catalyst, the hybridization of central metal ion and its shape are respectively :

- (1)  $sp^3d$ , trigonal bipyramidal (2)  $d^2sp^3$ , octahedral  
 (3)  $dsp^2$ , square planar (4)  $sp^3$ , tetrahedral

Ans. (3)

Sol. Wilkinson catalyst



13. At 320 K, a gas  $A_2$  is 20 % dissociated to  $A(g)$ . The standard free energy change at 320 K and 1 atm in  $J\ mol^{-1}$  is approximately : ( $R = 8.314\ JK^{-1}\ mol^{-1}$  ;  $\ln 2 = 0.693$  ;  $\ln 3 = 1.098$ )

- (1) 1844 (2) 2068 (3) 4281 (4) 4763

Ans. (3)

Sol.  $A_2(g) \rightleftharpoons 2A(g)$



$$1 - 1 \times \frac{20}{100} \qquad 2 \times \frac{20}{100}$$

$$0.8 \qquad \qquad 0.4$$

$$K_p = \frac{(p_A)^2}{(p_{A_2})} = \frac{0.4 \times 0.4}{0.8} = 0.2$$

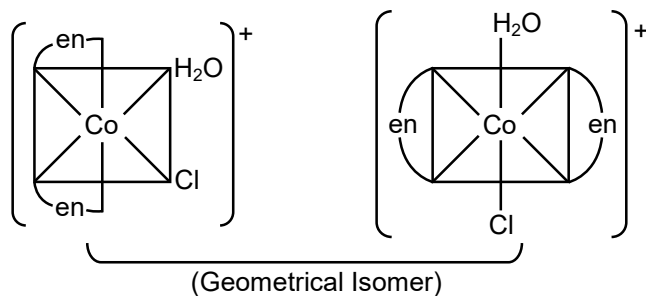
$$\Delta G^\circ = -2.303 \times 8.314 \times 320 \log_{10} 0.2 = 4281\ J/mole$$

14. Which of the following complexes will show geometrical isomerism ?

- (1) Potassium tris(oxalato)chromate(III)  
 (2) Pentaquachlorochromium(III)chloride  
 (3) Aquachlorobis(ethylenediamine)cobalt(II) chloride  
 (4) Potassium amminetrichloroplatinate(II)

Ans. (3)

Sol.  $[Co(H_2O)Cl(en)_2]Cl$



15. Which of the following statements is **false** ?

- (1) Splitting of spectral lines in electrical field is called Stark effect.  
(2) Frequency of emitted radiation from a black body goes from a lower wavelength of higher wavelength as the temperature increases.  
(3) Photon has momentum as well as wavelength.  
(4) Rydberg constant has unit of energy.

**Ans.** (2) and (4) [both are false]

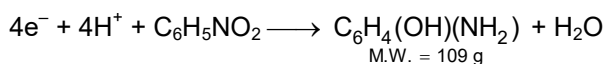
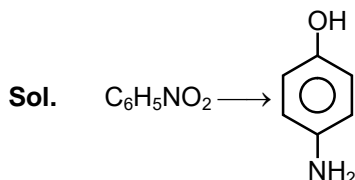
**Sol.** When temperature is increased, black body emit high energy radiation, from higher wavelength to lower wavelength.

Rydberg constant has unit  $\text{length}^{-1}$  (i.e.  $\text{cm}^{-1}$ )

16. When 9.65 ampere current was passed for 1.0 hour into nitrobenzene in acidic medium, the amount of p-aminophenol produced is :

- (1) 109.0 g                      (2) 98.1 g                      (3) 9.81 g                      (4) 10.9 g

**Ans.** (3)



$$(\text{v.f.}) = 4 \qquad W = ZIt = \frac{E}{F} \times I \times t \qquad \left( E = \frac{M}{4} \right)$$

$$W = \frac{109 \times 9.65 \times 60 \times 60}{4 \times 96500}$$

$$W = 9.81 \text{ g}$$

17. For which of the following processes,  $\Delta S$  is negative ?

- (1)  $\text{C}(\text{diamond}) \rightarrow \text{C}(\text{graphite})$                       (2)  $\text{N}_2(\text{g}, 1 \text{ atm}) \rightarrow \text{N}_2(\text{g}, 5 \text{ atm})$   
(3)  $\text{N}_2(\text{g}, 273 \text{ K}) \rightarrow \text{N}_2(\text{g}, 300 \text{ K})$                       (4)  $\text{H}_2(\text{g}) \rightarrow 2\text{H}(\text{g})$

