**4.1.1 Exercise 2 – Electrophilic Substitution Reactions of Benzene**

**1.**  Explain why benzene reacts with electrophiles

**2.** Explain why benzene reacts with electrophiles less readily than cyclohexene

**3**. Explain why benzene does not undergo addition reactions

4. a) Write an equation for the reaction of benzene with chlorine

b) What is the catalyst for this reaction?

c) Write an equation for the formation of the electrophile

d) Write the mechanism for the reaction of benzene with the electrophile

e) Write an equation for the regeneration of the catalyst

f) Suggest why the reaction should not be carried out above 50 oC

5. a) Write an equation for the reaction of benzene with bromine

b) What is the catalyst for this reaction?

c) Write an equation for the formation of the electrophile

d) Write the mechanism for the reaction of benzene with the electrophile

e) Write an equation for the regeneration of the catalyst

f) Suggest why the reaction should not be carried out above 50 oC

6. a) Write an equation for the reaction of benzene with nitric acid to form nitrobenzene

b) What is the catalyst for this reaction?

c) Write an equation to show the formation of the electrophile. Explain the role of the nitric acid in this reaction.

d) Write the mechanism for the reaction of benzene with the electrophile.

e) Write an equation for the regeneration of the catalyst

f) Suggest why the reaction should not be carried out above 50 oC.