**YEAR 11 HUMAN BIOLOGY ATAR**

**TEST 1: SCIENTIFIC METHOD &CELLS**



**SECTION A: MULTIPLE CHOICE: 25 marks**

**SECTION B: SHORT ANSWER QUESTIONS: 35 marks**

**TOTAL: 60 MARKS**

***WRITE ALL ANSWERS IN THE SPACES PROVIDED IN THE ANSWER BOOKLET***

**SECTION A: MULTIPLE CHOICE: (25 MARKS):**

1. The basic structural units of life are:
   1. tissues
   2. organs
   3. systems
   4. cells
2. The mitochondria:
   1. Give rise to the endoplasmic reticulum
   2. Are usually double-layered organisms with finger like extensions
   3. Are centre of RNA synthesis
   4. Are centres of cellular respiration
3. Mammalian sperm cells expend 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
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. lysosome
   4. endoplasmic reticulum
5. All cells obtain energy for their general metabolic activity by the oxidation of glucose. This basic process is known as cellular.
   1. reproduction
   2. respiration
   3. photosynthesis
   4. metabolism
6. Enzymes are:
   1. organic catalysts
   2. consumed in chemical reactions
   3. needed for all chemical reactions
   4. organic reactants
7. A student wanted to investigate the relationship between cell size and the rate at which substances enter cells. For his investigation he cut potato into cubes of 3 sizes: cube 1 was 5mm3, cube 2 was 10mm3 and cube 3 was 20 mm3. The cubes were covered in iodine for 5 minutes, after which they were removed and cut in half. Which cube had the smallest surface area to volume ratio?
   1. Cube 1
   2. Cube 2
   3. Cube 3
   4. None, as iodine is too large to enter the cell
8. A placebo is
   1. Another name for dependent variable
   2. An inactive substance that looks like the real medication
   3. The substance being tested in an experiment
   4. One of the controlled variables.
9. How are ADP and ATP related?
   1. They are identical except ADP has more energy.
   2. ADP has one more phosphate group and less stored energy than ATP.
   3. They are opposite processes.
   4. ATP has one more phosphate group and more stored energy than ADP.

The next two questions refer to the following graph

Enzyme Activity

1 2 3 4 5 6 7 8 9

pH

1. The above enzyme is active in the stomach. What is the optimum(best) pH for this enzyme?
   1. pH 7
   2. pH 4
   3. pH 9
   4. pH 5
2. This enzyme catalyses the reaction protein (large molecule) 🡪 peptide (smaller molecule). This reaction is an example of:
   1. anabolism
   2. catabolism
   3. synthesis
   4. exocytosis
3. An athlete's muscles become tired after vigorous physical activity. Which of the following chemicals is increasing in quantity in the muscles?
   1. glucose
   2. ATP
   3. lactic acid
   4. protein

# Immediately following a long period of inactivity, human muscle is likely to contain

* 1. more ATP and more ADP than when active
  2. more ATP and less ADP than when active
  3. less ATP and more ADP than when active
  4. less ATP and less ADP than when active

1. A series of interconnecting canals transporting fluids has been observed in the cell. These canals are called
   1. mitochondrion
   2. lysosomes
   3. cytoplasm
   4. endoplasmic reticulum

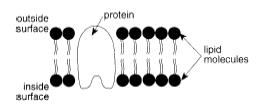
# Which one of the following statements about respiration is FALSE?

* 1. respiration produces ADP
  2. respiration uses glucose
  3. respiration releases CO2
  4. respiration involves energy transfer

1. A scientific experiment must have both an independent variable and a dependent variable. The dependent variable is the variable that
   1. serves as a basis for comparison.
   2. changes as a result of a change in the independent variable.
   3. is being tested.
   4. ensures the accuracy of the experiment.

The next two questions refer to the diagram below.

Structure A



Structure B

1. Which of the following statements is correct?
   1. Structure A is phospholipid and structure B is protein.
   2. Structure A is protein and structure B is phospholipid.
   3. Structure A is phospholipid and structure B is carbohydrate.
   4. Structure A is carbohydrate and structure B is protein.
2. Which of the following statements is correct?
   1. Structure A would be involved in the process of osmosis.
   2. Structure B would be involved in the process of facilitated diffusion.
   3. Structure A would be involved in the process of active transport.
   4. Structure B would be involved in the process of active transport.
3. Which of the following statements about aerobic and anaerobic respiration is correct?
   1. Anaerobic respiration produces more energy than aerobic respiration.
   2. Anaerobic respiration uses more oxygen than aerobic respiration.
   3. Aerobic respiration uses more oxygen than anaerobic respiration.
   4. Both processes occur in the mitochondria and compete for fuel substances with each other.
4. Refer to the following diagram of compartments containing solutions separated by a semi-permeable membrane.

