SECTION B

QUESTION 2

2.1 Read the extract below and answer the questions that follow.

> Sometimes during cell metabolism, chemical substances which are poisonous to the body are formed. However, the body cells are not destroyed due to the presence of enzymes that decompose these poisonous substances into harmless products. One such poisonous substance that is released as a by-product during normal cellular reactions is *hydrogen peroxide.* However, the enzyme, catalase, ensures that this poisonous substance is converted into two harmless products as quickly as possible.
>
> $$\underset{\text{Hydrogen peroxide}}{2H_2O_2} \longrightarrow \underset{\text{water}}{2H_2O} + \underset{\text{oxygen}}{O_2}$$
>
> [Source: *Liesl Sterrenberg & Helena Fouche, 1975*]

2.1.1 (a) What is the function of an enzyme? (2)

(b) Describe the benefits that humans derive from the function of enzymes mentioned in QUESTION 2.1.1. (2)

(c) Identify TWO harmless products released during decomposition of hydrogen peroxide. (2)

(d) What effect does the involvement of an enzyme in a chemical reaction have on its structure and its ability to take part in subsequent reactions? (2)

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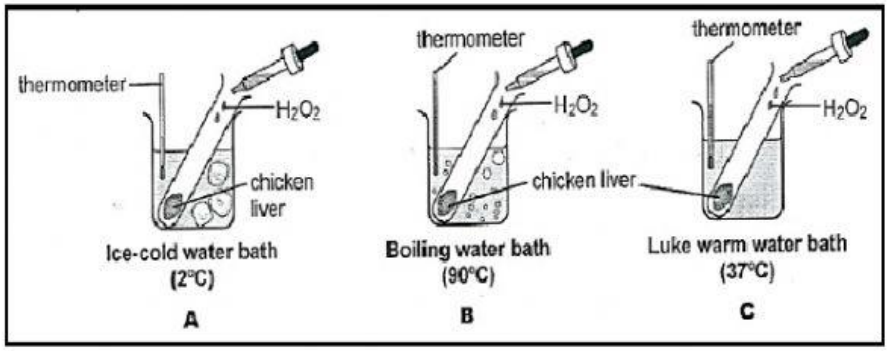
2.1.2 An experiment was conducted to determine the effects of different temperatures on the action of the enzyme catalase, found in raw chicken livers. The apparatus was set-up as shown below.



(a) Formulate a hypothesis for this investigation. (2)

(b) In which test tube, **A**, **B**, or **C**, would the reaction take place the fastest? Give a reason for your answer. (2)

(c) Which observation would indicate a positive reaction from the catalase? (1)

(d) What results would be observed after the experiment in test tubes **A** and **B** respectively? (4)

(e) Name the property of enzymes that is being investigated in this investigation. (1)

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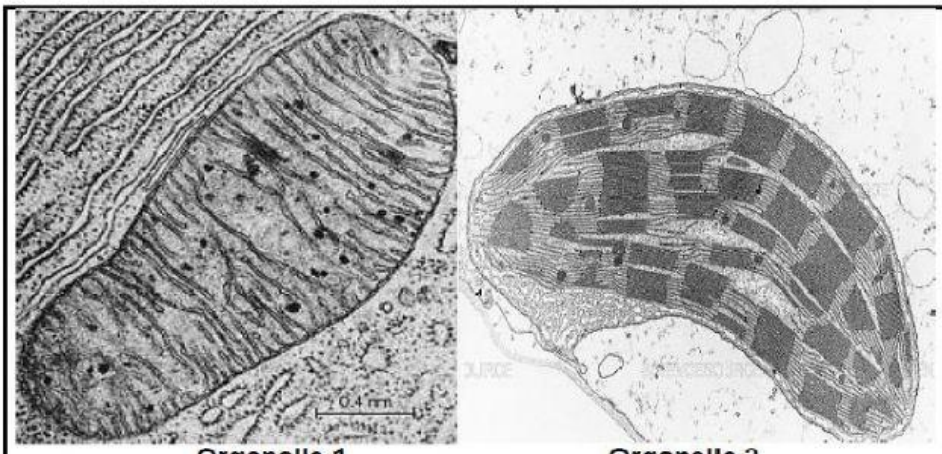
(f) Identify the TWO factors that must be kept constant in this investigation. (2)

2.2 Study the micrographs below showing two organelles.



Organelle 1 **Organelle 2**

2.2.1 Identify organelles **1** and **2** respectively. (2)

2.2.2 Which ONE of the organelles shown above is found in a plant cell only? (1)

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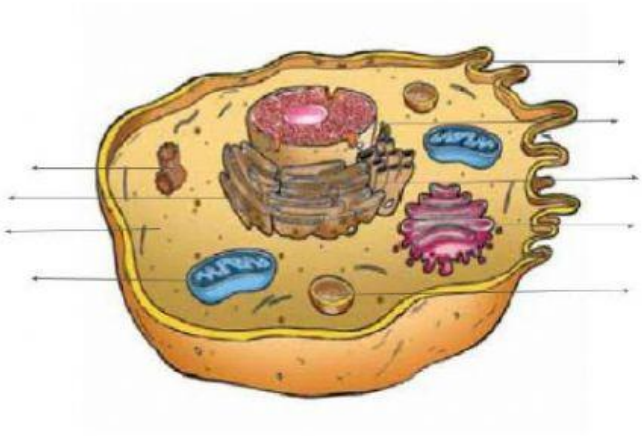
Identify the Parts



