National 5 Biology

Unit 1

Cell Biology

Ink Exercise Four

Enzymes

Name: _____

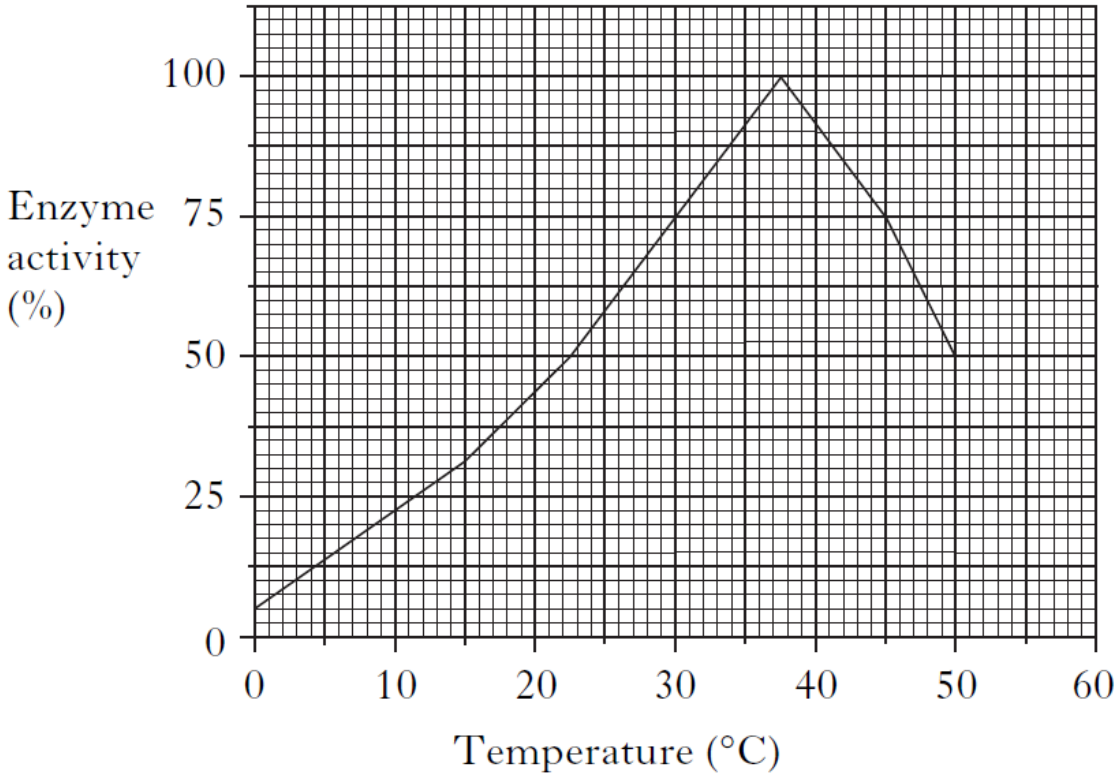
Class: _____

1. All proteins are composed of
    a. Genes
    b. DNA
    c. Amino acids
    d. Bases

2. Enzymes act as catalyst because they
    a. Are composed of protein
    b. Act on all substrates
    c. Raise the energy input
    d. Lower the energy input

3. The active site of an enzyme is complementary to
    a. One type of substrate molecule
    b. All types of substrate molecule
    c. One type of product molecule
    d. All types of product molecule

4. The graph shows the effect of temperature on the enzyme pepsin.

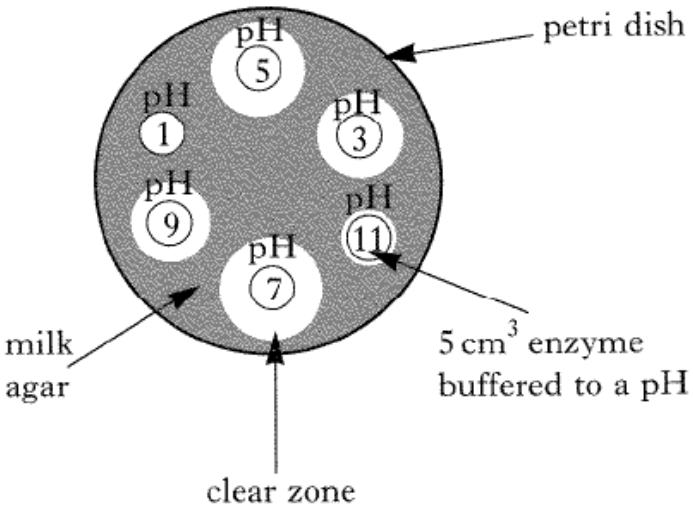


Between which two temperatures is there the greatest increase in enzyme activity?
    a. 0-10 ^{o}C
    b. 10-20 ^{o}C
    c. 20-30 ^{o}C
    d. 30-40 ^{o}C

5. Which of the following correctly describes amylase?
    a. It breaks down starch into amino acids
    b. It builds up glucose-1-phosphate into starch
    c. It breaks down proteins into peptides
    d. It breaks down starch into maltose

Questions 6, 7 and 8 refer to the following information below.

