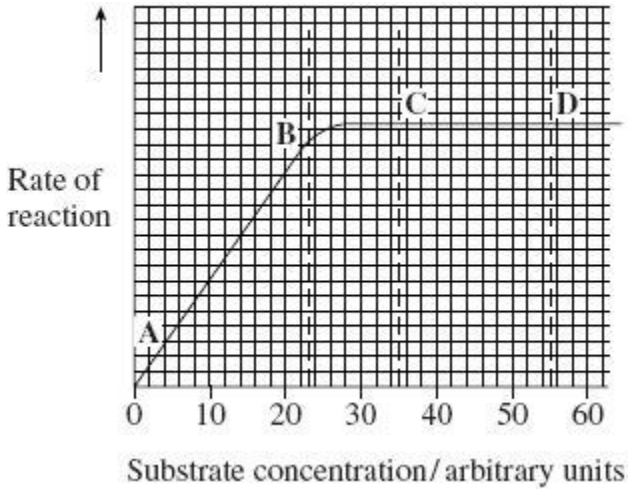
Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Q1.

The graph shows the effect of substrate concentration on the rate of an enzyme-controlled reaction.



(a) (i) Describe what the graph shows about the effect of substrate concentration on the rate of this enzyme-controlled reaction.

_____

_____

_____

_____

(2)

(ii) What limits the rate of this reaction between points **A** and **B**? Give the evidence from the graph for this.

_____

_____

_____

_____

(2)

(iii) Suggest a reason for the shape of the curve between points **C** and **D**.

_____

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_____

(1)

(b) Sketch a curve on the graph to show the rate of this reaction in the presence of a competitive inhibitor.

(1)

(c) Methotrexate is a drug used in the treatment of cancer. It is a competitive inhibitor and affects the enzyme folate reductase.

(i) Explain how the drug lowers the rate of reaction controlled by folate reductase.

_____

_____

_____

_____

_____

(2)

(ii) Methotrexate only affects the rate of the reaction controlled by folate reductase.

Explain why this drug does not affect other enzymes.

_____

_____

(1)

(Total 9 marks)

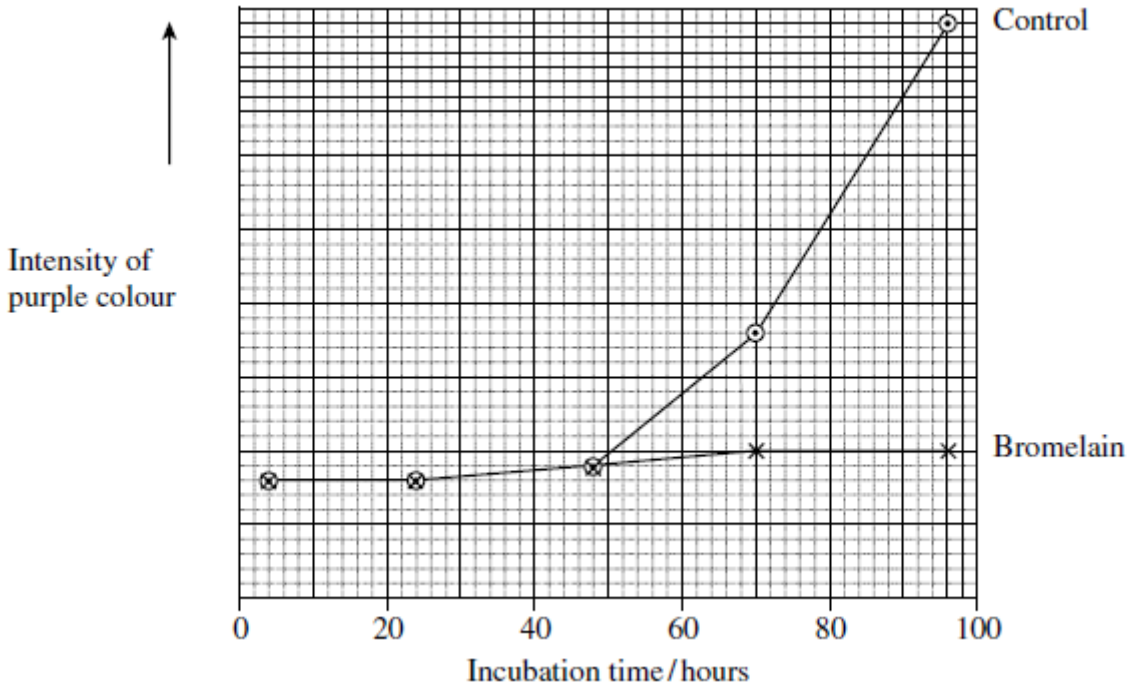
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Q2.

Scientists investigated the effect of bromelain on cancer cells. They took cells from skin cancers in mice and added them to a liquid growth medium in two dishes.

Four hours later they added a solution of bromelain to one of the dishes. They left the other dish as a control. They also added a substance to both dishes that is turned purple by respiring cells.

Both dishes were placed in an incubator. The scientists measured the intensity of the purple colour at intervals over a period of 100 hours.



(a) The scientists put the same number of skin tumour cells in each dish at the start of this investigation. Explain why it was important to put the same number of cells in each dish.

_____

_____

(1)

(b) The scientists concluded that bromelain did not kill cancer cells but stopped them dividing. Does the graph support this conclusion? Explain your answer.

_____

_____

_____

_____

(2)

(c) An article in a newspaper claimed that these data show that bromelain can be used to treat cancer.

Give **three** reasons why we should be careful about accepting this claim.

1. _____

_____

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2. _____

_____

3. _____

_____

(3)

(d) The rate of cell division is important in investigations into cancer. Suggest why.

_____

_____

_____

_____

(2)

(e) Scientists have investigated the effects of bromelain on cancer growth in humans. Suggest why they gave bromelain in addition to, rather than instead of, the usual treatment.

_____

_____

_____

_____

(2)

(Total 10 marks)

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