

***Human Biology ATAR – Task 2:* End of term test**

***Content covered weeks 1-9 (5%)***

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| --- | --- | --- | --- |
| Name: MARKING KEY | | | |
| Time allowed: 55 Minutes + 5 minutes reading time | | | |
| **Section** | Your Mark | Marks available | Percentage of Investigation |
| **Multiple Choice (A)** |  | 15 | 25% |
| **Short Answer (B)** |  | 35 | 58% |
| **Extended Response (C)** |  | 10 | 17% |
|  |  | **60** | **100%** |

**Declaration of Authenticity**

I (Student Name) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ declare that this work is my own and I have not plagiarised from any source.

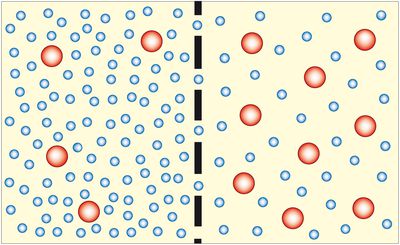
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***Section A – Multiple Choice (15 marks)***

*Answer all questions by clearly circling the letter ONLY. Use only a BLUE or BLACK pen. If you make a mistake, place a CROSS through the letter; do not erase or use correction fluid, and circle your new answer. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question*

1. The mitochondria:
   1. give rise to the endoplasmic reticulum
   2. are usually doubled-layered organisms with finger like extensions
   3. are the centre of RNA synthesis
   4. are the centres of cellular respiration
2. Lysosomes are thought to be concerned with:
   1. digestion of cell material
   2. production of energy
   3. passing in of genes
   4. secretion of materials
3. Cell membranes are generally composed of:
   1. A double layer of phospholipids and cholesterol with proteins dispersed throughout the membrane
   2. A double layer of phosphoproteins with glucose dispersed throughout the membrane
   3. A double layer of nucleic acids
   4. A double layer of proteins with phospholipids dispersed throughout the membrane
4. The type of tissue that is responsible for covering the outside of organs such as the kidney and liver, and lining the inside of organs such as the stomach and intestines is the:
5. Connective Tissue
6. Epithelial Tissue
7. Muscular Tissue
8. Nervous Tissue
9. Anabolism can be defined as:
10. reactions in which small molecules are built up to form large molecules and release energy
11. reactions in which small molecules are built up to form large molecules and require energy
12. reactions in which large molecules are broken down to smaller molecules and release energy
13. reactions in which large molecules are broken down to smaller molecules and require energy

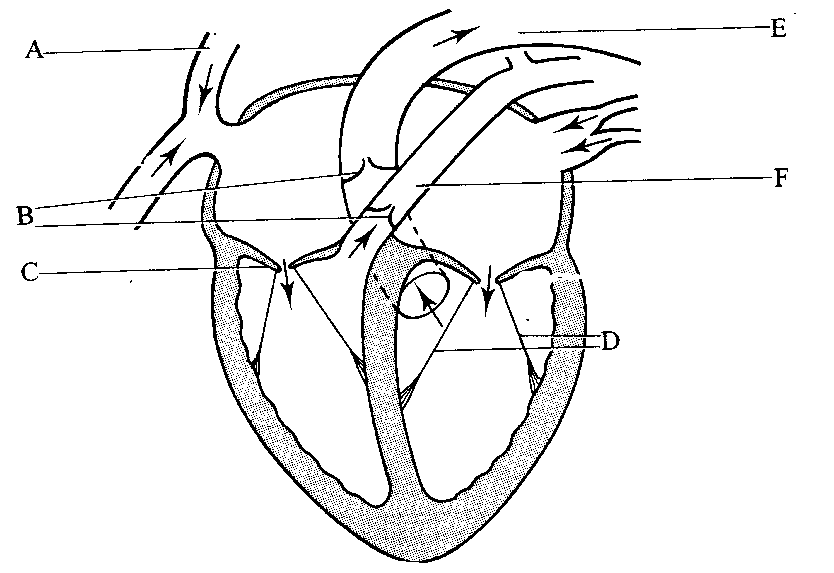
Question 6 refers to the below diagram representing osmosis



