

Unit 1 – Assessment

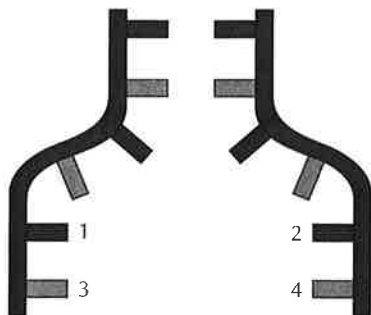
Section A

- Which two structural features are common to both plant and bacterial cells?
 - Cell wall and ribosomes
 - Cell wall and nucleus
 - Plasmid and ribosomes
 - Sap vacuole and nucleus
- Which of the following are two components of the cell membrane?
 - lipids and carbohydrates
 - Proteins and fats
 - Carbohydrates and proteins
 - Proteins and lipids
- Typical timings of the stages of mitosis are shown in the table below.

Stage	1	2	3	4
Time (minutes)	87	34	26	53

What percentage of the total time for mitosis is taken by stage 3?

- 13
 - 26
 - 37
 - 74
- The diagram below shows a section of unwound DNA.



If Number 1 represents the base G, then number 2 must represent the base

- A G
- B A
- C T
- D C

5. The DNA of a chromosome carries information that determines the structure and function of

- A base
- B fats
- C proteins
- D carbohydrates

6. The active site of an enzyme is complementary to

- A one type of product molecule
- B all types of product molecules
- C one type of substrate molecule
- D all types of substrate molecules

7. The steps involved in the process of genetic engineering are shown below:

- 1 insert required gene into vector/bacterial plasmid
- 2 extract required gene from source chromosome
- 3 grow transformed cells to produce a genetically modified organism
- 4 insert plasmid into host cell
- 5 identify section of DNA that contains required gene from source chromosome

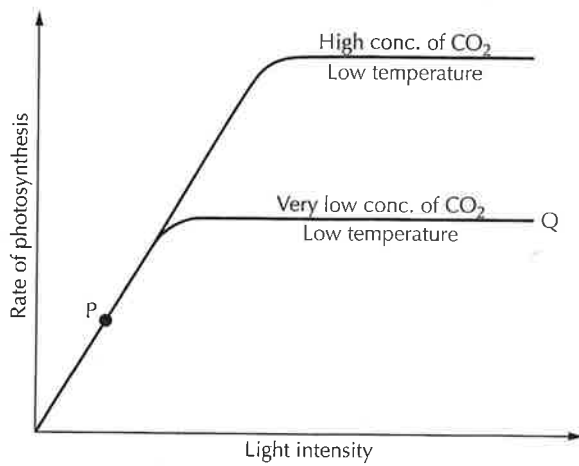
The correct order for these steps is

- A 3, 5, 2, 4, 1
- B 2, 5, 1, 4, 3
- C 5, 2, 1, 4, 3
- D 1, 4, 3, 2, 5

8. The raw materials for photosynthesis are

- A carbon dioxide and water
- B oxygen and water
- C carbon dioxide and sugar
- D oxygen and sugar

9. The graph below shows the effect of light intensity, concentration of carbon dioxide and temperature on the rate of photosynthesis.



Which factors are limiting the rate of photosynthesis at points P and Q on the graph?

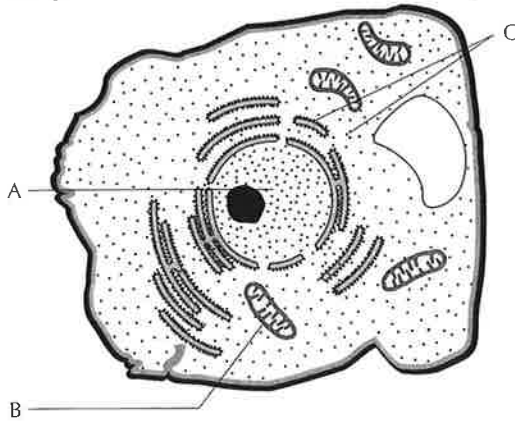
	P	Q
A	Light	Carbon dioxide
B	Light	Temperature
C	Carbon dioxide	Temperature
D	Temperature	light

10. Which line in the table identifies correctly the location and products of fermentation in plant cells?

	Location	Products
A	Mitochondria	Water + carbon dioxide + 38 ATP
B	Cytoplasm	Ethanol + carbon dioxide + 2 ATP
C	Mitochondria	Ethanol + carbon dioxide + 2 ATP
D	Cytoplasm	Water + carbon dioxide + 38 ATP

Section B

1. The diagram below shows a yeast cell.



(a) Complete the table below to give the name and function of the parts labelled A, B and C.

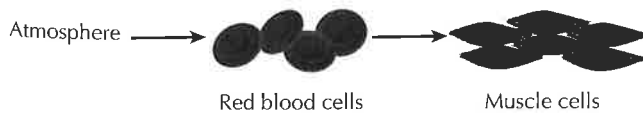
Letter	Structure	Function
A	Nucleus	
B	Mitochondrion	
C		Site of protein synthesis

2

(b) Name the structure that is present in plant cells but is absent from yeast cells.

_____ 1

2. The diagram below represents the transfer of oxygen from the atmosphere to muscle cells.



(a) From the diagram, state where the highest and the lowest concentrations of oxygen are found.

Highest concentration _____

1

Lowest concentration _____

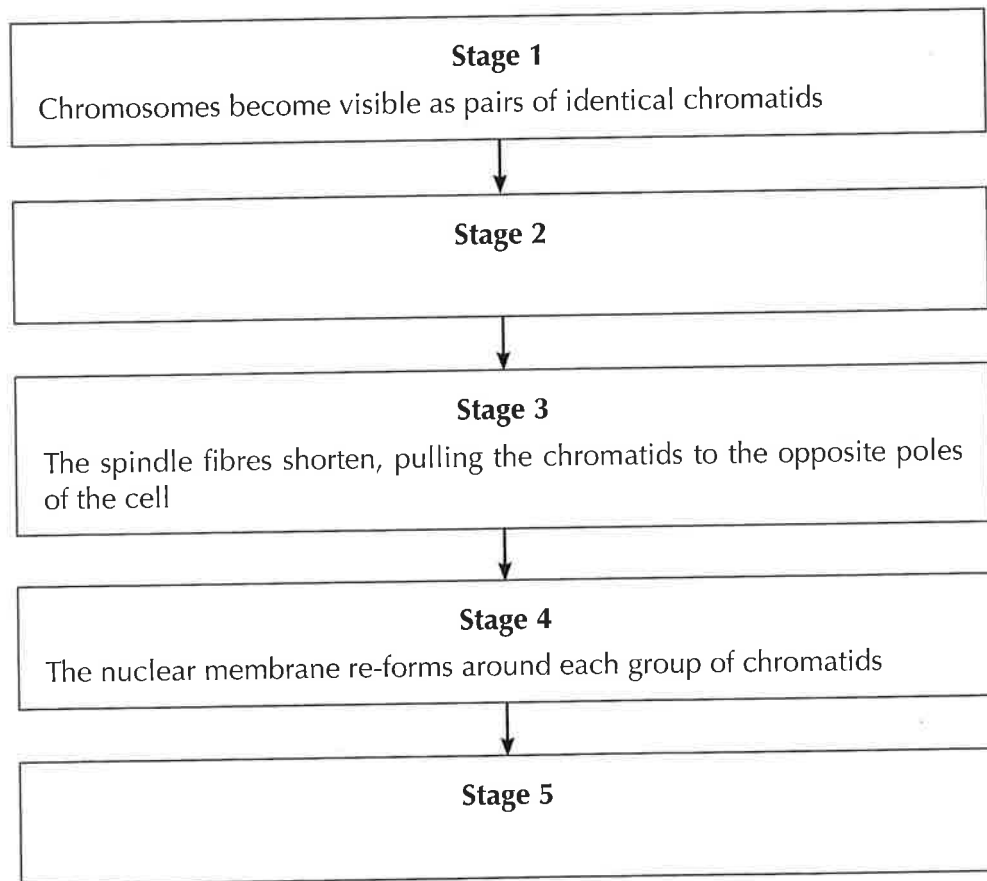
(b) Name the process by which oxygen enters cells.

1

3. Describe the osmotic effect of transferring:
Animal cells from a weak salt solution to a solution of pure water.
or
Plant cells from a weak sugar solution to a strong salt solution.

3

4. (a) The diagram below contains some of the stages of mitosis.
Describe **Stages 2** and **5** in the spaces provided.



1

1

(b) Cells can be produced in the lab by cell culture. This requires the use of aseptic techniques.

Describe two precautions that should be taken to ensure aseptic conditions.