**Ans.** (2)

**Sol.**  $\text{N}_2(\text{g}, 1 \text{ atm}) \longrightarrow \text{N}_2(\text{g}, 5 \text{ atm})$

$$\Delta S = \left( nC_p \ln \frac{T_2}{T_1} \right) + nR \ln \frac{V_2}{V_1} \quad \text{for isothermal process } T_1 = T_2 \text{ and } \frac{V_2}{V_1} = \frac{P_1}{P_2}$$

$$= 0 + nR \ln \frac{P_1}{P_2} = nR \ln \frac{1}{5}$$

$$\Delta S < 0$$

18. An unknown chlorohydrocarbon has 3.55 % of chlorine. If each molecule of the hydrocarbon has one chlorine atom only ; chlorine atoms present in 1 g of chlorohydrocarbon are :

(Atomic wt. of Cl = 35.5 u ; Avogadro constant =  $6.023 \times 10^{23} \text{ mol}^{-1}$ )

- (1)  $6.023 \times 10^9$                       (2)  $6.023 \times 10^{23}$                       (3)  $6.023 \times 10^{21}$                       (4)  $6.023 \times 10^{20}$

Ans. (4)

Sol.  $C_xH_yCl$

% Cl = 3.55

$$\text{Weight of Cl} = 1 \times \frac{3.55}{100}$$

$$n_{Cl} = \frac{1 \times 3.55}{100 \times 35.5}$$

$$\begin{aligned} \text{No of Cl}^- \text{ ion} &= \frac{1 \times 3.55}{100 \times 35.5} \times 6.023 \times 10^{23} \\ &= 6.023 \times 10^{20} \end{aligned}$$

19. The **incorrect** statement is :

(1)  $Cu^{2+}$  ion gives chocolate coloured precipitate with potassium ferrocyanide solution.

(2)  $Cu^{2+}$  and  $Ni^{2+}$  ions give black precipitate with  $H_2S$  in presence of HCl solution.

(3) Ferric ion gives blood red colour with potassium thiocyanate.

(4)  $Cu^{2+}$  salts give red coloured borax bead test in reducing flame.

Ans. (2)

Sol. Due to common ion effect, sufficient  $S^{2-}$  concentration not produce and not formed ppt of NiS.

20. The mass of a non-volatile, non-electrolyte solute (molar mass =  $50 \text{ g mol}^{-1}$ ) needed to be dissolved in 114 g octane to reduce its vapour pressure to 75 %, is :

- (1) 37.5 g                      (2) 75 g                      (3) 150 g                      (4) 50 g

Ans. (Bonus)

Sol.  $\frac{P^0 - P_s}{P_s} = \frac{n}{N}$

$$\frac{100P - 75P}{75P} = \frac{W}{1}$$

$$\frac{25}{75} = \frac{W}{50}$$

$$W = \frac{50}{3} \text{ g}$$

21. The **incorrect** geometry is represented by :
- (1)  $\text{NF}_3$  – trigonal planar (2)  $\text{BF}_3$  – trigonal planar  
 (3)  $\text{AsF}_5$  – trigonal bipyramidal (4)  $\text{H}_2\text{O}$  – bent

Ans. (1)

Sol.  $\text{NF}_3$



22. Assuming ideal gas behaviour, the ratio of density of ammonia to that of hydrogen chloride at same temperature and pressure is : (Atomic wt. of Cl 35.5 u)

(1) 1.46 (2) 1.64 (3) 0.46 (4) 0.64

Ans. (3)