An investigation into the effect of pH on the digestion of milk by an enzyme was carried out.
Five identical dishes were set up with wells cut out of the agar.
To each well was added 5cm^3 of the enzyme kept at a different pH as shown on the diagram below.



The dishes were kept at 35°C
The diameter of the area cleared by the action of the enzyme was measured.

	Diameter of clear zone (mm)				
pH	Dish 1	Dish 2	Dish 3	Dish 4	Dish 5
1	0	0	0	0	0
3	2	1	1	2	1
5	3	4	2	3	3
7	6	5	5	5	4
9	2	2	3	1	2
11	1	0	0	1	0

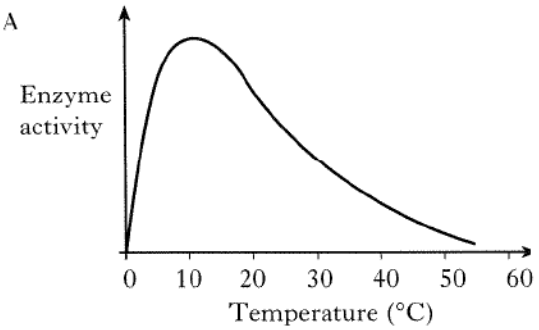
6. The average diameter cleared at pH 5 was
    a. 3mm
    b. 4mm
    c. 5mm
    d. 6mm

7. The variable altered in this investigation was
    a. Temperature
    b. Diameter of the well
    c. pH
    d. milk concentration

8. The pH at which the enzyme was most active was
    a. 3
    b. 5
    c. 7
    d. 9

9. Which of the graphs below shoes the effect of increasing temperature on enzyme activity?

A



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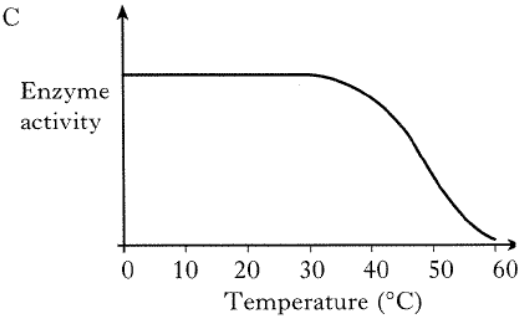
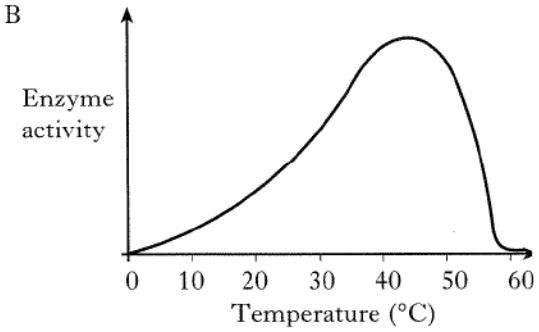


B



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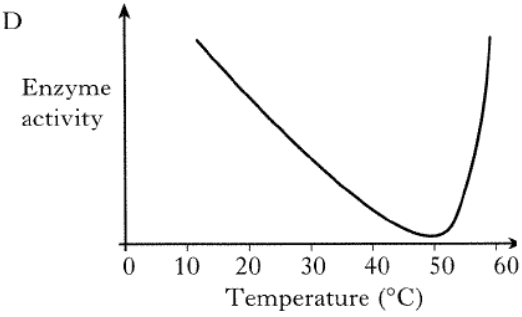
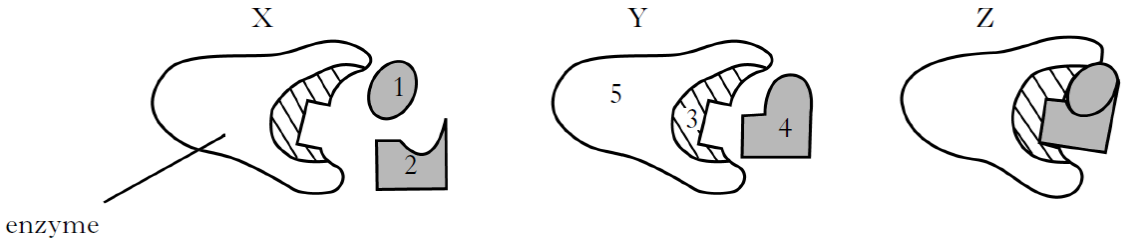