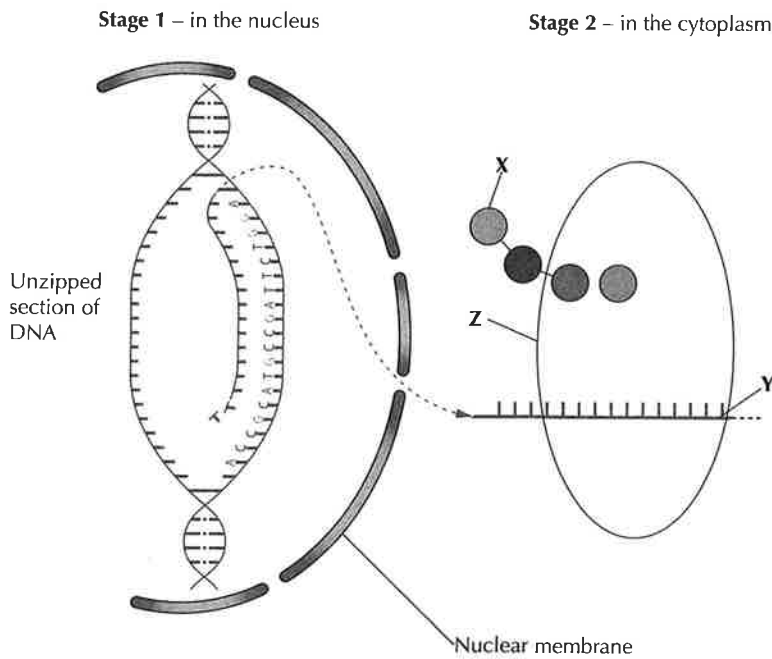
Precaution 1

1

Precaution 2

1

5. The diagram below shows how a protein chain is assembled from the DNA code.



(a) Name molecules X and Y.

X _____

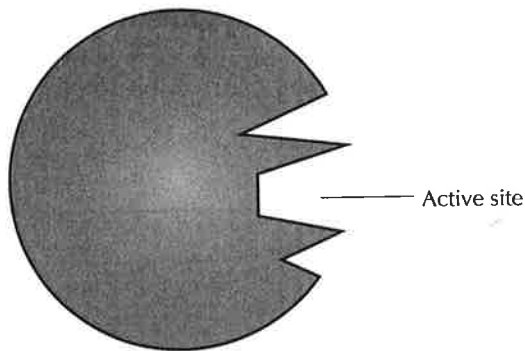
Y _____

1

(b) Name organelle Z where the protein chain is being assembled.

1

6. The diagram below represents the molecular structure of the enzyme catalase.

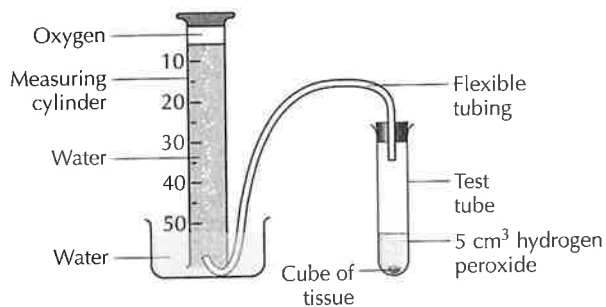


What happens to the active site when an enzyme is denatured?

1

7. Three groups of students investigated the catalase concentration of different tissues.

Each group set up a test tube containing 5 cm³ of hydrogen peroxide and a cube of tissue. The oxygen was collected over a 5 minute period and the volume was measured as shown in the diagram below.



The procedure was repeated by each group using cubes of liver, apple, carrot and plasticine.

The results from the three groups are given in the table below.

Tissue	Volume of oxygen collected in 5 minutes (cm ³)			
	Group 1	Group 2	Group 3	Average
Liver	44.5	43.5	44	44.0
Apple	1.0	1.5	0.5	1.0
Carrot	4.5	3.0	3.0	3.5
Plasticine	0	0	0	0

(a) The volume of hydrogen peroxide and time taken to collect the oxygen were kept constant in this investigation.
State two other variables that must be kept constant.

- 1 _____ 1
2 _____ 1

(b) Why was plasticine included as a control in this experiment?

_____ 1

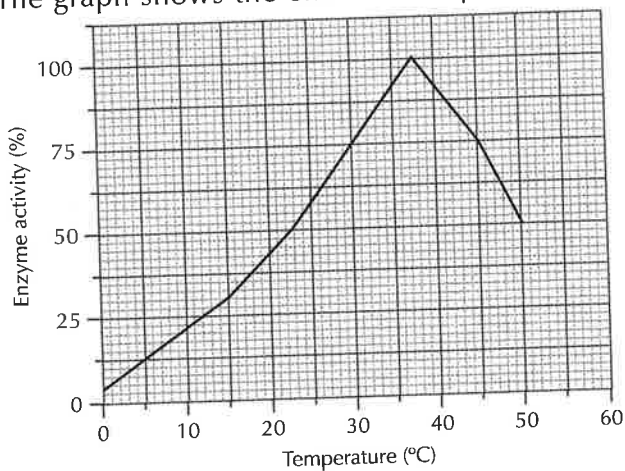
(c) What was done in this investigation to make the results reliable?

_____ 1

(d) What conclusion can be drawn from these results?

