Rosary School – Marj Elhamam

Chapter 1: Life processes

Past paper questions

Name: _____ Date: ___ / ___ / 2025

Grade: 9 (A, B, C, D) Subject: Biology IG

Question 1:

The table below shows some characteristics shared by most animals.

Complete the table by giving the missing characteristics and examples.

(4)

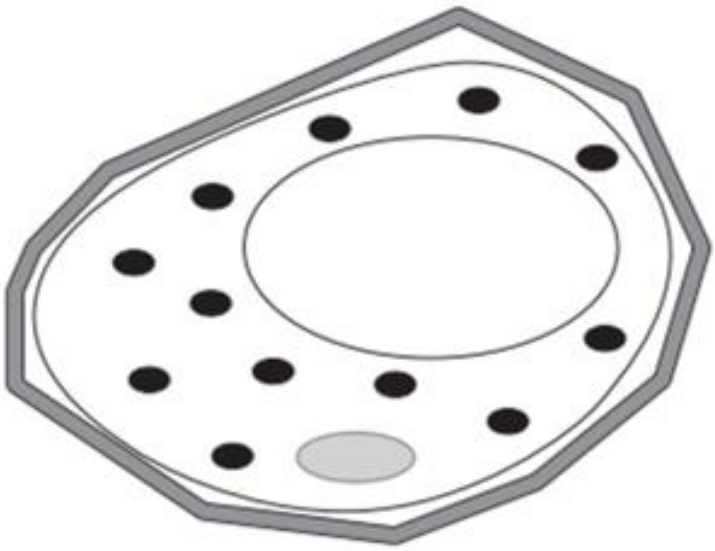
Characteristic	Example
they require nutrition	eating food
they respire	releasing energy from carbohydrate
	some animals can fly
they control their internal conditions	
	increase of the population of foxes
they grow	

Question 2:

The diagram shows a plant cell drawn by a student.

(i) Label the diagram to show the selectively permeable membrane.

(1)



(ii) Name three parts of a typical plant cell that are not found in an animal cell.

(3)

1 _____

2 _____

3 _____

(iii)

Ribosomes are found in plant cells and in animal cells.

Name the process that occurs at the ribosomes.

(1)

_____

Question 3:

A student investigates the effect of temperature on the rate of starch digestion by amylase. He carries out the first trial of his investigation at a room temperature of 20 °C.

He carries out the following steps in his investigation.

1 He puts one drop of iodine suspension into each of 12 wells on a spotting tile.

2 He then takes up 10 cm^3 of 10% starch suspension into a syringe.

3 He adds one drop of the starch suspension from the syringe to the first well in the spotting tile and records the colour change.

4 He rinses the outside of the syringe with water from a tap.

5 He then takes up exactly 5 cm^3 of 5% amylase suspension into the same syringe containing the 10% starch suspension.

6 He starts a stopwatch.

7 He then rocks the syringe containing the mixture gently backwards and forwards for one minute.

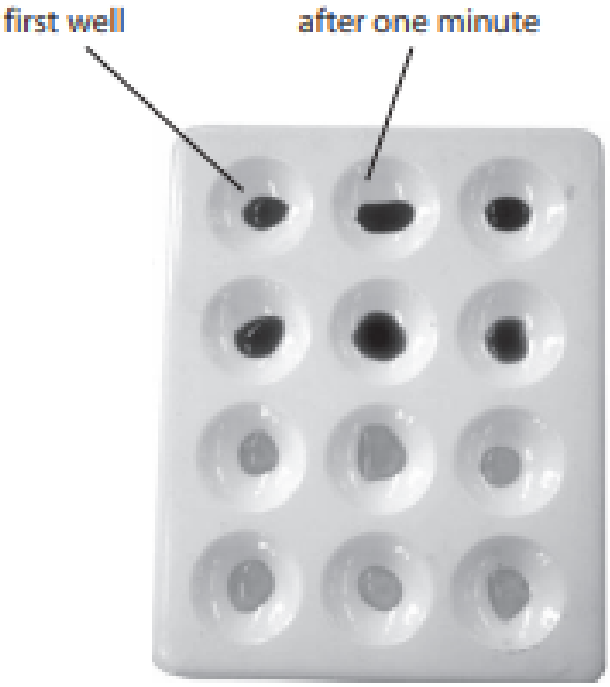
8 He adds one drop of the mixture from the syringe to the next well in the spotting tile and records the colour change.