10. Which line in the table below correctly shows the functions of an enzyme?

	Energy input of the chemical reaction	*Rate of the chemical reaction*
A	Lowers	Speeds up
B	Raises	Slows down
C	Raises	Speeds up
D	Lowers	Slows down

11. The diagram below shows three stages X, Y and Z that occur when an enzyme converts its substrate to a product.



a. This enzyme promotes the breakdown of a complex molecule into simpler molecules. Put the stages into the correct order to show this degradation reaction

_____ → _____ → _____ 1

b. Which number in the diagram represents the active site

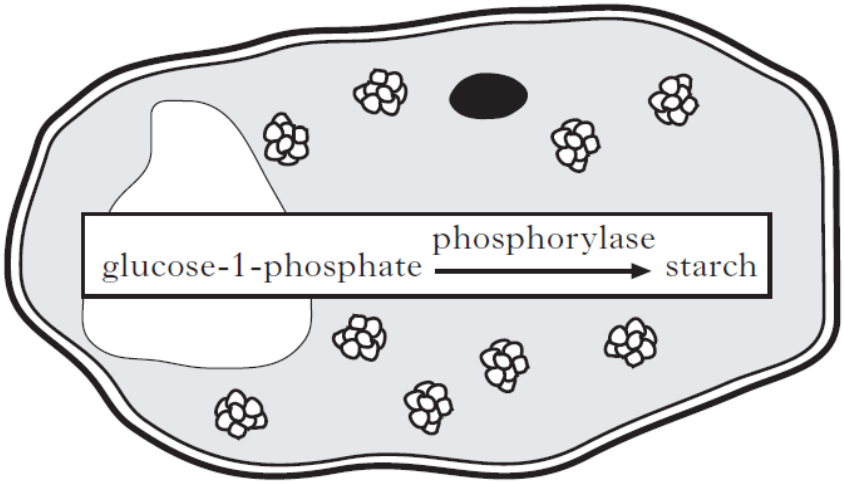
_____ 1

c. Describe what happens when an enzyme is denatured

_____

_____ 1

12. The diagram below shows the action of the enzyme phosphorylase in a potato cell



a. Underline the option in the bracket to make the sentence correct.

The action of the enzyme phosphorylase catalyses the (degradation / synthesis) of starch. 1

b. State the effect of phosphorylase on the rate of this reaction. 1

_____

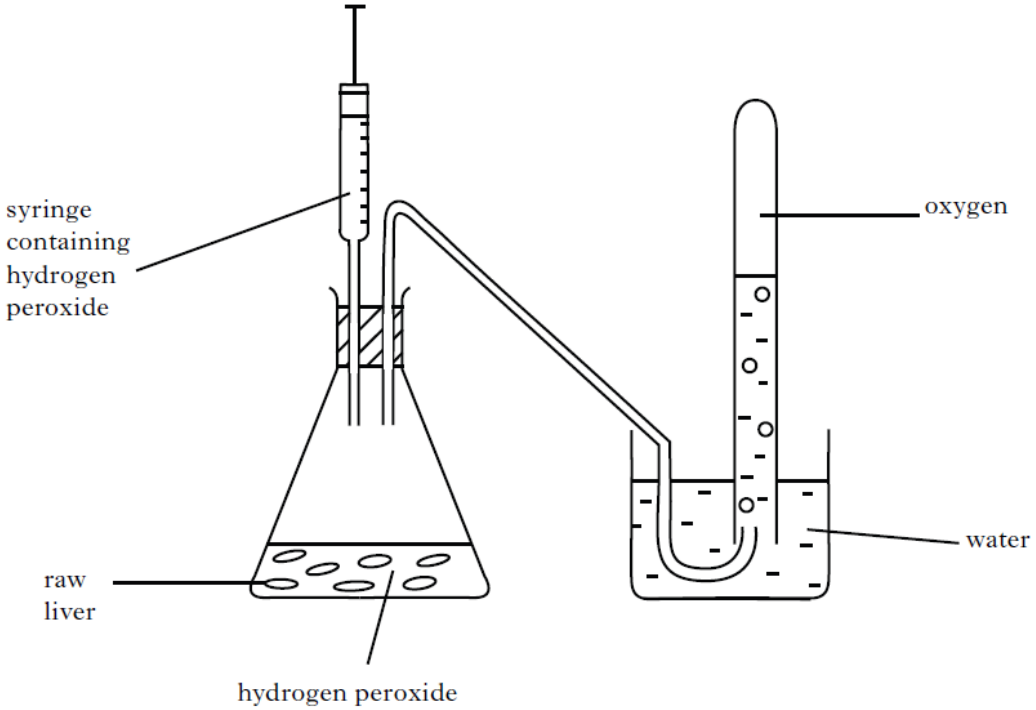
c. Explain why lipase could not produce starch in this reaction. 1

_____

13. Liver contains the enzyme catalase which carries out the following reaction.

hydrogen peroxide → water + oxygen

The investigation shown below was carried out to demonstrate the effect of pH on catalase activity in liver.
Hydrogen peroxide of different pH values was added to 1g of roughly chopped raw liver.



