## **Stage 2 Chemistry**

## **Birdwood**

HIGH SCHOOL **Topic 4: Organic and Biological Chemistry**

**Naming, Physical Properties**, **Alcohols**

**Review Paper 10**

**DUE DATE:** Ref: ESSENTIALS pages 228 - 237

**Question 1**

Cholesterol is a waxy, fat-like substance, also known as a lipid.  Cholesterol is essential to the body's cell membranes, insulation of the nerves and to the production of certain hormones.  To help digest food, the liver uses cholesterol to make bile acids.  However, high blood cholesterol is a 'risk factor' for heart disease, which means it increases your chance of getting a heart disease.

A structural formula for cholesterol is shown:



a *Name one* of the functional groups present in

cholesterol.

b In what type of solvent, polar or non-polar, would

you expect cholesterol to be most soluble? Explain.

c Cholesterol can be oxidized using a suitable

oxidizing agent.

To what organic family of compounds would

the *product* of this oxidation belong?

(5 marks)

(5 marks)

**Question 2**

The table below shows the boiling points of two common substances.

|  |  |  |
| --- | --- | --- |
| **Substance** | **Molecular Formula** | **Tb/0C** |
| ethanal | CH3CHO | 20.1 |
| ethanol | CH3CH2OH | 78.3 |

a i Describe the main *type* of secondary interaction that is present in ethanol.

ii State its relative strength compared to the secondary interactions shown in ethanal.

b Draw a diagram to show *two* ethanol molecules held together by this secondary interaction.

c Explain why the melting point of ethanol is so much higher than that of ethanal.

(8 marks)

**Question 3**

a Draw the structural formula for 3-methylhexan-3-ol.

b Is 3-methylhexan-3-ol a primary, secondary or tertiary alcohol? (3 marks)

**Question 4**

The United States Environmental Protection Agency states that the legal limit for mercury in public water systems is 0.002 mg L-1.

Convert this to g mL-1. (2 marks)

**Question 6**

a Calculate the mass, in mg, of sodium hydroxide needed to prepare 500 mL of a 100 ppm standard solution.

b The concentration of Cd2+ ions in a sample of waste water was found to be 5000 ppb.

The legal limit is 2.5 ppm. Is this sample within the limit?

c Prozac is a drug given to patients suffering from depression and the eating disorder, bulimia nervosa.

For depression, the recommended dose is 20 mg per day.

If the volume of aqueous body fluid in an average adult is 45 L, calculate the concentration of Prozac,

in mmol mL-1 in the aqueous body fluid in an average adult who has taken the prescribed daily dosage.

[The molar mass of Prozac is 309.326 g/mol ]

(8 marks)

**Question 7**

Write *structural formulae* and *name* the alcohol that would be oxidized to form the compound

3-methyl butan-2-one. (2 marks)

**TOTAL MARK = 35**