Large solute

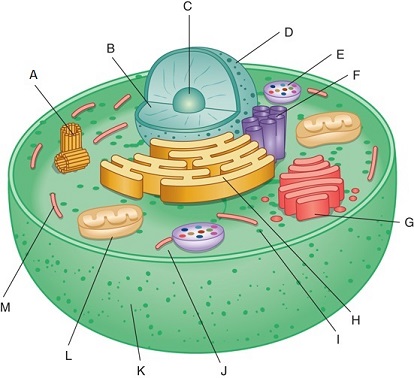
 Water molecule

1. Which of the following situations would occur?
2. Overall the solute would travel through the membrane from right to left
3. Overall the water would travel through the membrane from left to right
4. The water will travel in both directions across the membrane equally
5. Overall the solute will travel through the membrane from right to left and the water from right to left
6. How are ADP and ATP related?
7. they are identical except ADP has more energy
8. ADP has one more phosphate group and less stored energy that ATP
9. they are opposite processes
10. ATP has one more phosphate group and more stored energy than ADP
11. In facilitated diffusion
    1. transport is quicker than normal diffusion
    2. transport is selective
    3. transport of one substance is stopped by another
    4. all of the above
12. A protein is made up of:
    1. simple sugars
    2. fatty acid
    3. glycerol
    4. amino acids
13. Erythrocytes mainly carry:
    1. oxygen
    2. carbon dioxide
    3. oxygen and carbon dioxide
    4. oxygen and nitrogen
14. Referring to the blood vessels in the mammalian body, which statement is always true?
15. arteries carry deoxygenated blood, veins carry oxygenated blood
16. arteries carry oxygenated blood, veins carry deoxygenated blood
17. arteries carry blood towards the heart, veins carry blood away from the heart
18. arteries carry blood away from the heart, veins carry blood towards the heart



1. The part of the heart labelled A is the
   1. aorta
   2. superior vena cave
   3. semi lunar valve
   4. left atrium
2. What is the function of the structure labelled F?
   1. to carry blood from the body into the right atrium
   2. to carry blood from the right ventricle to the lungs
   3. to carry blood from the lungs to the right ventricle
   4. to carry blood from the body into the left atrium
3. The type of tissue that would most likely contain the highest number of mitochondria is:
   1. muscle tissue
   2. nervous tissue
   3. epithelial tissue
   4. connective tissue

Question 15 refers to the diagram below:



