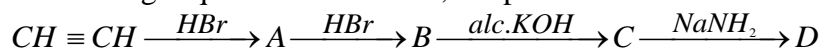


CHEMSITRY
PART-2

13. In the following sequence of reactions, the product D is



- A) Ethanol B) Ethyne C) Ethanal D) Ethene

14. $CH_3CH_2COOH \xrightarrow[\text{redP}]{Cl_2} A \xrightarrow{alc.KOH} B$ What is B?

- A) CH_3CH_2COCl B) CH_3CH_2CHO C) $ClCH_2CH_2COOH$ D) $CH_2 = CHCOOH$

15. The two forms of D-glucopyranose obtained from the solution of D-glucose are called

- A) Isomers B) Anomers C) Epimers D) Enantiomers

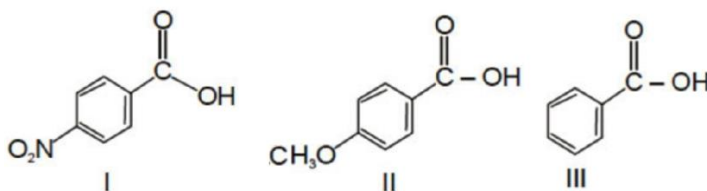
16. The equilibrium constant for the given reaction is approximately 10^{-3}



Which is strongest conjugate base in the given reaction?

- A) $HPO_4^{2-}(aq)$ B) $HCO_3^-(aq)$ C) $H_2PO_4^-(aq)$ D) $CO_3^{2-}(aq)$

17.



Order of K_a will be:

- A) $I > II > III$ B) $II > I > III$ C) $I > III > II$ D) $III > I > II$

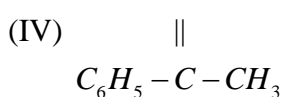
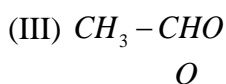
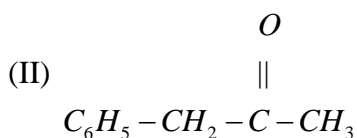
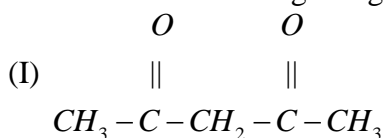
18. Among CaH_2 , NH_3 , NaH and B_2H_6 , which are covalent hydride?

- A) NH_3 and B_2H_6 B) NaH and CaH_2 C) NaH and NH_3 D) CaH_2 and B_2H_6

19. Most common oxidation states shown by cerium are

- A) + 2, + 4 B) + 3, + 4 C) + 3, + 5 D) + 2, + 3

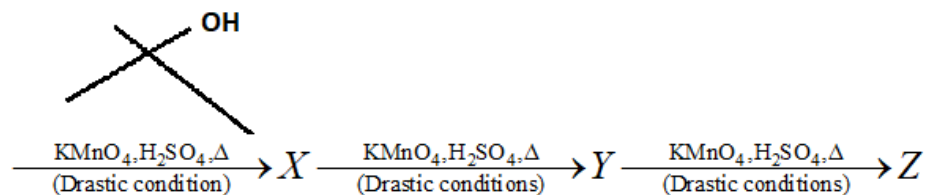
20. Which of the following can give iodoform test?



- A) only IV B) II and IV C) III and IV D) All of these

21. An elemental crystal has a density of 8570 kg/m^3 . The packing efficiency is 0.68. The closest distance of approach between neighbouring atom is 2.86 \AA . What is the mass in amu of one atom approximately?

22.



The number of C-atoms present in the final product 'Z' is

23. 500 mL of 0.150 M AgNO_3 solution were added in 500 mL of 1.09 M Fe^{2+} solution and the reaction is allowed to reach an equilibrium at 25°C .