# B

# A

starch molecules

semi-permeable membrane

glucose molecules

If the membrane is permeable to glucose, but not to starch, the most likely net movements in the above system would be

* 1. glucose from A to B and no net water movement
  2. glucose from A to B and water from B to A
  3. glucose from B to A and water from A to B
  4. glucose from A to B and water from A to B

1. In Kreb’s cycle
2. energy is stored in the form of ATP
3. energy is stored in the form of ADP
4. energy is liberated from of ATP
5. energy is liberated from of ADP
6. The rough ER is so named because it has an abundance of \_\_\_\_\_\_\_\_ on it
   1. mitochondria
   2. lysosomes
   3. ribosomes
   4. Golgi body
7. The Golgi body is involved in
   1. transporting proteins to be released from the cell
   2. packaging proteins into vesicles
   3. altering or modifying proteins
   4. all of the above
8. The cell membrane contains channels and pumps that help move materials from one side to the other. What are these channels and pumps made of?

|  |  |
| --- | --- |
|  | a. carbohydrates |
|  | b. lipids |
|  | c. bilipids |
|  | d. proteins |

2. Proteins are made up of
   1. Amino acids
   2. Nucleotides
   3. Monosaccharides
   4. Fatty acids

***END OF SECTION A***

**YEAR 11 HUMAN BIOLOGY ATAR**

**TEST 1: SCIENTIFIC METHOD &CELLS**

**ANSWER BOOKLET**

**/55 %**

**NAME:**

**SECTION A: MULTIPLE CHOICE: (25 MARKS):**

*Place an* **×** *through the correct response:*

1. [A] [B] [C] [D] 14. [A] [B] [C] [D]

2. [A] [B] [C] [D] 15. [A] [B] [C] [D]

3. [A] [B] [C] [D] 16. [A] [B] [C] [D]

4. [A] [B] [C] [D] 17. [A] [B] [C] [D]

5. [A] [B] [C] [D] 18. [A] [B] [C] [D]

6. [A] [B] [C] [D] 19. [A] [B] [C] [D]

7. [A] [B] [C] [D] 20. [A] [B] [C] [D]

8. [A] [B] [C] [D] 21. [A] [B] [C] [D]

9. [A] [B] [C] [D] 22. [A] [B] [C] [D]

10. [A] [B] [C] [D] 23. [A] [B] [C] [D]

11. [A] [B] [C] [D] 24. [A] [B] [C] [D]

12. [A] [B] [C] [D] 25. [A] [B] [C] [D]

13. [A] [B] [C] [D]

**SECTION B: SHORT ANSWERS (30 MARKS):**

1. The surface area to volume ratio decreases as an organism gets bigger. **Explain** this statement. Use diagrams to illustrate your answer.

(4 marks)

1. Red blood Cells (RBCs) are very sensitive to a change in the salt concentration of the surrounding solution. If transferred from plasma to a solution of low salt concentration, they swell and may even burst (**haemolysis**).  
   A haematologist carried out an experiment to find the percent of human RBCs haemolysed at different salt concentrations. The following results were obtained:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Salt Concentration**  **(g/100mL)** | 0.33 | 0.36 | 0.38 | 0.39 | 0.42 | 0.44 | 0.48 |
| **% RBC**  **Haemolysed** | 100 | 90 | 80 | 68 | 30 | 16 | 0 |

* 1. Draw a line graph on the graph grid on the next page, to show this data. (5 marks)
  2. What is the independent variable?

(1 mark)

* 1. What is the dependent variable?

(1 mark)

* 1. Explain why the cells burst.

(1 marks)

* 1. At what salt concentration are all the cells haemolysed?

(1 mark)

* 1. What do you think will happen if the salt concentration is increased to 0.6g/100mL?

(1mark)

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* 1. Write the overall equation for cellular respiration.

(1 mark)

* 1. What does ATP stand for?

(1 mark)

* 1. List two reasons why cells require energy.  
         
       
         
     + 1. marks)
  2. Where in the cell does aerobic respiration take place?

(1 mark)

* 1. Where in the cell does anaerobic respiration take place?

(1 mark)

1. With the aid of a diagram, explain how enzymes work.

(4 marks)

1. Substances are able to pass across the cell membrane in different ways. With reference to the cell membrane, explain the following terms:
   1. Diffusion
   2. Osmosis
   3. Facilitated Diffusion
   4. Active Transport

(4 marks)

1. Write the correct term for each of the following:

* 1. The spreading out of particles so that they are evenly distributed over the space available.
  2. All the minute structures found in the cytoplasm of a cell.

(2 marks)

***END OF TEST***