Chapter 16 – Answers to QUESTIONS (for in-chapter questions)

1  a  2-iodobutane,  b  1,1-dichloroethane.

2  a

\[ \text{CH}_2\text{BrCH}_2\text{Br} \]

b  \text{CH}_2\text{BrCHBrCH}_2\text{Cl}.

3  a  Silver bromide.

b  \text{Ag}^+(\text{aq}) + \text{Br}^{-}(\text{aq}) \rightarrow \text{Ag}^+\text{Br}^{-}(\text{s})

c  The C–Br bond needs to break, which takes time to happen.  d  Bromide ions are substituted by water molecules, then form a precipitate of AgBr with silver nitrate.

4  a  propan-2-ol,  b  ethane-1,2-diol.

5  The second stage is faster because the carbocation is unstable, and so reacts quickly with the nucleophile.  The first stage is slower because it involves breaking the C–Br bond, which requires energy.

6  a  The reaction will be slower.  b  The reaction will be faster.

7  a  S_N2 because there are two molecules (bromobutane and the iodide ion) involved in the rate equation.

b  The reaction happens in one step, where the bromide ion is leaving as the iodide ion is arriving.

8  a  CH_3CH_2CN,  b  CH_3CH_2OCH_2CH_3,  c  CH_3CH_2NH_2.

9  a  Aqueous sodium hydroxide, heat.

b  Aqueous potassium cyanide, heat in ethanol.

c  Concentrated ammonia solution, heat.

10  An alkyne would be formed (ethyne in this example).