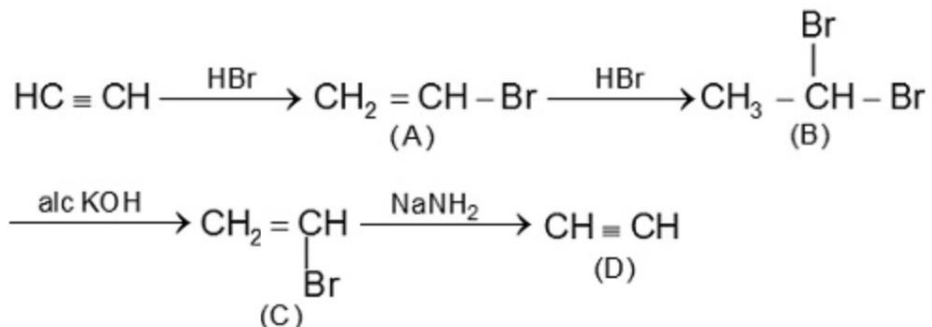
For 25 mL of the solution, 30 mL of 0.0832 M KMnO_4 were required for oxidation. Calculate equilibrium constant (M^{-1}) of the reaction at 25°C .

24. Sum of total number of amphoteric and neutral oxides among the following is:
 CO , NO , Al_2O_3 , PbO_2 , CaO , SnO_2 , ZnO

25. A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolyzed between platinum electrodes using a current of 5 amperes for 20 min. What mass of Ni is deposited at the cathode? (Atomic mass of Ni = 58.7)

SOLUTIONS
CHEMISTRY

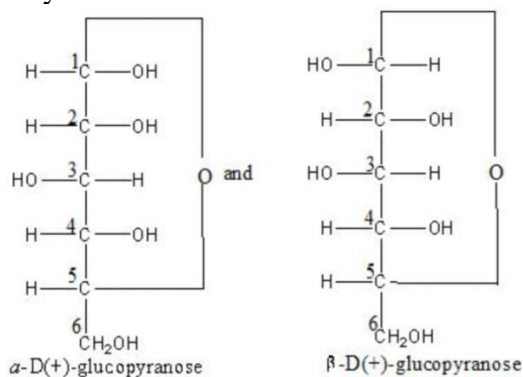
13.



14. 1st step is Hell-Volhard Zelinsky reaction, halogenation of carboxylic acid at α -C

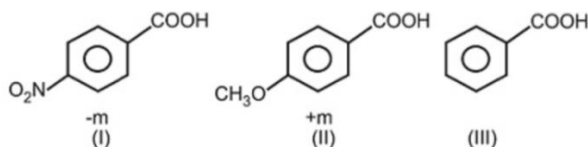


15. Two forms of D-glucopyranose are α -D-(+ -)glucopyranose and β -D-(+ -)glucopyranose. These are anomers (a pair of stereoisomers which differ in configuration only around first-carbon atom are called anomers).



Since the value of K for this reaction is greater than 1, it means this reaction is favourable in forward direction. Therefore, CO_3^{2-} is the stronger conjugate base than HPO_4^{2-}

17.



Acidic strength (K_a) α -m

$$\propto \frac{1}{+m}$$

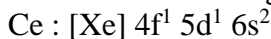
Order : I > III > II

18. Hydrides are binary compounds of hydrogen. These can be classified in four groups viz :

(i) Ionic hydrides e.g., NaH, CaH₂, LiH etc.

- (ii) Covalent hydrides e.g., B₂H₆, NH₃, SbH₃ etc.
- (iii) Polynuclear hydrides e.g., LiAlH₄, NaBH₄ etc.
- (iv) Interstitial hydrides, in which hydrogen is trapped in the interstitial spaces of transition metals.

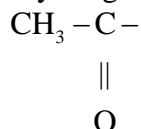
19. The electronic configuration of Ce is:



The most common oxidation states shown by cerium are +3 and +4 .

As energy difference between 4f and 5d-orbitals is very less, so electrons of f-orbitals also take part in bond formation