_____ 1

8. The graph shows the effect of temperature on the enzyme amylase.



(a) Between which two temperatures was there the greatest overall increase in enzyme activity?

Tick (✓) the correct box

- 0°C to 10°C
 10°C to 20°C
 20°C to 30°C
 30°C to 40°C

1

(b) From the graph, predict the temperature at which the enzyme activity will reach zero

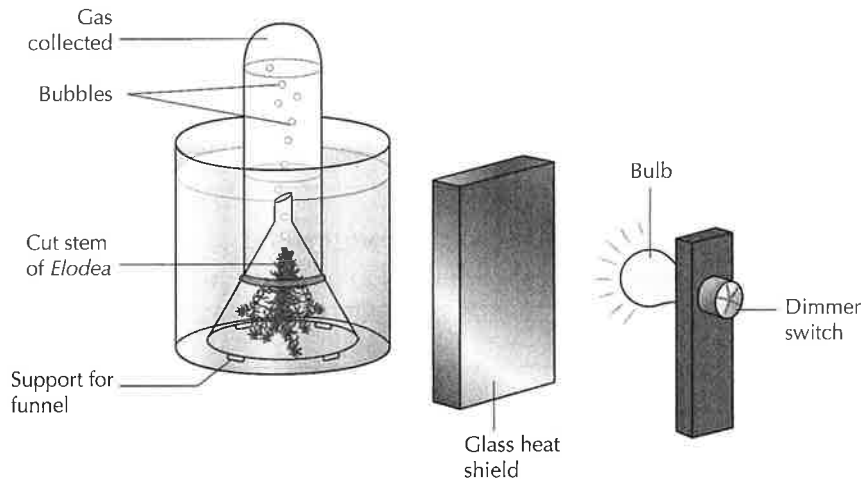
_____ °C

1

9. An experiment was set up to measure the effect of light intensity on the rate of photosynthesis in the aquatic plant, *Elodea*.

The light intensity was varied using a dimmer switch on the bulb.

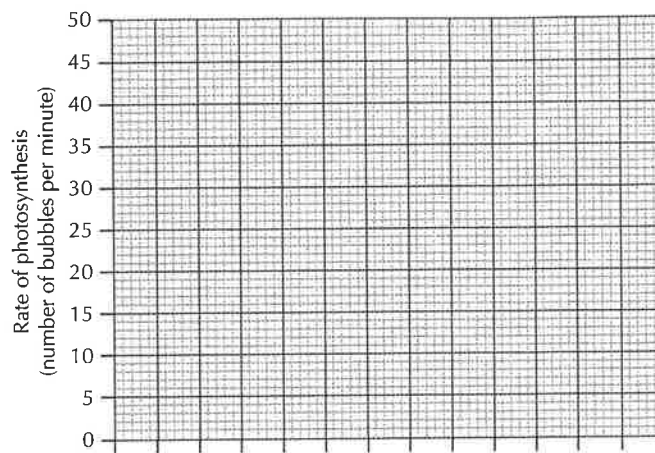
The rate of photosynthesis was measured by counting the number of bubbles released per minute.



The results of the experiment are shown in the table below.

Light intensity (units)	Rate of photosynthesis (number of bubbles per minute)
2	4
4	12
6	28
8	48
10	48
12	48

(a) On the grid below, plot a line graph to show the rate of photosynthesis against light intensity.



2

- (b) There are two stages in photosynthesis.
Hydrogen and a high-energy molecule are produced during the light reaction.

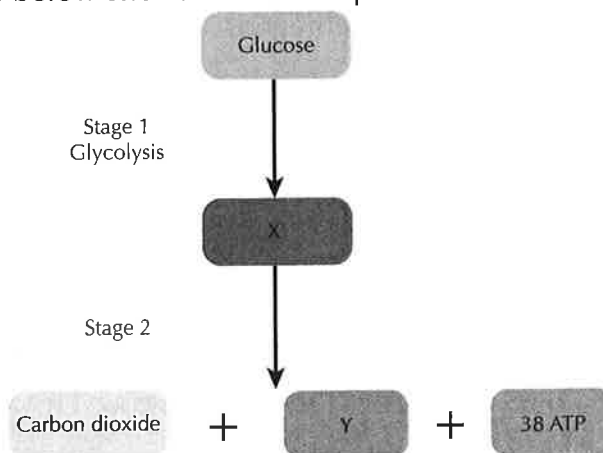
(i) Name the high-energy molecule.

1

(ii) Describe the use of hydrogen in carbon fixation.

1

10. The diagram below shows aerobic respiration in an animal cell.



- (a) Name substances X and Y.

X _____

Y _____

2

- (b) Name the part of the cell where stage 1 takes place.

1

- (c) Describe how the reaction would differ in the absence of oxygen.

1