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

Track 3

FORM: 3

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 Question 1 and choose any TWO other 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	7	1	2	3	4	5	
Max. Mark	6	10	6	4	17	5	7	15	15	15	15	15	
Actual Mark													Total Mark

													100

Section A: Answer ALL questions in this section.

1. Write the term in Column A that best fits the description in Column B.

Column A		Column B
a.		The building blocks of organisms
b.		Thread-like structures making up the mycelium
c.		An organelle in plant and animal cells used to generate energy
d.		The object being observed under the light microscope
e.		The system used for naming organisms
f.		An organism having both male and female sex organs

(6 marks)

Total 6 marks

2. All living things are classified according to their characteristics.

a. Name **ONE** kingdom made up:

i. Of only eukaryotic cells.

_____ (1 mark)

ii. Of only unicellular organisms.

_____ (1 mark)

iii. Of organisms which make their own food using simple substances.

_____ (1 mark)

b. There are three basic shapes of bacteria - spherical, rod-shaped and spiral. Some bacteria are harmful and cause disease while others are useful.

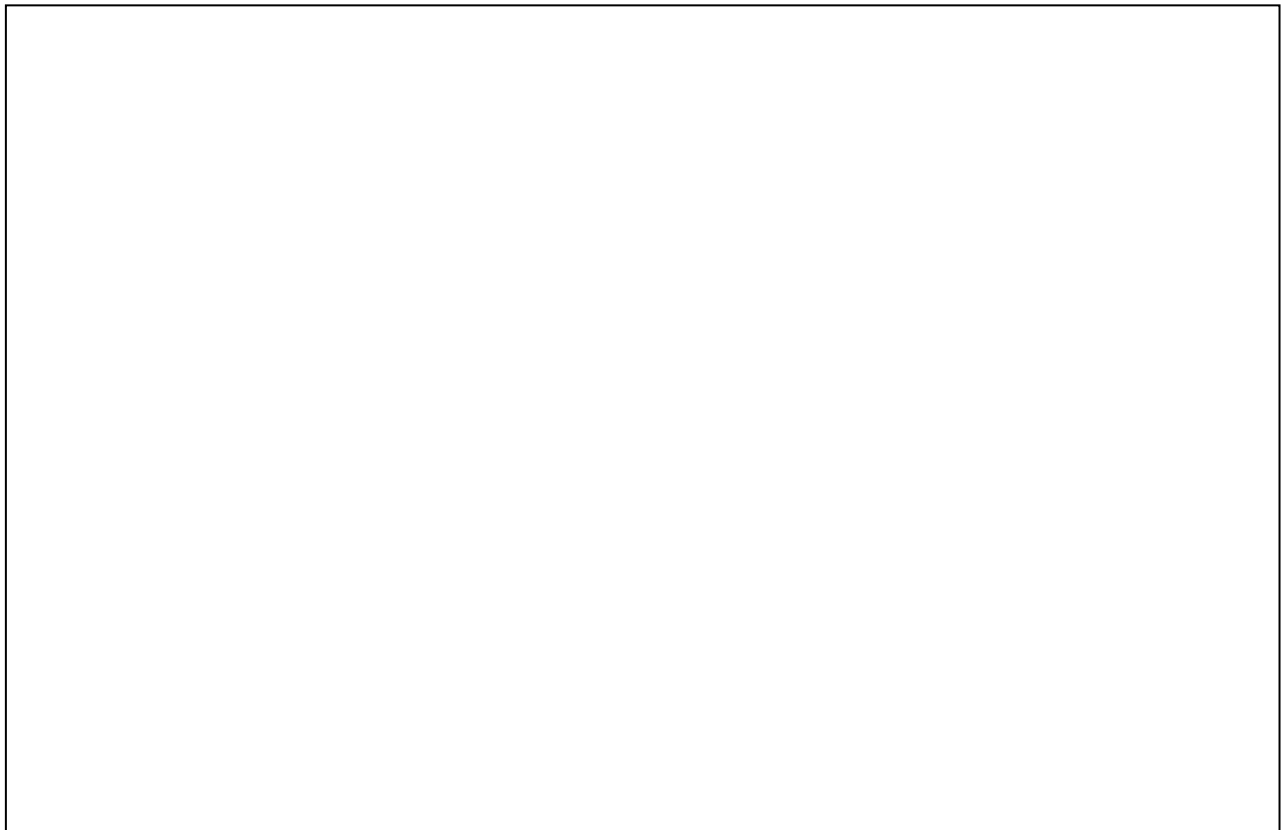
i. Name **ONE** disease caused by harmful bacteria and **ONE** disease caused by harmful fungi.

(2 marks)

ii. List **ONE** example of useful bacteria and **ONE** example of useful fungi.

(2 marks)

iii. Draw the structure of a typical bacterium. Remember to label your diagram. (3 marks)



Total 10 marks

3. Vertebrates can be classified as cold-blooded or warm-blooded.

a. Define the terms underlined above and give **ONE** example of a warm-blooded organism:

i. Vertebrates: _____
_____ (1 mark)

ii. Warm-blooded: _____

_____ (2 marks)

b. Explain the function of the swim bladder in fish.

_____ (1 mark)

c. Both amphibians and fish live in water however, they have different body coverings. Contrast their body coverings.

_____ (2 marks)

Total 6 marks

4. During an experiment, Clayton prepared 2 beakers. Beaker A was filled with 50mL dilute sugar solution and beaker B was filled with 50mL concentrated sugar solution. In each beaker he added 3 raisins. After 3 hours, he observed the raisins in each beaker.

a. Name the process that would be taking place during this experiment.

_____ (1 mark)

- b. Describe the result you would expect to see in the raisins placed in beaker B. Explain your answer.

(3 marks)

Total 4 marks

5. The following table shows different characteristics of various animals.

- a. Fill in the table by writing the name of the **phylum** or **class** being described and give **ONE** example of each.

Phylum or Class	Characteristics	ONE Example
	Long, thin and flat body.	
	These have 4 pairs of legs and live on land. Their mouth parts have pincers, do not have antennae.	
	Long, cylinder-like body made up of segments. Some are external parasites while others are of economic importance.	
	Covered in hair or fur. Young develops inside the mother.	

(8 marks)

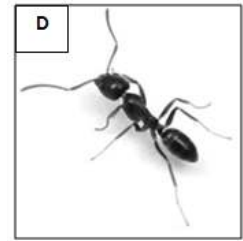
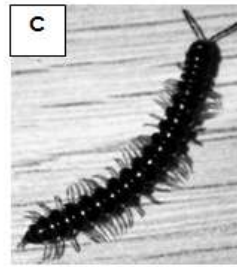
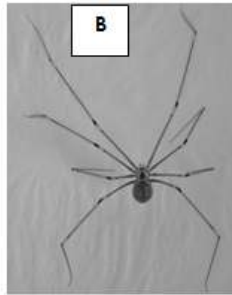
- b. All living organisms reproduce. For each of the organisms listed below, state the type of asexual reproduction it carries out.

i. Bacteria: _____ (1 mark)

ii. Yeast: _____ (1 mark)

iii. Mucor: _____ (1 mark)

c. The following diagram shows a biological key. Identify each organism using the information given below.



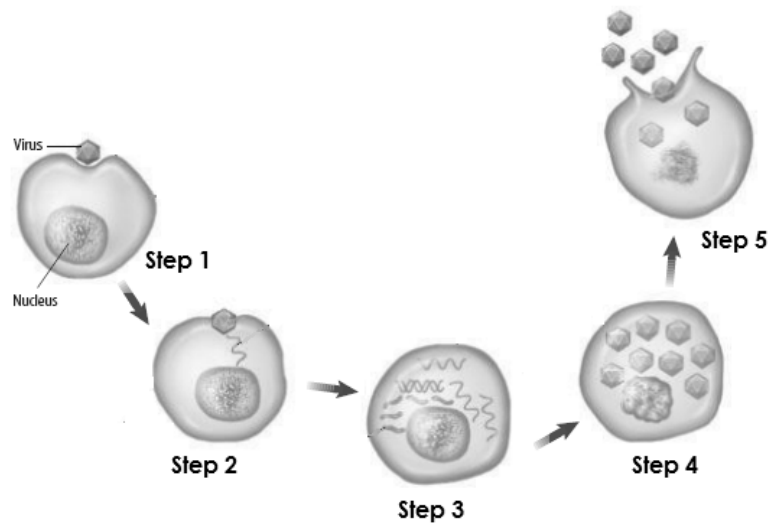
- 1a. Body made up of 3 segments Go to 2
 1b. Body made up of many segments Go to 2
- 2a. Have legs Go to 3
 2b. Does not have legs **Lumbricina**
- 3a. Have 3 pairs of legs Go to 5
 3b. Have more than 3 pairs of legs Go to 4
- 4a. Have 4 pairs of legs **Pholcus phalangioides**
 4b. Have more than 4 pairs of legs Go to 6
- 5a. Abdomen is half the body size **Pterostichus melanarius**
 5b. Abdomen is not half the body size **Formicidae**
- 6a. Antennae are long compared to legs **Chilopoda**
 6b. Antennae are not long compared to legs **Diplopoda**

Letter	Name
A	
B	
C	
D	
E	
F	

(6 marks)

Total 17 marks

6. The following diagram represents the process of reproduction in a virus. For each step, briefly describe the process taking place. (5 marks)