The time taken to collect 1cm^3 of oxygen was recorded and the results are shown in the table below.

pH of hydrogen peroxide solution	Time to collect 1cm^3 of oxygen (seconds)			Average time to collect 1cm^3 of oxygen (seconds)
	Trial 1	Trial 2	Trial 3	
7	76	77	81	78
8	56	58	57	57
9	50	45	40	45
10	53	50	53	52
11	59	69	70	66

a. From the table, state the optimum pH for catalase in liver

_____ 1

b. Name the variable altered in the experiment

_____ 1

c. State two variables which would need to be kept constant in this experiment

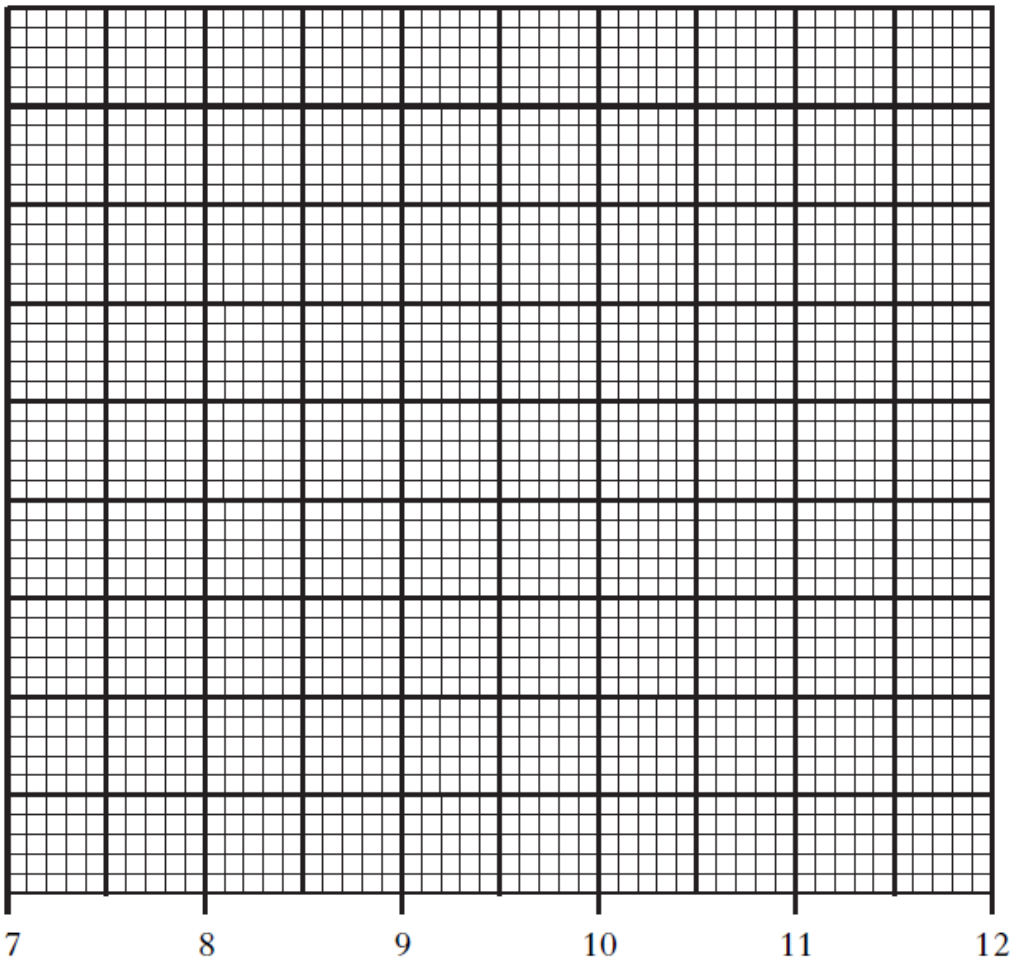
_____

_____ 2

d. Explain why the experiment was repeated at each pH value and averages calculated

_____ 1

e. Construct a line graph of the **average** time taken to collect 1cm^3 of oxygen against pH of hydrogen peroxide solution



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f. Predict the average volume to collect 1cm^3 of oxygen at pH 12

1

_____

Areas I need to work on: