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St. Nicholas College Naxxar Boys Secondary
Half-Yearly Examinations
February 2015

Track/Level
2

FORM 4

SUBJECT **Biology**

TIME: **2 hours**

Name _____

Class _____

Instructions:

There are **TWO sections** in this paper.

Section A – This section carries 55 marks:

- Write down all your answers on the exam paper.
- **All** questions should be answered.

Section B – This section carries 45 marks:

- There are 5 questions but you only answer 3.
- **Answer any THREE questions.**
- Each question carries 15 marks.
- Write your answers for section B on foolscap.

For Teacher's Use:

	Section A						Section B					
Question No.	1	2	3	4	5	6	1	2	3	4	5	
Max. Mark	9	5	5	14	14	8	15	15	15	15	15	
Actual Mark												Total Mark
												100

Section A

Answer all questions in this Section. This Section carries 55 marks.

1. Read the following passage and fill in the blanks with the most appropriate term.

Here's an example of what a male Olympic heavyweight rower might eat when training heavily during the day. The diet provides about 6,000 calories a day. It's only suitable for athletes who do intensive training and isn't recommended for the general public. This is a part of his diet:

7am: Breakfast:

Athletes must take in high amounts of _____. These will serve as an energy source during training.

8am: Training

During training they need to drink plenty of _____ in order to stay _____ since they sweat a lot.

9.45am: Post-Training Breakfast

After training, the athlete needs to consume meals high in _____ to help the recovery of worn muscles.

There should also be vitamins and minerals included in the diet. _____ is needed so that the athlete has enough red blood cells to supply him with oxygen. Also _____ is needed to maintain healthy bones.

11.00: Training

The athlete might also consume a sports drink during training in order to replenish _____ in order to maintain the correct blood pressure.

When doing heavy exercise all of the muscles involved are required to work maximally for as long as possible. This will create soreness or muscle exhaustion due to production of _____ acid. This is an example of _____ respiration.

Total: 9 marks

2. Write the term that best fits the following descriptions.

	Description	Term
a.	The reaction that converts two monosaccharide molecules into a disaccharide	
b.	The chemical that is used to test for starch	
c.	The building blocks of proteins	
d.	The process of the movement of food down the gullet	
e.	The process by which plants make their own food	

Total: 5 marks

3. Where do each of the following passages lead to?

a. Esophagus _____

b. Pancreas _____

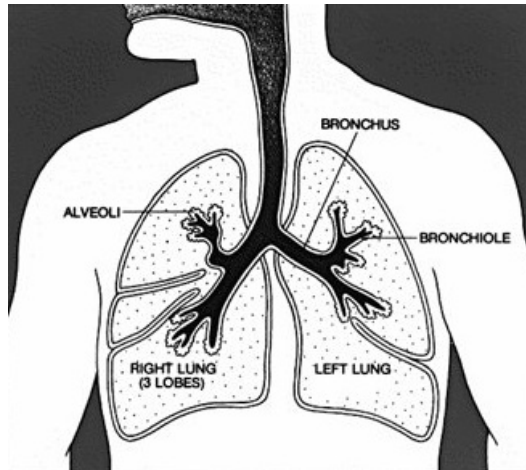
c. Small intestine _____

d. Rectum _____

e. Gall bladder _____

Total 5 marks

4. The diagram below shows the human lungs.



a) (i) What is the function of alveoli?

(2 marks)

b) (i) Respiratory gases flow in and out through the trachea. Describe the characteristic of the trachea.

(2 marks)

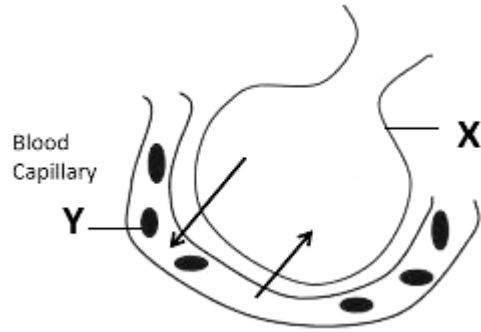
(ii) On the diagram above, draw an arrow to show the flow of oxygen and carbon dioxide.

(2 marks)

(iii) Describe how the intercostal muscle and diaphragm can change the volume and pressure in the thoracic cavity during inhalation.

