



SAFETY BAY
SENIOR HIGH SCHOOL

excellence in education

Task 2 Cells and Metabolism Test: ANSWER BOOKLET

NAME: ANSWER KEY

FORM: _____ DATE: _____

Multiple Choice

/20

Short Answer

/40

Extended Answer

/10

Total

/70

SECTION ONE: Multiple choice answers

Cross (X) through the correct answer.

1	a	b	c	<input checked="" type="radio"/> d
2	a	b	c	<input checked="" type="radio"/> d
3	a	<input checked="" type="radio"/> b	c	d
4	<input checked="" type="radio"/> a	b	c	d
5	a	<input checked="" type="radio"/> b	c	d
6	<input checked="" type="radio"/> a	b	c	d
7	a	<input checked="" type="radio"/> b	c	d
8	<input checked="" type="radio"/> a	b	c	d
9	<input checked="" type="radio"/> a	b	c	d
10	<input checked="" type="radio"/> a	b	c	d

11	a	b	c	<input checked="" type="radio"/> d
12	a	b	c	<input checked="" type="radio"/> d
13	<input checked="" type="radio"/> a	b	c	d
14	a	<input checked="" type="radio"/> b	c	d
15	a	b	c	<input checked="" type="radio"/> d
16	a	<input checked="" type="radio"/> b	c	d
17	<input checked="" type="radio"/> a	b	c	d
18	a	<input checked="" type="radio"/> b	c	d
19	a	b	<input checked="" type="radio"/> c	d
20	<input checked="" type="radio"/> a	b	c	d

SECTION TWO – SHORT ANSWER

Six questions worth 40 marks

Complete all answers in wither blue or black pen.

Question 21

Define and List a function for each of the following:

(8 marks)

a) Osmosis

Diffusion of water through a semi-permeable membrane from an area of high water conc to an area of low conc.

Function - movement of water into + out of cell.

b) Cell membrane

A membrane that forms the external boundary of a cell.

Function - separates cell contents from external environment, controls movement of molecules.

c) Active transport

Use of energy to move substances, usually ions, across a cell membrane from low to high conc.

Function - move substances into cell against conc gradient.

d) Facilitated diffusion

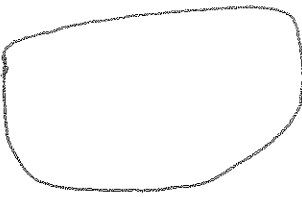
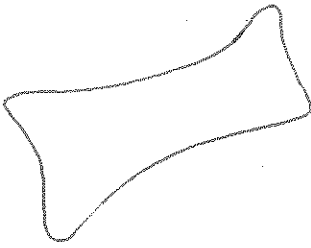

A type of passive transport that allows substances across membranes using transport proteins.

Function - allows movement of larger molecules into cells with the conc gradient.

Question 22

A student observed changes in an onion cell that was placed in salt water. Draw what he would have seen in the boxes below:

a)

		
Normal Cell	Cell after 10 minutes	Cell after 30 minutes

(3 marks)

b) What is the name for this process? Osmosis

(2 marks)

c) Explain your drawings and why the cell changes?

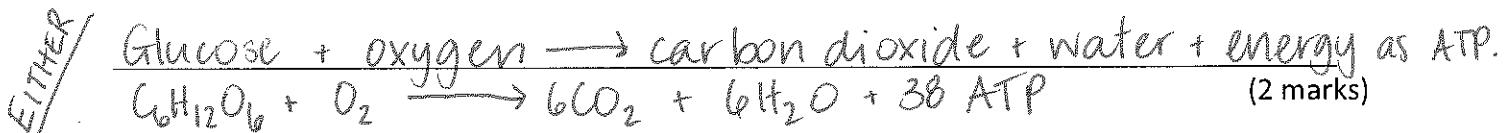
cell shrinks as water is leaving the cell due to Osmosis / osmotic pressure.

The water is moving from an area of high conc to an area of low conc along a conc gradient.

(4 marks)

Question 23

a) Write the equation that summarises cellular respiration



(2 marks)

b) Why is it necessary for cells to respire?