1. The part labelled with the letter E is a:
   1. mitochondrion.
   2. lysosome.
   3. microtubule.
   4. centriole.

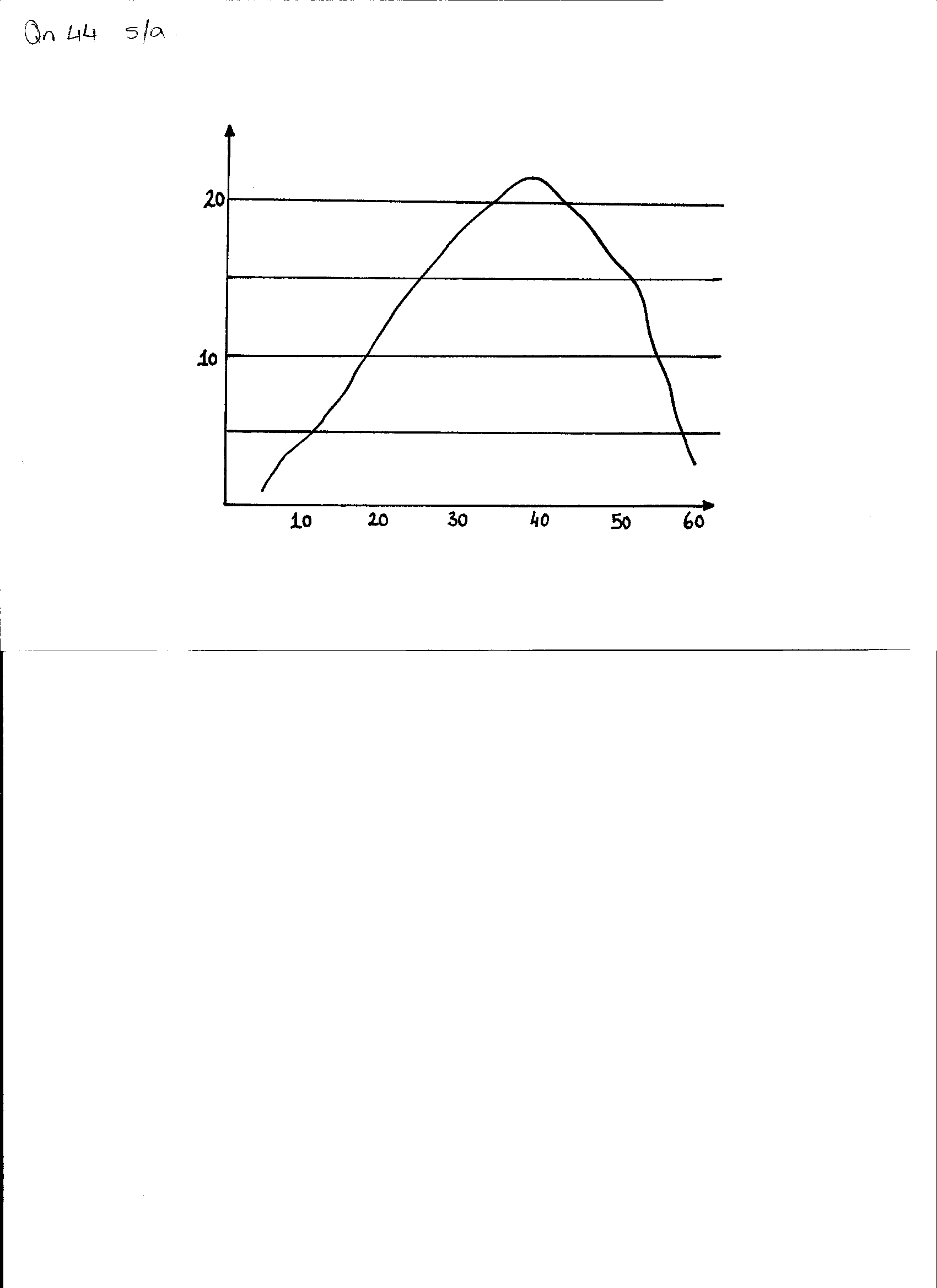
**END OF MULTIPLE CHOICE**

***Section B – Short Answer***

Answer all questions in the spaces provided. Use only BLUE or BLACK pen.

1. The following graph shows the results of an experiment involving the breakdown of starch by an enzyme (4 marks)

**Effect of temperature on breakdown of starch by an enzyme**



**Enzyme activity in mg of starch broken**

**Temperature in OC**

1. What is the optimum temperature for the activity of this enzyme? (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_40oC +/- 1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Why does the rate of reaction drop rapidly at body temperatures above 45OC? (1 mark)