Sol.  $d = \frac{P(\text{M.w.})}{RT}$

$$\frac{d_{\text{NH}_3}}{d_{\text{HCl}}} = \frac{(\text{M.w.})_{\text{NH}_3}}{(\text{M.w.})_{\text{HCl}}} = \frac{17}{36.5} = 0.46$$

23. The correct match between items of List-I and List-II is :

List-I	List-II
(A) Phenelzine	(P) Pyrimidine
(B) Chloroxylenol	(Q) Furan
(C) Uracil	(R) Hydrazine
(D) Ranitidine	(S) Phenol
(1) (A)-(S), (B)-(R), (C)-(Q), (D)-(P)	(2) (A)-(R), (B)-(S), (C)-(P), (D)-(Q)
(3) (A)-(R), (B)-(S), (C)-(Q), (D)-(P)	(4) (A)-(S), (B)-(R), (C)-(P), (D)-(Q)

Ans. (2)

Sol. → Phenelzine contains hydrazine

→ Chloroxylenol contains phenol

→ Uracil is the pyrimidine base

→ Ranitidine contains furan ring

24. The gas phase reaction  $2\text{NO}_2(\text{g}) \rightarrow \text{N}_2\text{O}_4(\text{g})$  is an exothermic reaction. The decomposition of  $\text{N}_2\text{O}_4$ , in equilibrium mixture of  $\text{NO}_2(\text{g})$  and  $\text{N}_2\text{O}_4(\text{g})$ , can be increased by :

(1) addition of an inert gas at constant pressure.

(2) lowering the temperature

(3) increasing the pressure

(4) addition of an inert gas at constant volume.

Ans. (1)

Sol.  $2\text{NO}_2(\text{g}) \longrightarrow \text{N}_2\text{O}_4(\text{g}) \quad \Delta H = (-)$

By addition of an inert gas at constant pressure, volume increases, so reaction moving in backward direction and decomposition of  $\text{N}_2\text{O}_4$  increases.



25. Which one of the following is not a property of physical adsorption ?

- (1) Higher the pressure, more the adsorption
- (2) Greater the surface area, more the adsorption
- (3) Lower the temperature, more the adsorption
- (4) Unilayer adsorption occurs

Ans. (4)

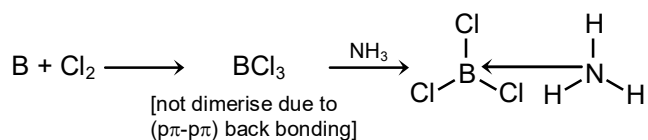
Sol. Physical adsorption is multilayer adsorption.

26. A group 13 element 'X' reacts with chlorine gas to produce a compound  $XCl_3$ .  $XCl_3$  is electron deficient and easily reacts with  $NH_3$  to form  $Cl_3X \leftarrow NH_3$  adduct; however,  $XCl_3$  does not dimerize. X is :

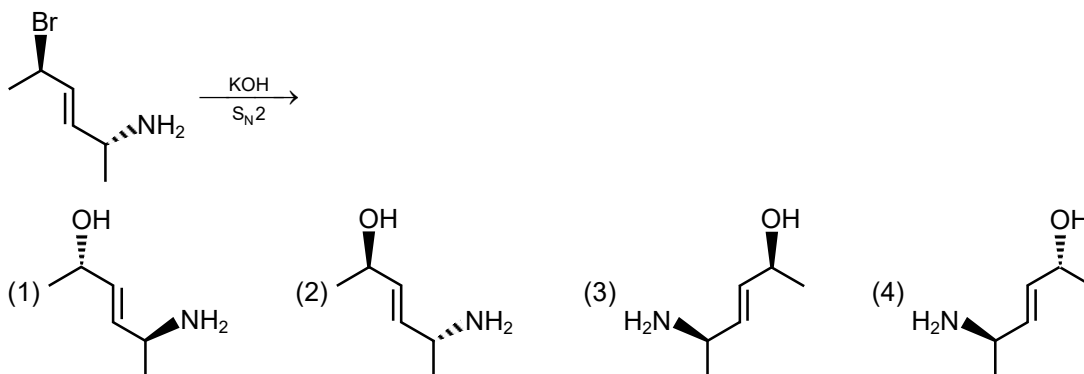
- (1) B
- (2) Al
- (3) In
- (4) Ga

Ans. (1)