9 He repeats this at intervals of one minute until he has added starch and amylase mixture to all of the wells.

10 He then repeats steps 1–9 but this time he uses iodine, amylase and starch suspension that have been stored in a water bath at 40 °C.

11 He also keeps the syringe containing the mixture in the water bath at 40 °C between drops.

The photograph shows his results for 20 °C at the end of the experiment when all the wells have mixture added.



(a) (i) Give one safety precaution the student should take when carrying out this investigation.

(1)

(ii) How many minutes do the samples of mixture added to the spotting tile in the photograph represent?

(1)

(b) Explain the purpose of the following steps in the student's experiment.

(i) step 4

(1)

(ii) step 7

(1)

(iii) step 11

(1)

(c) (i) Identify two variables that the student controls in his experiment.

(2)

1

2

(ii) Name the independent variable that the student is investigating.

(1)

(d) Using the photograph, explain how many minutes it took for the reaction to be completed at 20 °C.

(3)

(e) The results for the spotting tile at 40 °C would be different from the trial carried out at 20 °C.

(i) Describe how the appearance of the results will be different.

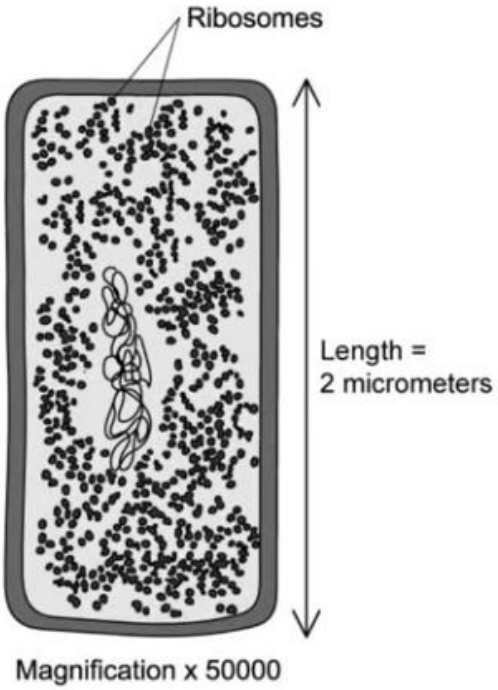
(2)

(ii) Explain the difference in the appearance of the results.

(2)

Question 4:

The diagram below shows a bacterium cell.



Use the following equation to calculate the image size of this bacterium cell.

Give your answer in mm. (1mm = 1000µm)

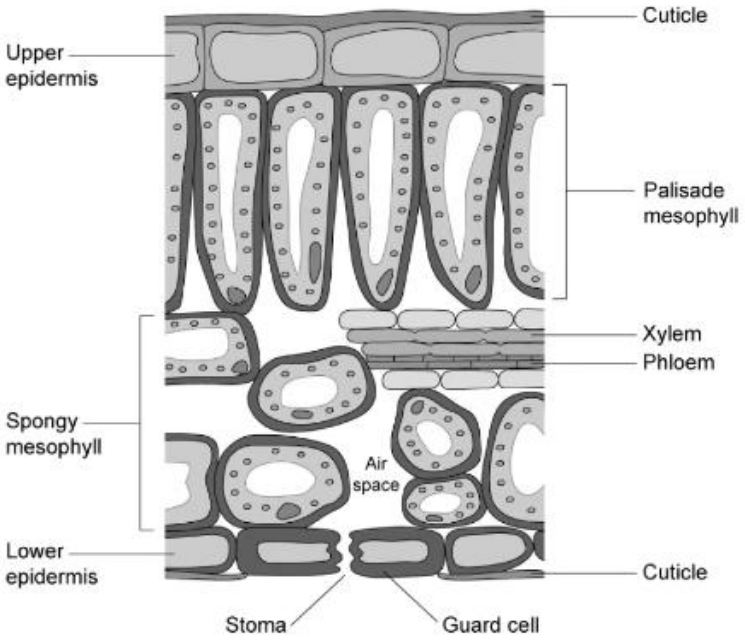
$$Magnification = \frac{Image\ size}{Actual\ size}$$

(3)

Question 5:

a.