To release the energy for all of the cell's activities such as movement, production + secretion of new substances

(2 marks)

Question 24

ATP is involved in cellular metabolic processes as energy

a) Define what ATP consists of

Adenosine & a chain of three phosphate groups

(2 marks)

b) List three reasons why cells require energy

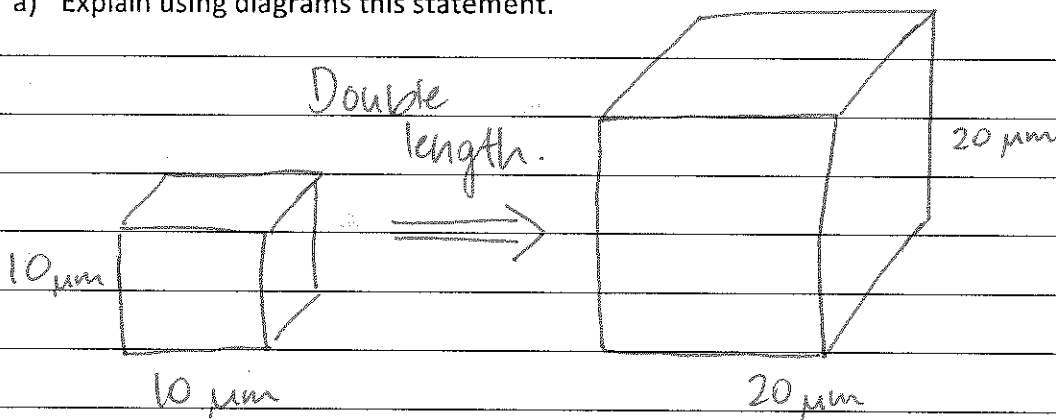
1. Cell division / Growth
2. Protein synthesis
3. Cell transport

(3 marks)

Question 25

The surface area to volume ratio decreases, as a cell gets larger.

a) Explain using diagrams this statement.



When the diameter of a cell is doubled, its volume is eight times greater but its surface area is only four times greater.

(4 marks)

b) Give an example of a human cell that is larger than regular body cells and how its structure allows this.

Muscle / Nerve cell

- they are long & thin which reduces surface area to volume ratio.

(2 marks)

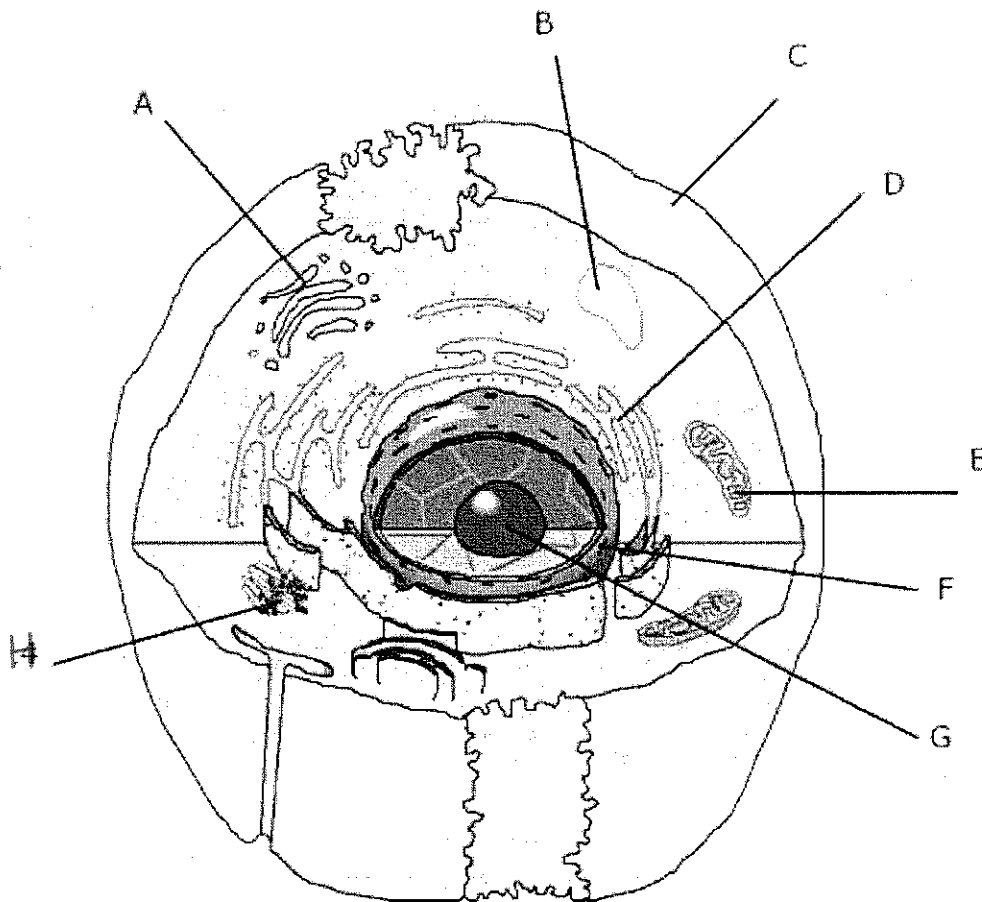
Question 26

Use the diagram of a typical cell to answer the following

a) Label the parts numbered 1 to 8.