At 45oC the enzyme molecules would be breaking down, or de-naturing

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

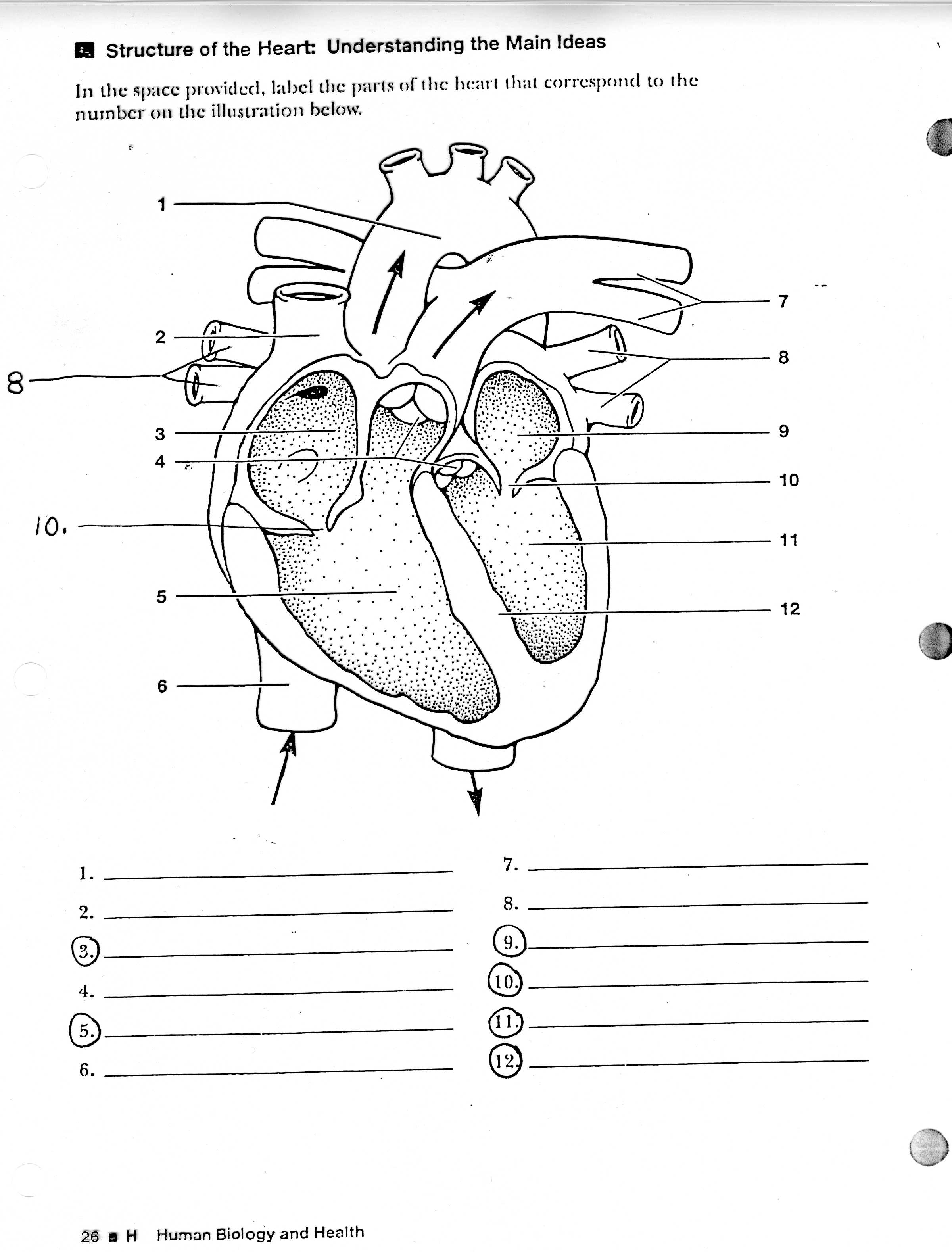
1. What is the end product from the digestion of starch? (1 mark)

Glucose

1. State **ONE** factor, other than temperature, which affects the activity of an enzyme (1 mark)

pH; concentration; substrate concentration; removal of products; presence of co-factors

1. Use this diagram of the heart to answer the following questions (13 marks)



1. Name the following (2 marks)

structure 10 : Atrioventricular Valve

structure 4: Semi Lunar valve

1. Explain the function they have in common (3 marks)

* Prevents back flow 1
* Atrioventricular prevents backflow to atria 1
* semi lunar prevents backflow into ventricles, once in aorta 1

1. Which chamber of the heart does the greatest work? Give evidence to support (3 marks)

* left ventricle 1
* thickness of wall 1
* Aorta is thick walled and muscular 1

1. Define Cardiac output and include the formula to solve for CO (2 marks)

* the cardiac output – the amount of blood leaving every minute (1)
* cardiac output (mL/minute) = stroke volume (ml) x heart beat (beats/minute) (1)

Label the following structures (3 marks)

1. 7 Pulmonary artery
2. 12 Septum
3. 6 Inferior vena cava
4. Explain the following processes, where they occur in the cell and the amount of energy each process yields (6 marks)
5. Aerobic respiration (3 marks)

with oxygen

occurs in cytosol/cytoplasm, and mitochondria

produces 2 + 36 = 38 ATP

b. Anaerobic respiration (3 marks)