The image below shows the structure of a leaf in a green plant magnified 220 times.



For the image above:

(i) Name **one** type of organelle visible.

(1)

(ii) Name **two** types of cell visible.

(2)

(iii) Name **two** types of tissue present.

(2)

b.

Explain why the leaf shown in part (a) is an example of an organ. (2)

_____

c.

The leaf image in part (a) measures 6 cm from top to bottom.

Use the formula below to calculate the actual thickness of the leaf. Give your answer in mm.

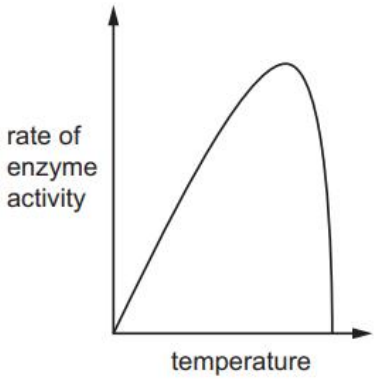
$$\text{Actual thickness} = \frac{\text{Image thickness}}{\text{Magnification}}$$

Question 6:

For each question there are four possible answers A, B, C and D. Choose the one you consider correct.

1)

The graph shows the effect of temperature on an enzyme's activity.



The three statements describe what is happening at different positions on the graph.

What is the correct order for the statements as the temperature increases?

1 The maximum frequency of effective collisions is happening.

2 The enzyme is denatured.

3 Kinetic energy of the molecules increases so the rate of reaction increases.

A $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 3 \rightarrow 1$ **D** $3 \rightarrow 1 \rightarrow 2$

2)

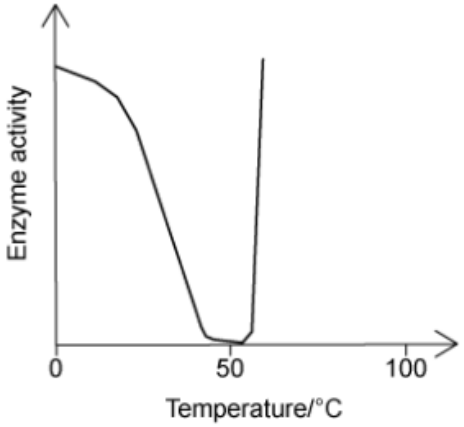
What can be said to be true of all enzymes?

	their optimum pH is 7	they are made from amino acids	they move about randomly in a fluid
A	X	X	X
B	X	✓	✓
C	✓	X	✓
D	✓	✓	X

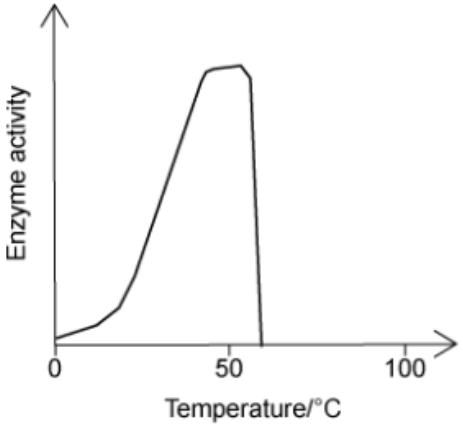
3)

Which graph in the image below shows the correct effect of temperature on the activity of an enzyme?

