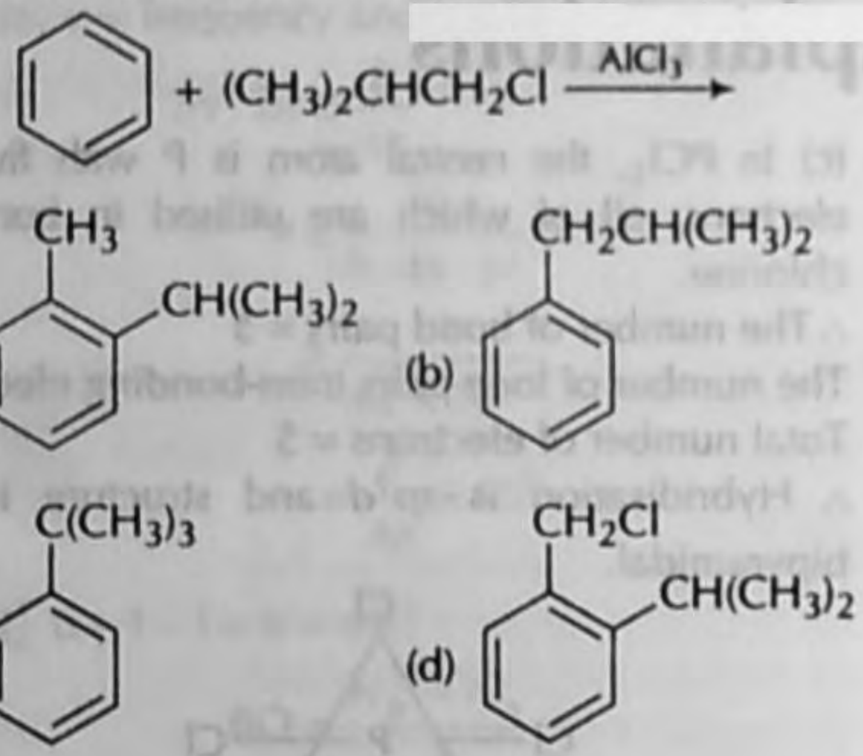
1 Mark Questions

1. Electrophile among the following is
   (a) NH_3 (b) SO_3
   (c) NO_2 (d) $CH{\equiv}C^-$

2. The major product for the following reaction is



3. Trouton's rule is obeyed by
   (a) hydrogen (b) methanol
   (c) benzene (d) acetic acid

4. Which one of the following compounds is known as silanes?
   (a) Silicon hydrides (b) Silicon halides
   (c) Silicon hydroxides (d) Silicon oxides

5. The shape of PCl_5 is
   (a) tetrahedral (b) square planar
   (c) trigonal bipyramidal (d) square pyramidal

2 Marks Questions

6. The correct order of acidity is
   (a) $C_6H_5COOH < CH_3COOH < C_6H_5OH < C_2H_5OH$
   (b) $CH_3COOH < C_6H_5COOH < C_2H_5OH < C_6H_5OH$
   (c) $C_2H_5OH < C_6H_5OH < C_6H_5COOH < CH_3COOH$
   (d) $C_2H_5OH < C_6H_5OH < CH_3COOH < C_6H_5COOH$

7. Consider the following equilibrium

$$SO_2(g) + \frac{1}{2}O_2(g) \rightleftharpoons SO_3(g);$$

$\Delta H = -23.5$ kcal/mol

   The formation of SO_3 is favoured by
   (a) compression and decreasing the temperature
   (b) compression and increasing the temperature
   (c) expansion and increasing the temperature
   (d) expansion and decreasing the temperature

8. A molecular electronic excited state has a life time of 10^{-9} s, the uncertainty in measuring the frequency (Hz) of the electronic transition is approximately
   (a) $\frac{h}{4\pi} \times 10^9$ (b) $\frac{h}{4\pi} \times 10^{-9}$
   (c) $\frac{1}{4\pi} \times 10^{-9}$ (d) $\frac{1}{4\pi} \times 10^9$

9. According to the molecular orbital theory, bond order for H_2^+ species is
   (a) 0.5 (b) 1.0 (c) 1.5 (d) 2.0

10. According to crystal field theory, the electronic configuration of $[Ti(H_2O)_6]^{3+}$ in the ground state is
   (a) $e_g^1 t_{2g}^0$ (b) $t_{2g}^0 e_g^1$ (c) $e^0 t_2^1$ (d) $t_{2g}^1 e_g^0$

11. The ions with lowest and highest radii among O^{2-}, F^-, Na^+ and Mg^{2+} are respectively,
   (a) Mg^{2+} and O^{2-} (b) O^{2-} and F^-
   (c) O^{2-} and Mg^{2+} (d) Na^+ and Mg^{2+}

Common Data for Questions 12 and 13

The solubility products of FeS, ZnS, CuS and HgS are 1.0×10^{-19}, 4.5×10^{-24}, 4.0×10^{-38} and 3.0×10^{-53} respectively.

12. H_2S is passed through an aqueous solution containing all the four metal ions. The metal ion that precipitates first is

(a) Fe^{2+} (b) Zn^{2+}

(c) Cu^{2+} (d) Hg^{2+}

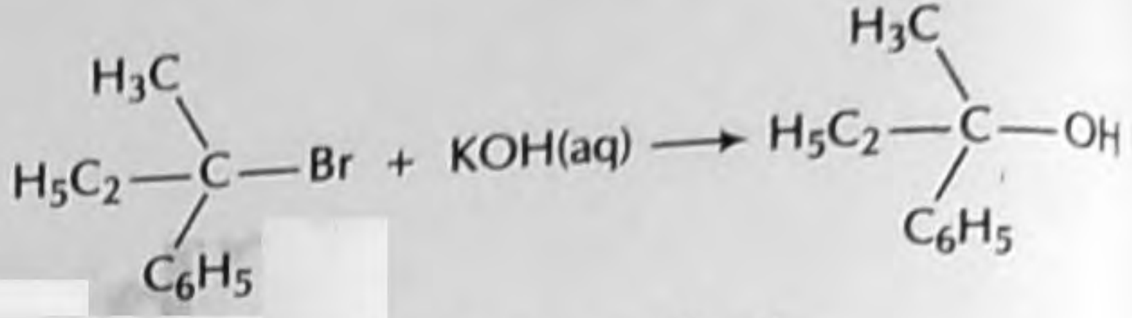
13. The concentration of S^{2-} at which FeS begins to precipitate from the mixture having 0.1 M Fe^{2+} is

(a) 1.0×10^{-17} M (b) 1.0×10^{-18} M

(c) 1.0×10^{-19} M (d) 1.0×10^{-20} M

Statement for Linked Answer Questions 14 and 15

Consider the reaction,



14. The above reaction is an example of

(a) addition reaction

(b) bimolecular elimination reaction (E_2)

(c) unimolecular substitution reaction (S_N1)

(d) bimolecular substitution reaction (S_N2)

15. If the concentration of KOH in the reaction mixture is doubled, the rate of the reaction will be

(a) decreased to one-half

(b) the same

(c) increased by two times

(d) increased by four times