Step 1: _____

Step 2: _____

Step 3: _____

Step 4: _____

Step 5: _____

Total 5 marks

7. Read the following passage and answer the questions that follow.

The human brain is part of the nervous system. The brain connects to nerves that travel throughout the body. Nerves from our senses send signals to the brain to let the brain know what is going on in the outside world. The brain also sends signals using nerves to muscles in order to make our body move. The brain may not move, but it needs lots of energy. Energy is sent to the brain by our blood. There are lots of blood vessels with red blood cells flowing through the brain at all times.

a. From the passage above name **ONE**:

- i. Organ: _____ (1 mark)
- ii. Specialised cell: _____ (1 mark)
- iii. Vital function: _____ (1 mark)
- iv. Organ system: _____ (1 mark)
- v. Tissue: _____ (1 mark)

b. Draw a clearly labelled diagram of an animal cell. (2 marks)



Total 7 marks

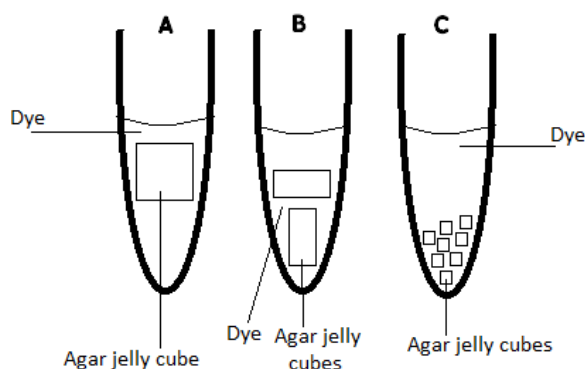
Section B

Answer question ONE and choose any other TWO. This section carries 45 marks. Write the answers for section B on foolscap.

1. A group of Biology students carried out the following experiment to investigate the relationship between the volume and surface area.

In test tube A, the students placed 1 cube (1cm x 1cm x 1cm) of agar jelly. In test tube B, they put 1 cube (1cm x 1cm x 1cm) of agar jelly that was cut in half. In test tube C, they put 1 cube (1cm x 1cm x 1cm) of agar jelly that was cut into 8 small pieces.

In each test tube, they added 15ml of purple coloured dye, causing the blocks to change in colour. They then measured the time it took for each of the blocks to change colour completely.



The results of the experiment were recorded in the table below.

Test Tube	Time taken for blocks to change colour in seconds
A	480
B	125
C	45

- a. On the graph paper provided, draw a bar graph to represent the data in the table above. (5)
- b. From the graph obtained, describe the relationship between surface area to volume ratio and the time taken for the cubes to change colour. (3)

- c. Name and briefly describe the process that was taking place during the experiment. (2)
- d. Name the structure found in animal and plant cells that controls what enters and leaves the cell. (1)
- e. Briefly describe an experimental procedure to investigate the effect of temperature on the time taken for the agar jelly cubes to change colour. Predict what you expect the results to be. (4)

(Total – 15 marks)

2. Compare and contrast between:

- a. Objective lenses and eyepiece lens. (4)
- b. Egestion and excretion. (3)
- c. Flagellum and pseudopodia. (3)
- d. Sexual and asexual reproduction. (5)

(Total – 15 marks)

3. Give biological explanations for the following statements.

- a. Viruses are considered borderline between living and non-living. (3)
- b. Osmosis is a special type of diffusion. (2)
- c. Breathing and respiration are two different processes. (3)
- d. A red blood cell placed in a dilute solution will burst but a plant cell would not. (4)
- e. A spider is not an insect. (3)

(Total – 15 marks)

4. The following statements describe different phyla of the plant kingdom.

a. Write the name of the phylum that best fits the description.

i. These plants have needle-like leaves and reproduce by producing seeds in cones. (1)

ii. These plants have an underground stem that takes the form of a rhizome. (1)

iii. These plants produce seeds inside fruits. (1)

iv. These plants have a simple structure called a thallus. (1)

b. Draw a neat and labelled diagram of a typical plant cell. (3)

c. Name **ONE** specialised cell found in plants. Describe its shape in relation to its function. (3)

d. Name the structures found in ferns used for reproduction. State the location where these structures are found. (2)

e. List **THREE** differences between monocotyledons and dicotyledons. You can present your answer in a table.(3)

(Total – 15 marks)

5. Clayton wanted to prepare a temporary slide of onion epidermal cells to observe under the light microscope.

a. Briefly describe the procedure he should follow to prepare the slide. (4)

b. Calculate the magnification of the objective lens used if the total magnification was x450. Show your working. (2)

- c. Name and draw a labelled diagram of a plant-like protist. (4)
- i. Briefly explain why the organism you mentioned above (5c) is considered plant-like. (2)
- d. List **THREE** factors that increase the rate of diffusion. (3)

(Total – 15 marks)