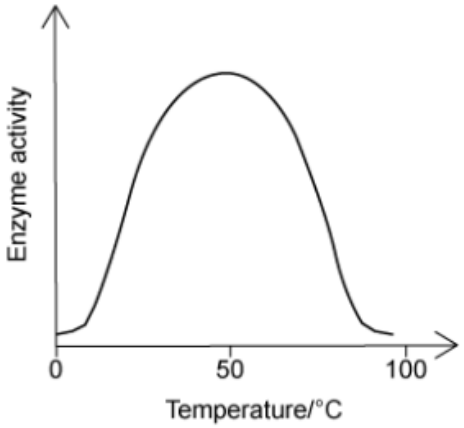
A



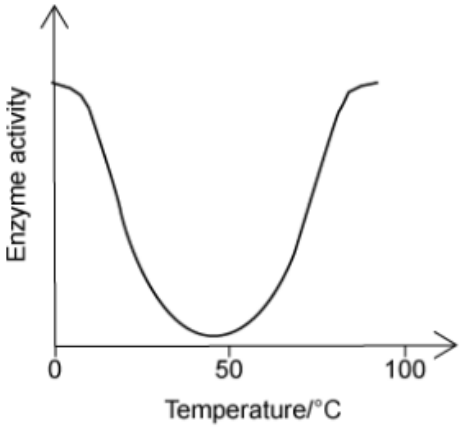
B



C



D



Question 7:

Enzymes are biological molecules that act as catalysts in metabolic reactions.

(a) (i) State what is meant by the term catalyst. [1]

_____

_____

(ii) State what is meant by the term metabolic. [1]

_____

_____

(b) A teacher investigates the effect of enzyme concentration on the rate of a reaction.

He uses the enzyme catalase, which is found in potato.

He changes the enzyme concentration by adding different numbers of potato discs.

Catalase breaks down hydrogen peroxide solution into water and oxygen. This is his method.

- cut same-sized discs from a potato
- put 5 cm3 of hydrogen peroxide solution into each of five test tubes
- add a different number of potato discs to the hydrogen peroxide
- measure the volume of oxygen gas produced in three minutes

The teacher repeats each test four times for each concentration.

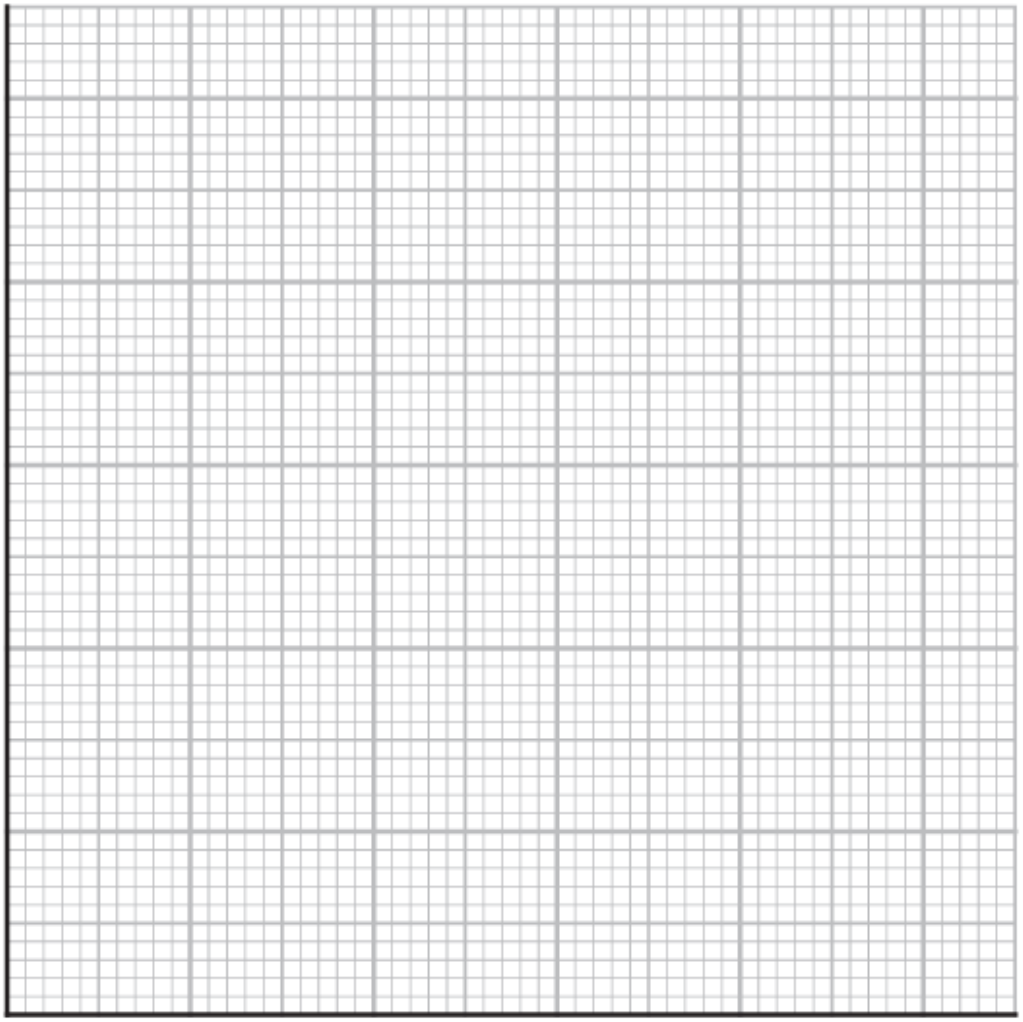
He then calculates the mean rate of oxygen production for each concentration.