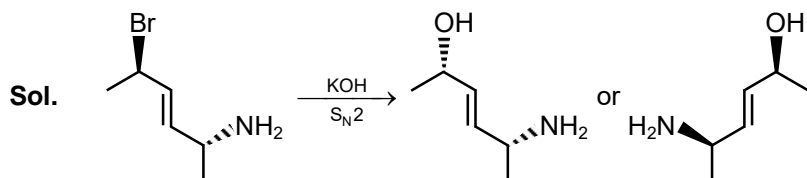
Sol.  $BCl_3$



27. The major product of the following reaction is :



Ans. (3)

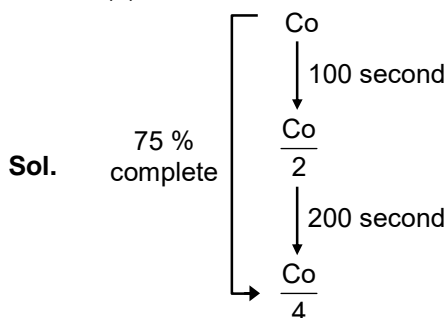


Inversion takes place at the carbon containing bromine atom.

28. If 50 % of a reaction occurs in 100 second and 75 % of the reaction occurs in 200 second, the order of this reaction is :

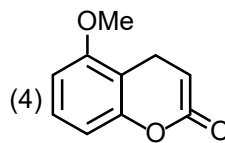
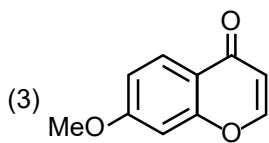
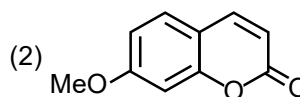
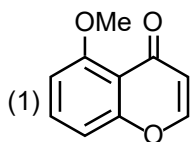
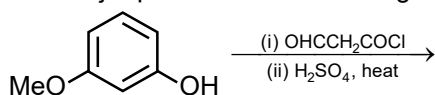
- (1) 2 (2) 3 (3) Zero (4) 1

Ans. (4)

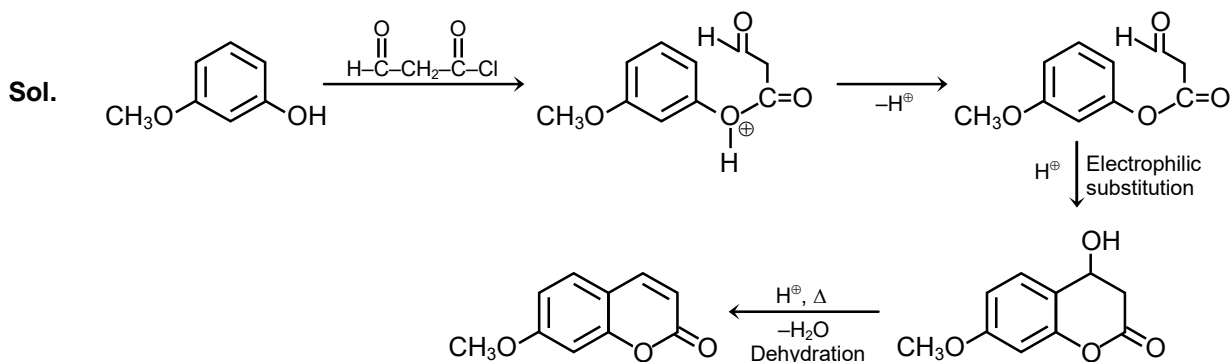


First order reaction as half life is constant.

29. The major product of the following reaction is :



Ans. (2)



30. Which of the following compounds will most readily be dehydrated to give alkene under acidic condition?

- (1) 4-Hydroxypentan-2-one (2) 3-Hydroxypentan-2-one  
(3) 1-Pentanol (4) 2-Hydroxycyclopentanone

Ans. (1)

Sol. CC(O)CC(=O)C will most readily be dehydrated to give conjugated alkene.