(4 marks)

c. The diagram below shows a part of the respiratory system of humans.



i) Name structures X and Y.

Structure X : _____ (1 mark)

Structure Y : _____ (1 mark)

ii) On the arrows in the diagram above, write down the name of the gas that is entering structure X and the gas exiting structure X.

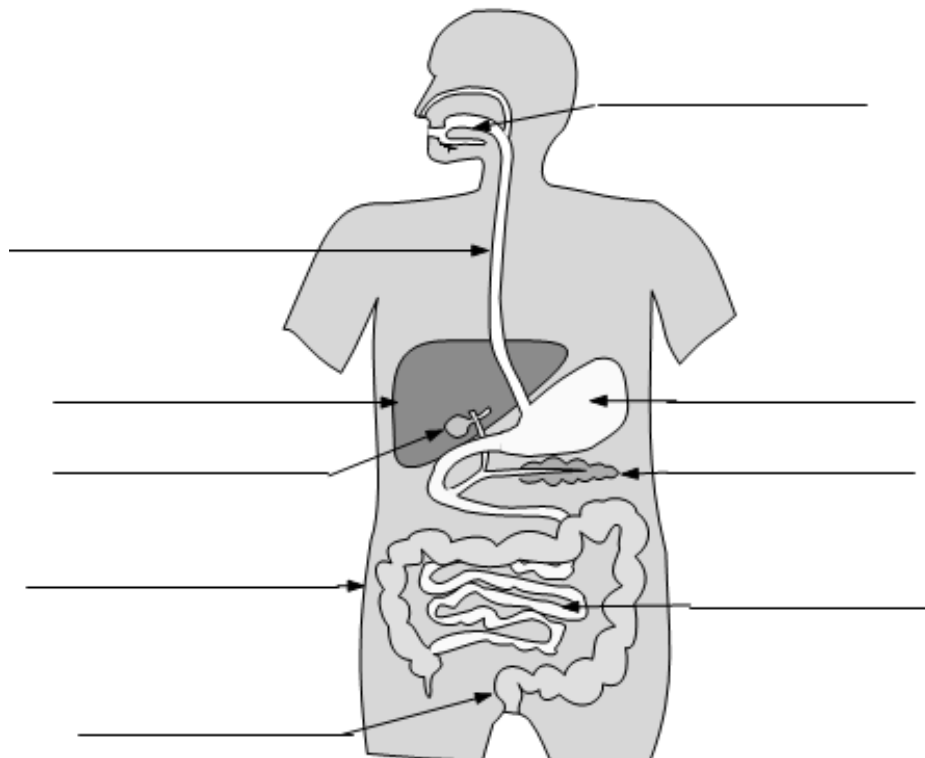
(1 mark)

iii) Name the process that enables the exchange of the respiratory gases to occur between X and Y.

_____ (1 mark)

Total: 14 marks

5a. Label the different parts of the digestive system in the spaces provided.



(9 marks)

b. Fill in the table below by writing the site/s where the given enzyme is produced.

	Enzyme	Site/s of Production
i.	Trypsin	
ii.	Lipase	
iii.	Amylase	
iv.	Pepsin	
v.	Sucrase	

(5 marks)

Total: 14 marks

6. Joe Borg is a lab technician in a local food industry. He was instructed to sort out the containers, but he cannot find the colour-code key which indicates what each coloured container holds. He discovers that there are 4 different containers, coloured pink, purple, green and black.

He tested the food in the 4 containers and his results are tabulated in the table below.

Containers	Iodine	Sodium Hydroxide/ Copper Sulphate	Benedict's Solution	Ethanol
Pink	Black	Blue	Orange	Clear
Purple	Brown	Purple	Blue	Opaque
Green	Brown	Purple	Orange	Clear
Black	Black	Blue	Blue	Opaque

a) Identify what nutrient is being tested when;

i. Iodine is used: _____

ii. Sodium Hydroxide and Copper Sulphate are used: _____

iii. Benedict's Solution is used: _____

iv. Ethanol is used: _____

(4 marks)

b) What nutrient does each container have?

i. Pink: _____

ii. Purple: _____

iii. Green: _____

iv. Black: _____

(4 marks)

Total: 8 marks

Section B – Answer any THREE questions.