(4 Marks)

- | | |
|---------------------------------|---------------------------------|
| A. <u>Golgi body/apparatus.</u> | B. <u>Vacuole</u> |
| C. <u>Cell membrane</u> | D. <u>Endoplasmic reticulum</u> |
| E. <u>Mitochondria</u> | F. <u>Nucleus</u> |
| G. <u>Nucleolus</u> | H. <u>Ribosome</u> |



b) State the functions of the following cellular organelles.

- A Secretes proteins & lipids into cell, forms lysosomes
- D Provides a surface on which chemical reactions can occur
- E Site of cellular respiration & ATP production
- F Contains genetic material that controls cell activities

(4 marks)

SECTION THREE – EXTENDED ANSWER

One question worth 10 marks

Answer question using blue or black pen and pencil for the diagrams.

Question 27

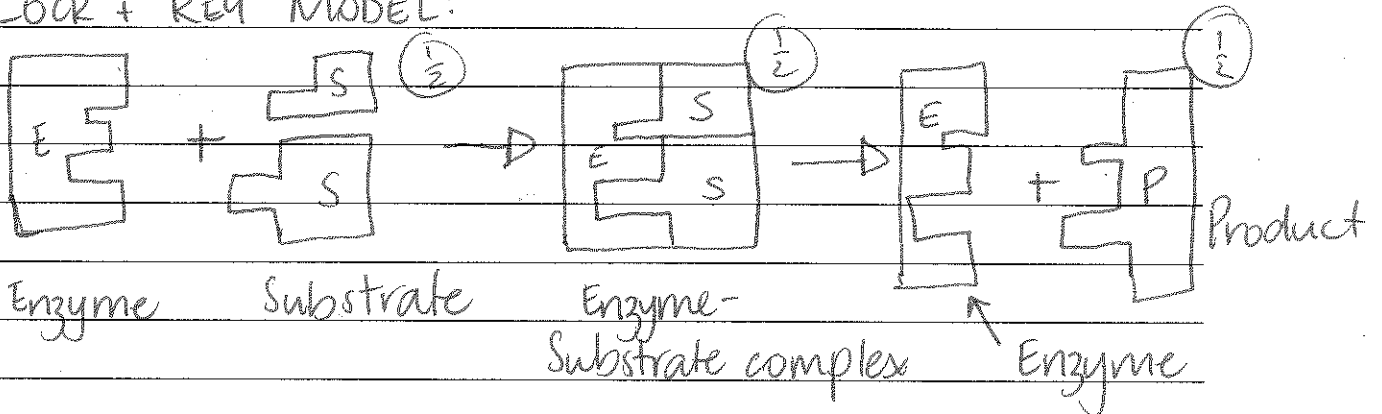
- a) With the aid of a diagram explain how an enzyme works in an anabolic reaction

(6 marks)

- b) Enzymes operate efficiently in optimum conditions. Explain what this statement means using the appropriate terminology. (4 marks)

a) Anabolic reaction - small molecules are made up into large molecules (1/2)

LOCK + KEY MODEL:



Enzymes act upon a substrate (1)

They reduce the amount of activation energy required (1)

The substrate fits a specific enzyme at its active site. (1)

In anabolism, two substrate molecules enter the active site to become a larger product molecule.

Factors affecting enzyme activity

b)

A number of factors influence the activity of enzymes and the rates of chemical reactions in which they are involved.

- The higher the concentration of enzyme, the faster the rate of a chemical reaction. By regulating the type and amount of enzymes present, the body is able to control which reactions occur and the rate at which they proceed.
- Temperature influences enzyme activity. The rate of most chemical reactions increases as temperature increases. This is true of most enzyme reactions but only within a limited temperature range. Because they are proteins, the structure of enzymes changes beyond about 45–50°C and the enzyme is inactivated. The temperature at which an enzyme works best is called the *optimum temperature*. For most enzymes in the human body this is between 30°C and 40°C.
- Enzymes are very sensitive to the pH of the medium in which a reaction is taking place. Each enzyme has an optimum pH at which it will work most effectively.
- Many enzymes require the presence of certain ions or non-protein molecules before they will catalyse a reaction. Such substances are called **co-factors**. Co-factors change the shape of the active site so that the enzyme can combine with the substrate. Without a co-factor the enzyme molecule is intact but cannot function. Some co-factors are non-protein organic molecules. They are then called **co-enzymes**. Many vitamins function as co-enzymes.

1/2 - Conditions

1/2 - Explanation.