The table shows his results.

Enzyme concentration (number of potato discs)	Mean rate of oxygen production in cm^3 per minute
2	2.0
4	4.4
6	7.0
8	8.2
10	8.2

(i) Plot a line graph to show the effect of enzyme concentration on the mean rate of oxygen production.

Use a ruler to join the points with straight lines. [5]



(ii)

Explain the effect of increasing enzyme concentration on the rate of oxygen production. [3]

_____

_____

_____

_____

_____

(iii) Name a piece of apparatus suitable for measuring the volume of oxygen produced. [1]

_____

(iv) Explain why it is important for the teacher to keep the volume and concentration of the hydrogen peroxide constant. [2]

_____

_____

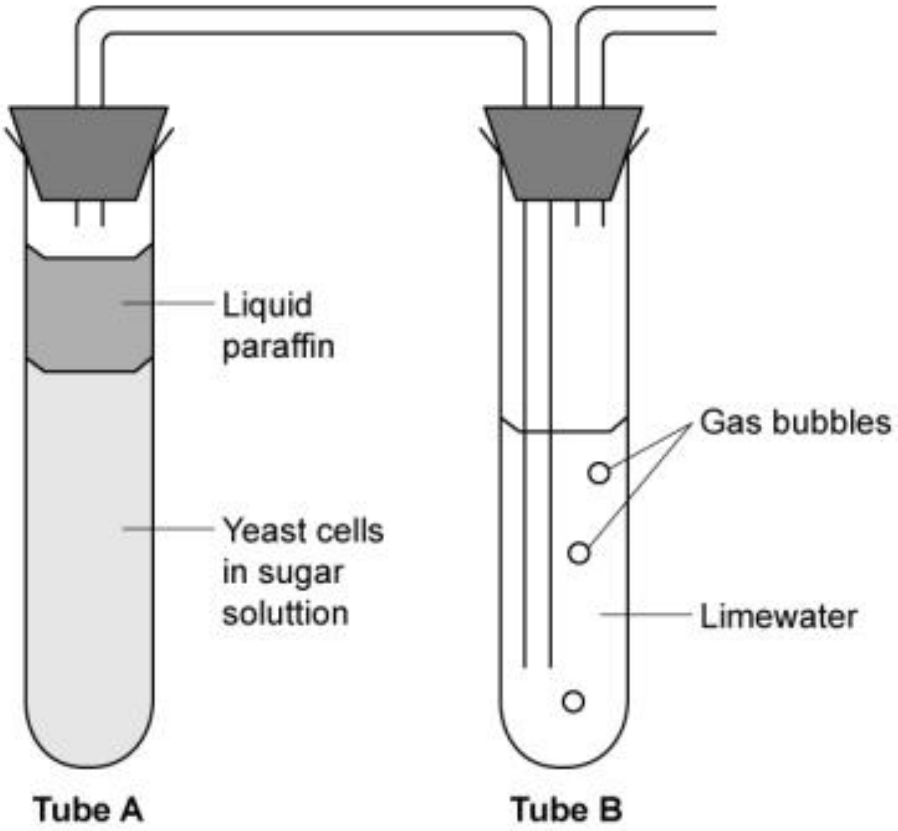
_____

(v) Name another variable the teacher should keep constant in his investigation. [1]

_____

Question 8:

(a) The diagram shows some apparatus set up to investigate respiration in yeast cells. Note that paraffin is impermeable to oxygen.