1. An experiment was carried out to investigate the effect of temperature on the rate of activity of the enzyme trypsin. Trypsin was added to a cube of cooked egg white inside a test tube. The time taken for the egg white to be digested was recorded. This was repeated at different temperatures. The results are shown in the table below.

Temperature in °C	10	22	33	37	44	50
Time for digestion in minutes	20	7	4	3	6	35

- a. On the graph paper provided, draw a line graph to show the results obtained. Draw the temperature on the x-axis and the time on the y-axis. (5 marks)
- b. From the graph, identify the temperature at which the rate of digestion was the fastest. (1 mark)
- i. What is this temperature called? (1 mark)
- c. From the graph, identify the time taken for digestion when the temperature is 27 °C. (1 mark)
- d. What happens to the enzymes when placed at:
- i. A very low temperature (1 mark)
- ii. A very high temperature (1 mark)
- e. Name **ONE** other factor (apart from temperature) that could affect the rate of reaction brought about by the enzyme trypsin. (1 mark)
- f. State **ONE** precaution which should be followed when carrying out this experiment. (1 mark)
- g. If the concentration of the enzyme trypsin was increased in the test tube, what would happen to the rate of digestion? (1 mark)
- i. Give a short explanation for your answer above. (2 marks)

Total 15 marks

2. Respiration is one of the seven vital functions.

- a. Define the term respiration. (1 mark)
- b. Name the organelle found in cells where aerobic respiration takes place. (1 mark)
 - i. List **ONE** similarity and **ONE** difference between aerobic and anaerobic respiration. (2 marks)
- c. State **ONE** use of anaerobic respiration in industry. (1 mark)
 - i. For the use mentioned above, name the micro-organism which is used. (1 mark)
- d. Respiratory surfaces have a number of characteristics that speed up the rate of gas exchange.
 - i. List **TWO** characteristics of respiratory surfaces. (2 marks)
 - ii. Name the respiratory surface found in fish. (1 mark)
 - iii. Briefly describe how gas exchange takes place in insects. You can use diagrams to support your answer. (4 marks)
- e. Name **ONE** disease caused by smoking. (1 mark)
- f. Name **ONE** harmful gas that causes air pollution. (1 mark)

Total 15 marks

3. Give biological explanations for the following statements.

- a. The enzyme pepsin is secreted as pepsinogen (inactive form) in the stomach. (3 marks)
- b. Acid rain is the result of air pollution. (3 marks)
- c. The surface area of the ileum (small intestines) is very large. (3 marks)
- d. The leaves of plants are adapted for gas exchange. (3 marks)
- e. Cilia and mucus are found along the respiratory tract in humans. (3 marks)

Total 15 marks

4. List **TWO** characteristics that are common to all enzymes. (2 marks)

a. **Copy the table** below and fill in the missing columns by **stating the enzyme** that works on the following substances and **stating the product which forms**.

	Substrate	Enzyme	Product Formed
i.	Starch		
ii.	Proteins		
iii.	Lipids		
iv.	Maltose		

(8 marks)

b. Holozoic nutrition starts with ingestion and ends with egestion. List the **THREE** other stages involved in holozoic nutrition and **describe** each stage. (3 marks)

c. List **TWO** sites where the duodenum receives enzymes from. (2 marks)

Total 15 marks

5. Animals have different diets. Their teeth are adapted for their diet.

a. Briefly describe the **shape and function** of the following types of teeth found in humans:

- i. Incisors (1 mark)
- ii. Canines (1 mark)
- iii. Molars (1 mark)

b. List **TWO** differences between the jaw structure of herbivores and that of carnivores. (2 marks)

c. State the function of the carnassials found in animals such as dogs and cats. (1 mark)

- d. Name the structure responsible for blocking the trachea while swallowing food to prevent choking. (1 mark)
- e. Name the site where:
- i. Digestion begins (1 mark)
 - ii. Digestion ends (1 mark)
- f. Name the organ where bile is:
- i. Stored. (1 mark)
 - ii. Produced. (1 mark)
- g. State the difference between physical and chemical digestion. (2 marks)
- h. The gut of ruminants, such as cows, is adapted for their diet. Their stomach is made up of four chambers. Briefly describe how this adaptation helps the ruminants. (2 marks)

Total 15 marks