2.2.4 In which part of organelle **2** is the pigment responsible for the absorption of light found? (1)

2.2.5 Support the statement that says organelle **1** is called the 'powerhouse' of the cell. (2)

2.2.6 Which cell between a muscle cell and a skin cell contains more of organelle **1**? Explain your answer. (2)

2.2.7 Tabulate THREE differences between organelle **1** and organelle **2.** (7)

2.2.8 Calculate the actual size of the micrograph of organelle **2** in micrometres if the measured size of the image using a ruler is 86 mm and the electron microscopic magnification is 4000x. (3)

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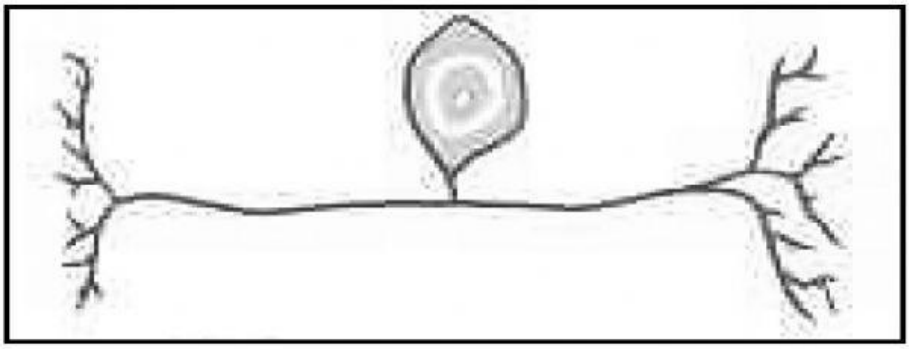
2.3 Study the diagram below.



2.3.1 Supply the caption for the diagram above. (1)

2.3.2 Redraw a labelled diagram of the above structure and indicate with an arrow the direction of flow of an impulse. (3)

2.3.3 From the diagram in QUESTION 2.3.2 identify a structure with the following function:

(a) Provides nutrition and energy to the impulse

(b) Forms a synoptic cleft and transports impulse away from the neuron (2)

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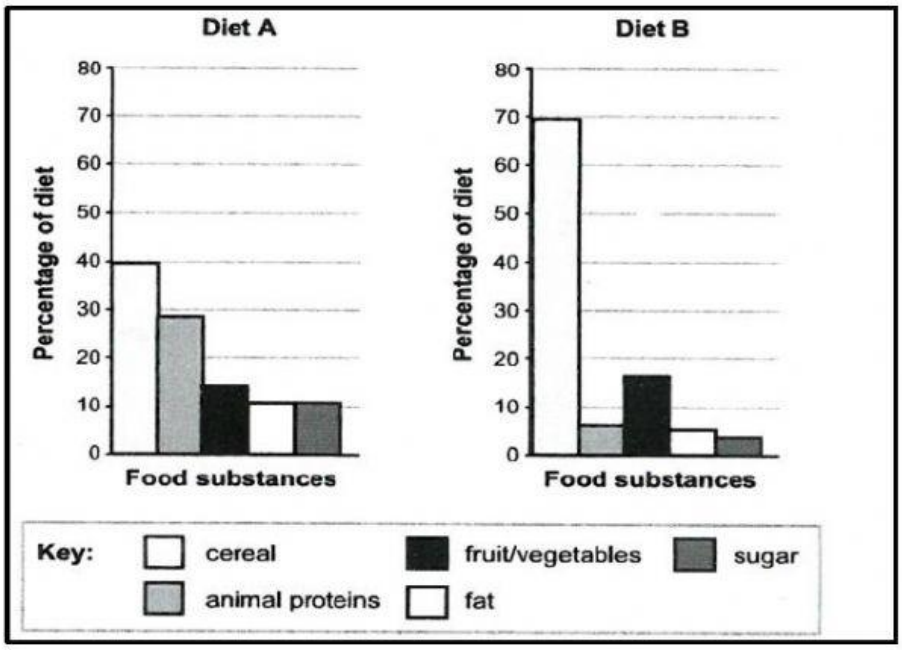
QUESTION 3

3.1 The histogram below shows the composition of diets of two people.



3.1.1 (a) From the histograms, name TWO types of food substances from diet **B** that represent a very similar percentage diet. (2)

(b) Give TWO functions of cereal in a diet. (2)

(c) Calculate the difference between the percentages of fruit / vegetables in diets **A** and **B**? (3)

(d) Which diet provides more energy? Give a reason for your answer. (2)

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(e) Diet **B** is eaten by a vegetarian. However, it is evident that this person also consumes dairy products. Provide evidence from the graph. (1)

3.1.2 (a) Define the term *obesity*. (2)

(b) Give ONE reason why obesity is regarded as a life-threatening condition. (2)

(c) Diabetes is one of the sicknesses caused by obesity. Give the causes, ways of prevention and treatment of diabetes. (7)

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