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**Cellular Functions and Metabolism test.**

**This paper consists of: 20 Multiple choice questions (20 marks)**

**7 Short Answer questions (40 marks)**

**and 1 Extended Answer (10 marks)**

**Please answer the questions in the answer booklet provided using blue or black pen.**

**Do not write on this booklet.**

**SECTION ONE – MULTIPLE CHOICE** (20 marks)

This section has 20 questions. Answer **all** questions on the separate Multiple-choice Answer Sheet provided.

**Question 1**

The basic structural units of life are:

1. tissues
2. organs
3. systems
4. cells

**Question 2**

DNA can be found in which of the following organelles:

1. Nucleus and ribosomes
2. Nucleus and mitochondria
3. Nucleus and golgi body
4. Mitochondria and ribosomes

**Question 3**

Mammalian sperm cells expand a large amount of energy in moving through the female reproductive tract. On the basis of this information you would predict that these cells would contain a large number of:

1. vacuoles
2. mitochondria
3. ribosomes
4. chloroplasts

**Question 4**

The organelles of the cell are concerned in essential processes, one of which is the synthesis of protein. This particular organelle is the:

1. ribosome
2. golgi body
3. nucleolus
4. endoplasmic reticulum.

**Question 5**

All the cells obtain energy for their general metabolic activity by the breakdown of glucose. This basic process is known as cellular:

1. metabolism
2. reproduction
3. respiration
4. transport

**Question 6**

Active transport occurs when the substances move across membranes:

1. from lower to higher concentration
2. from higher to lower concentrations
3. by osmosis
4. by simple diffusion

**Question 7**

The nuclear membrane is

1. composed of a bilayer of proteins
2. composed of a bilayer of phospholipids
3. a complex combination of carbohydrates and proteins
4. a complex combination of carbohydrates and lipids

**Question 8**

If a mixture of proteins and glucose were placed in a cellulose bag and immersed in water, the glucose will diffuse but the protein will not. This is because the bag is:

1. a living membrane
2. selectively or differentially permeable
3. not carrying out osmosis
4. impermeable to all except large molecules.

**Question 9**

Metabolism can be described as:

1. the sum of all chemical reactions in the body
2. anabolic reactions that produce energy
3. anaerobic and aerobic respiration
4. catabolic reactions that release energy

**Question 10**

There are more mitochondria in muscle cells than in any other type of cell. This suggests that muscle cells:

1. are larger than other cells
2. lack enzymes
3. use more A.T.P
4. have long fibres.

**Question 11**

The energy needed to get a chemical reaction started is called:

1. enzyme Inhibition
2. start Codon
3. activation Energy
4. aerobic Respiration

**Question 12**

**Water**

**Glucose**

Water particles will pass through the membrane:

1. from left to right
2. in neither direction
3. in both directions
4. from right to left

**Question 13**

Enzymes are:

1. Organic catalysts
2. Consumed in chemical reactions
3. Needed for all chemical reactions
4. Organic reactants

**Question 14**

Enzyme Activity

1 2 3 4 5 6 7

pH

The above enzyme is active in the stomach. What is the optimum pH (acidity) for this enzyme?

1. pH7
2. pH4
3. pH1
4. pH5

**Question 15**

A protein is made up of:

1. carbohydrates
2. lipids
3. vitamins
4. amino acids

**Question 16**

The maximum size of animal cells is:

1. Unlimited – cells can be any size
2. Limited by the surface area-to-volume ratio
3. Limited only by the number of organelles it contains
4. Limited by the presence of a cell wall.

**Question 17**

In the system illustrated here a bag that is differentially permeable to iodine is filled with corn starch and immersed into a beaker of water.

**Corn starch in differentially permeable bag**

**Water and iodine mixture**

Shortly after the bag is immersed in water

1. the iodine will move into the bag
2. the corn starch will move into the water
3. the water will move into the bag
4. both water and iodine will move into the bag

**Question 18**

Phagocytosis is a cellular process that involves:

1. Lipids being transported in vesicles through a cell membrane
2. Solids being transported in vesicles through a cell membrane
3. Molecules being transported through a cell membrane with no energy requirements
4. The movement of molecules from an area of high concentration to an area of low concentration.

**Question 19**

The specificity of an enzyme refers to its:

1. capacity to speed up a chemical reaction
2. potential to be recycled
3. sensitivity to temperature and pH
4. restriction in binding with only one substrate

**Question 20**

Thousands of proteins are found in living cells. Their main role in cells is to:

1. provide energy
2. provide structure and catalyse chemical reactions
3. assist other chemicals to break down
4. provide the physical structural components of membranes

**END OF SECTION ONE**

**SECTION TWO – SHORT ANSWER (40 Marks)**

Seven questions worth 40 marks

Complete all answers in either blue or black pen.

**Question 21**

Explain why a cell requires each of the following: (4 marks)

1. proteins

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1. lipids

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1. carbohydrates

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1. oxygen

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**Question 22**

In relation to human biology, what is the meaning of each term below?

a) Surface area (2 marks)

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b) Concentration gradient (2 marks)

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**Question 23**

1. Explain how substances move across a cell membrane through the following processes:

i) osmosis (2 marks)

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ii) facilitated diffusion (2 marks)

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iii) active transport (2 marks)

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b) Explain the difference between pinocytosis and phagocytosis (2 marks)

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**Question 24**

1. Write the equation that summarises cellular respiration

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**(**2 marks)

b) Explain the role of ATP and ADP in cellular respiration. You may use a diagram to help.

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(4 Marks)

c) Write the word equation for aerobic respiration

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(2 Marks)

d) List three differences between aerobic respiration and anaerobic respiration:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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(3 marks)

1. How does your body remove lactic acid produced from anaerobic respiration?

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**Question 25**

The surface area to volume ration decreases, as a cell gets larger. Explain using diagrams this statement.

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(4 Marks)

**Question 26**

With the aid of a diagram, explain why an enzyme and a substrate are represented as a ‘lock and key’ model.

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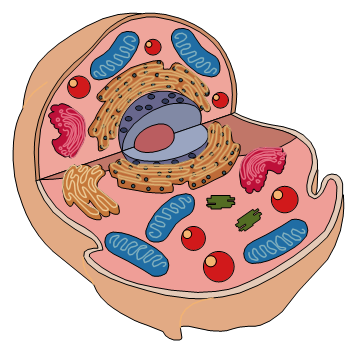
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(3 Marks)

**Question 27**

Label the diagram of an animal cell below

A



B

E

F

C

D

G

H

**A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ E \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**B \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ F \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ G \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**D \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ H \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (4 Marks)

**SECTION THREE – EXTENDED ANSWER**

One question worth 10 marks

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

**Question 28**

List and explain five factors that affect enzyme function (10 marks)

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