20. Anything that has



group gives positive iodoform

21. The packing efficiency = 0.68, means the given lattice is BCC.

The closest distance of approach = 2r

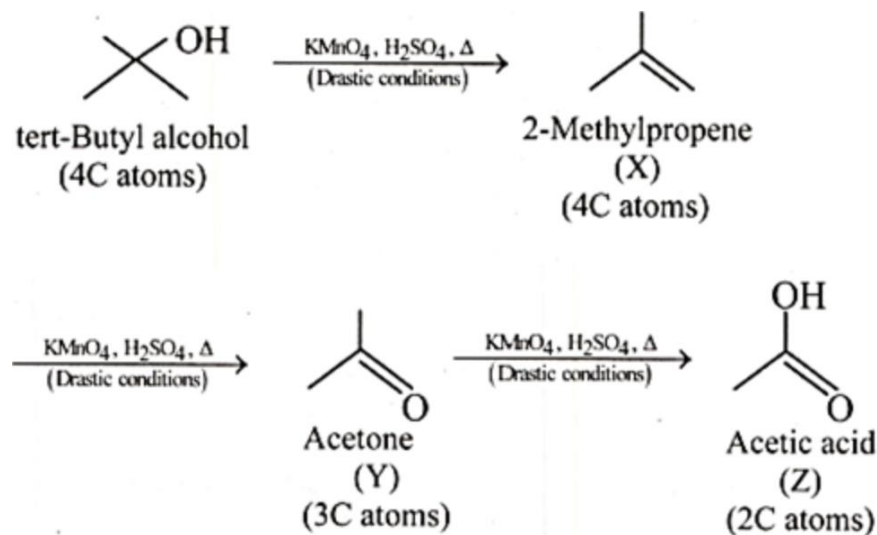
$$2r = 2.86 \text{ \AA} = \frac{\sqrt{3}a}{2} \Rightarrow \frac{2 \times 2.86}{\sqrt{3}} = 3.30 \text{ \AA}$$

Let, at. wt. of the element = w

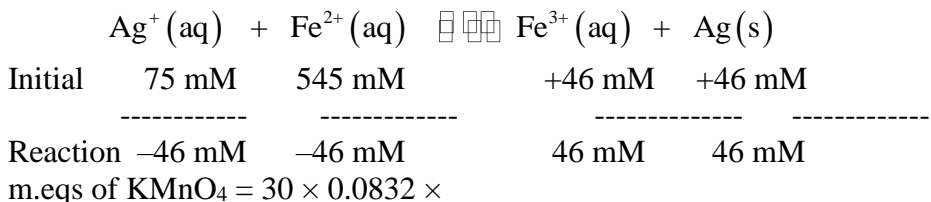
$$\therefore \frac{2 \times w}{6 \times 10^{23} \times (3.3)^3 \times 10^{-30}} = 8570$$

$$w = 92.39 \approx 93 \text{ amu}$$

22.



23.



$$= 12.48 \text{ m.eqs}$$

(Z factor = 5)

$$\text{m.eqs of Fe}^{2+} = 12.48 \text{ Meqs} = 12.48 \text{ mM}$$

(Z factor = 1)

$$\text{Total mM of Fe}^{2+} \text{ left} = 12.48 \times 40 = 499 \text{ mM}$$

At Equilibrium concentrations

$$[\text{Ag}^+] = \frac{29 \text{ mM}}{1000 \text{ mL}} = 0.029 \text{ M}$$

$$[\text{Fe}^{2+}] = \frac{499 \text{ mM}}{1000 \text{ mL}} = 0.499 \text{ M}$$

$$[\text{Fe}^{3+}] = \frac{46 \text{ mM}}{1000 \text{ mL}} = 0.046 \text{ M}$$

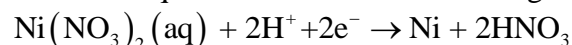
$$K_c = \frac{[\text{Fe}^{3+}]}{[\text{Ag}^+][\text{Fe}^{2+}]} = \frac{0.046}{0.499 \times 0.029} = 3.18 \text{ M}^{-1}$$

24. CO & NO are neutral oxide.

CaO basic oxide. Rest of them are amphoteric oxide.

25. Quantity of electricity used = Current in amperes x Time in second = 5A x (20 x 60) s = 6000 C

Chemical equation for the reaction during electrolysis :



$$2\text{F} \quad 58.7\text{g}$$

Charge Q on n moles of electrons is given by : Q = nF

Charge required to deposit 1 mole nickel

$$= 2 \text{ F} = 2 \times 96500$$

$$\text{C} = 1.93 \times 10^5 \text{ C}$$

Molar mass of nickel = 58.7g mol⁻¹

1.93 x 10⁵ C of charge produces nickel = 58.7g

$$6000 \text{ C of charge produces nickel} = \frac{(58.7\text{g}) \times (6000\text{C})}{(1.93 \times 10^5 \text{ C})} = 1.82 \text{ g}$$