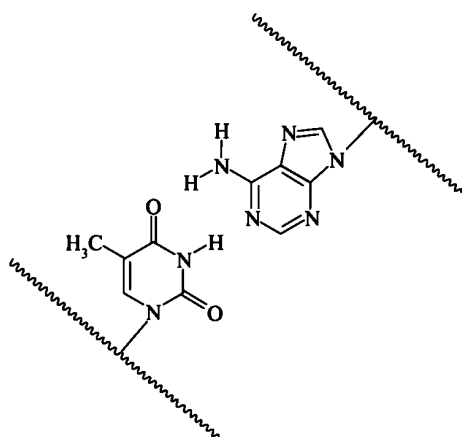


Environmental Chemistry

Formative Test

1. DNA is found in all living cells. The diagram below shows a section of a DNA molecule.



- (a) Identify one product of the aerobic decomposition of DNA. /1
- (b) Identify one product of the anaerobic decomposition of DNA. /1
- (c) Living cells can obtain energy by aerobic respiration.
Write an equation for aerobic respiration. /2
- 2.
- (a) Describe how oxides of nitrogen are formed as a consequence of the combustion of petrol in motor vehicles. Include one equation in your answer. /4
- (b) Identify one environmental problem, other than acid rain, that may result from the presence of oxides of nitrogen in the troposphere. /1
- (c) Explain whether nitrogen (II) oxide is a primary or secondary pollutant. /2
- (d) Describe how catalytic converters reduce the quantities of nitrogen oxides generated by cars. /2
- (e) Explain how an increase in the amounts of nitrogen oxides in the atmosphere could lead to an increase in the amounts of nutrients available to plants. /3
- 3.
- (a) Describe how greenhouse gases maintain a steady temperature in the Earth's atmosphere. /3
- (b) Human actions are increasing the level of greenhouse gases in the atmosphere. It is possible that this could lead to an increase in the average temperature of the Earth's atmosphere.
State the name of this effect. /1
- (c) Describe one harmful consequence that this increase in average temperature is predicted to have for the human population. /2

- 4.
- (a) State the pH below which rainfall is classified as acid rain. /1
 - (b) Calculate the concentration of H^+ in rain that has a pH of 4.9. /2
 - (c) Explain how the reaction of SO_3 with water lowers the pH of rainwater. Include one equation in your answer. /3
 - (d) Unpolluted rainwater is acidic due to the presence of CO_2 in the atmosphere. Explain why CO_2 in the atmosphere is unlikely to cause acid rain. /2
 - (e) Describe one harmful environmental effect of acid rain. /2
- 5.
- (a) Describe how Al^{3+} removes suspended matter from water. /3
 - (b) Chlorine gas is an effective oxidising agent and for this reason is commonly added to pool water. State one reason for adding an oxidising agent like chlorine gas to pool water. /1
 - (c) State the effect that raising the pH of pool water will have on the concentration of chlorine gas dissolved in the water. /1
 - (d) Calculate the pH of a solution of NaOH with a concentration of $3.6 \times 10^{-5} \text{ mol L}^{-1}$. /3
- TOTAL /40