without oxygen

Occurs in cytosol/cytoplasm

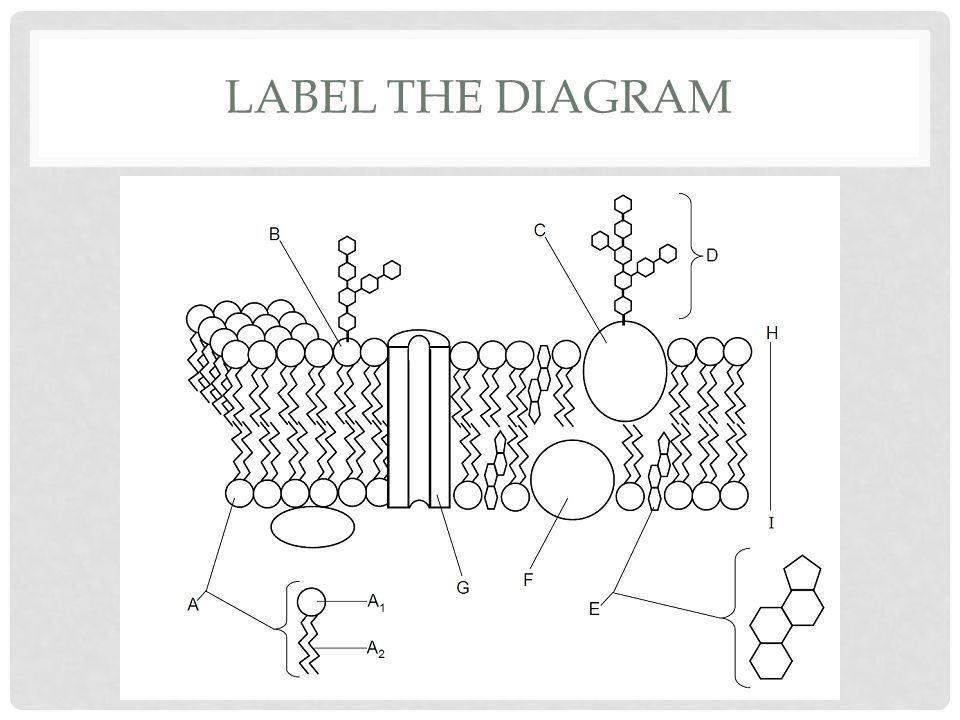
Produces 2 ATP

1. Blood is made up of plasma and formed elements. List the three types of formed elements in the table below, and give ONE function of each. (6 marks)

|  |  |
| --- | --- |
| **COMPONENT OF THE BLOOD** | **FUNCTION** |
| Platelets  (Thrombocytes) | Helps in blood clotting |
| Red Blood Cells  (Erythrocytes) | Transports oxygen |
| White Blood cells  (Leucocytes) | Involved in immune defence |

|  |  |
| --- | --- |
| **STRUCTURE** | **NAME** |
| A1 | Hydrophilic head |
| A2 | Hydrophobic tail |
| C | Protein |
| E | Cholesterol |
| G | Protein channel |
| H-I | Phospholipid bi-layer |

1. Label the structures in the diagram below, by writing the name next to the matching letter in the table (6 marks)



***Section C – Extended Response***

*Write your answer on the lined pages provided. Answers should be in BLUE or BLACK pen*

1. Explain how oxygen and carbon dioxide are transported in the blood. Your answer should explain the different ways they are transported (include comparative amounts and percentages) (10 marks)

**Oxygen:**

* Only 3% of O2 is carried in the blood dissolved in the plasma
* 97% is carried in the blood combined with haem part of the haemoglobin to form oxyhaemoglobin
* Up to four oxygen can bind to a single haemoglobin
* Hb+O2 à HbO2
* Oxygen will combine with haemoglobin in the capillaries surrounding the alveoli
* Oxygen combines with haemoglobin when oxygen concentration is high, near the lungs
* Oxygen will be removed from oxyhaemoglobin when oxygen concentration is low, in the body cells

**Carbon Dioxide:**

* 7-8% is dissolved in blood plasma
* 22% combines with the globin part of haemoglobin molecule to form carbinohaemoglobin
* Up to four carbon dioxides can bind to a single haemoglobin
* 70% carried in plasma as bicarbonate ions
* 
* CO2 with form bicarbonate ions in areas of high concentration CO2, in body cells
* Bicarbonate will form CO2 again in areas of low CO2 concentration, in the lungs (alveoli)