ARENES: HALOGENATION

1. a) A: Bubble chlorine through hot benzene for an hour in the presence of UV light.

   B: Bubble chlorine through benzene at room temperature in the presence of either aluminium chloride or iron, but in the absence of UV light.

   C: React benzene with bromine at room temperature in the presence of either aluminium bromide or iron, but in the absence of UV light.

   (With B and C you don't need to mention both possible catalysts - just choose one of them.)

   b) The molecule is a ring of carbon atoms, each with a hydrogen and chlorine atom attached. These can lie above or below the ring. If the chlorine atom on, say, carbon 1was below the ring, then the chlorine atom on carbon 2 could lie either above or below the ring – producing geometric isomers. There are obviously lots of variations on this if you consider all the carbons around the ring.

   c) chlorobenzene

2. a) D: Bubble chlorine through methylbenzene at room temperature in the presence of either aluminium chloride or iron, but in the absence of UV light.

   E: Bubble chlorine through boiling benzene in the presence of UV light.

   b) 4-chloromethylbenzene and 2-chloromethylbenzene

   c) Use an excess of chlorine.

   d) (chloromethyl)benzene, (dichloromethyl)benzene, (trichloromethyl)benzene