(i) State the type of respiration being investigated in this experiment.

(1)

(ii) State how you reached your answer to part (i).

(1)

.....

.....

(2 marks)

(b) Identify the gas in the bubbles produced by the yeast in part (a).

.....

(1 mark)

(c) A group of students wanted to use the apparatus in part (a) to investigate the effect of temperature on respiration in yeast.

They set up the test tubes containing the yeast and sugar solution in water baths at a range of temperatures and counted the number of bubbles produced to give a measure of the rate of respiration.

Give two factors that the students would need to control in their investigation.

.....

.....

(2 marks)

(d) Complete the table to indicate whether the statements apply to **aerobic respiration**, **anaerobic respiration** or **both**.

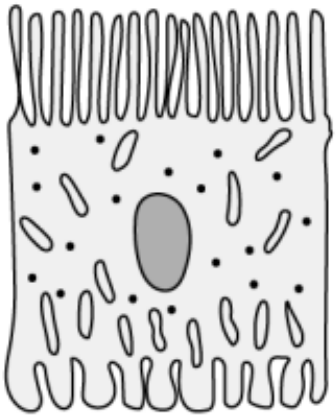
The first statement has been completed for you.

Statement	Respiration Type
Produces lactic acid as a waste product	Anaerobic respiration
Produces ethanol when it occurs in yeast	
Produces lots of ATP	
Releases energy from glucose	
Increases during intense exercise	

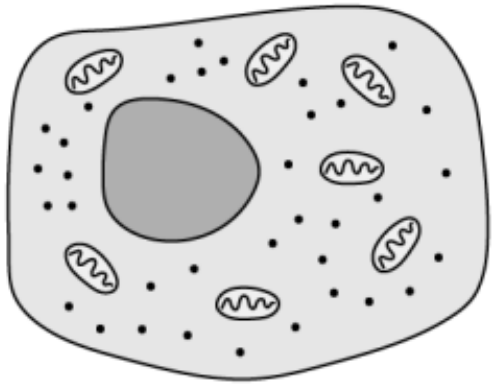
(4 marks)

Question 9:

(a) The diagram shows two cells.



X



Y

Suggest which cell (**X** or **Y**) is better adapted to carry out diffusion and give a reason for your choice.

.....

..... **(2 marks)**

b) A student carried out an experiment into osmosis in plant tissue. They set up their investigation as shown below.

Each beaker contained potato discs in a solution of sugar (sucrose) or distilled water.

The student found that the potato discs in Beaker 5 decreased in mass.

With reference to osmosis, explain why this is.

--- **(2 marks)**

c) Which of the following is a suitable control variable for the investigation carried out by the student in part **(c)**?

A	Maintain the same sugar concentration in each beaker
B	Repeat the experiment 3 times
C	Use the same size potato pieces in each beaker
D	Calculate an average of the results

(1 mark)

Question 10:

As an embryo develops, its cells differentiate.

(a) Explain the importance of cell differentiation in the development of the growing embryo.

(2)

(b) (i) Which of these is a feature of adult stem cells?

(1)

- ☒ **A** they do not divide
- ☒ **B** they divide by meiosis
- ☒ **C** they can become all cell types
- ☒ **D** they are found in some tissues and organs

(ii) Adult stem cells or embryonic stem cells can be used in medical treatments.

Explain why the choice between these two types of stem cells can cause issues for doctors.

(2)

Note:

Use **SLAAPUK** for Graph Questions **(Edexcel IGCSE)**

- **S**cale: Linear and uses at least half the axes
- **L**ine: Straight, neat, and accurate
- **A**xes: Correct way around (independent variable on x-axis)
- **A**xes labelled: Include variable names
- **P**oints: Plot them accurately
- **U**nits: Included with axis labels
- **K**ey: Add a key if needed (for multiple lines or data sets)