**YEAR 11 ATAR HUMAN BIOLOGY UNIT 1 2018 - ASSESSMENT TASK 2**

**TEST 1: SCIENTIFIC METHOD, CELLS & METABOLISM - MARKING KEY**

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1. D** | **6. A** | **11. B** | **16. B** | **21. A** |
| **2. D** | **7. C** | **12. C** | **17. B** | **22. C** |
| **3. B** | **8. B** | **13. B** | **18. C** | **23. D** |
| **4. A** | **9. D** | **14. D** | **19. C** | **24. D** |
| **5 B** | **10. B** | **15. A** | **20. B** | **25. A** |

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

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

* *The larger the cell, the smaller the SA to V ratio because volume increases at a greater rate than SA (1 mark)*
* *Therefore as an organism increases in volume or size the ratio between volume and SA decreases (1 mark)*
* *2 marks for diagram comparing SA and V ratios of 2 cubes or relevant shapes (2 marks)*

**27. 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 percentage of human RBCs haemolysed at different salt concentrations. The following results were obtained:**

a. Draw a line graph on the graph grid on the next page, to show this data.

* *Title – must state IV and DV (1 mark)*
* *Y axis title (1/2 mark)*
* *Y axis increments correct (1/2 mark)*
* *X axis title (1/2 mark)*
* *X axis increments correct (1/2 mark)*
* *Accuracy of plotted points (1 mark)*
* *Line of best fit (1 mark)*

b. What is the independent variable?

* *Salt concentration (1 mark)*

c. What is the dependent variable?

* *% of red blood cells haemolysed (1 mark)*

d. Explain why the cells burst.

* *Cells burst because there is a lower salt concentration outside the cell compared to inside the cell, therefore greater osmotic pressure inside the cell and water will diffuse into cell* and eventually it bursts. (*1 mark) As it is only 1 mark only – they don’t need all detail – use your discretion.*

e. At what salt concentration are all the cells haemolysed?

* *0.33g/100mL (1 mark)*

f. At what salt concentration is there 50% haemolysis?

* *0.4-0.41g/100mL (1 mark)*

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

* *Water would move outside of the red blood cell through osmosis, causing the cell to shrivel up (1mark)*

**28.**

a. Write the overall equation for cellular respiration.  
*glucose + oxygen -> carbon dioxide + water + energy (1 mark)*

b. What does ATP stand for?

* *Adenosine triphosphate(1 mark)*

c. List two reasons why cells require energy.

* *Any 2 of: active transport, movement, synthesis, growth, division, nerve impulses, heat, anabolism (2 marks)*

d. Where in the cell does aerobic respiration take place?

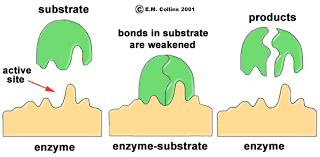
* *Mitochondria (1 mark)*

e. Where in the cell does anaerobic respiration take place?

* *Cytoplasm (1 mark)*

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

* *Enzymes act as biological catalysts which lower the activation energy of metabolic reactions (1 mark)*
* *The substrate that is specific to the enzyme locks onto the active site of the enzyme forming the enzyme-substrate complex and the reaction takes place (1 mark)*
* *Products are released and the enzyme molecule is recycled (1 mark)*
* *Diagram should reflect the picture below (1 mark)*

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**30. Substances are able to pass across the cell membrane in different ways. With reference to the cell membrane, explain the following terms:**

a. Diffusion:

* *The movement of particles across a semi-permeable membrane from an area of high concentration to an area of low concentration or down the particle’s concentration gradient (1 mark)*

b. Osmosis:

* *The movement of water across a semi-permeable membrane from an area of high concentration to an area of low concentration or down the water’s concentration gradient (1 mark)*

*c.* Facilitated Diffusion

* *The process whereby carrier proteins assist in the movement of substances across a semi-permeable cell membrane from an area of high concentration to an area of low concentration or down the substance’s concentration gradient (1 mark)*

d. Active Transport:

* *A process that uses energy to move substances across a semi-permeable cell membrane from an area of low concentration to an area of high concentration or against the substance’s concentration gradient (1 mark)*

**31. Write the correct term for each of the following:**

a. The type of muscle found in the urinary bladder and the digestive tract – *smooth muscle (1 mark)*

b. The spreading out of particles so that they are evenly distributed over the space available – *diffusion (1 mark)*  
c. The type of connective tissue which has a fluid matrix – *blood (1 mark)*

d. The type of muscle tissue, which is striated with branching cells – *cardiac muscle (1 mark)*

e*.* All the minute structures found in the cytoplasm of a cell – *organelles (1 mark)*