Question 25 (5 marks)

What is the relationship between dissolved oxygen and biochemical oxygen demand and why is it important to monitor both in natural ways?

Dissolved oxygen is the amount of oxygen dissolved in 1 L of water solution and biochemical oxygen demand is the amount of oxygen required for metabolism of microbes over a period of 5 days at 20°C and in darkness. DO can be measured by a oxygen sensitive probe or Winkler method and indicates the amount of oxygen available for metabolism and proliferation of aquatic plants in waterways. A high DO is required for maximum functioning and a lack of DO can lead to death of aquatic organisms, which will form organic matter which is decomposed to produce anaerobic bacteria, which release toxins not degrading with quality of water. BOD is measured by measuring initial DO and placing the sample incubated at 20°C and in darkness for five days and measuring DO. Then BOD is proportional to initial DO and final DO. Monitoring BOD in waterways is essential in conjunction with DO as a high BOD but normal DO can lead to death of aquatic life. Monitoring BOD and DO are related to measuring eutrophication level, as a high DO and low BOD will indicate excessive growth of algae produced by an algae bloom. Monitoring eutrophication or by measuring BOD and DO can prevent an algal bloom causing it treated early, thus maintaining quality of water.