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St. Nicholas College Naxxar Boys Secondary
Half-Yearly Examinations
February 2016

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	8	1	2	3	4	5	
Max. Mark	5	6	5	10	7	5	10	7	15	15	15	15	15	
Actual Mark														Total Mark
														<hr/> 100

Section A: Answer ALL questions in this section.

1. Cells are the building blocks of living organisms.

a. Name **ONE** organelle found **ONLY** in plant cells and describe its function.

2 marks

b. Cells can become specialised. Define the term 'specialised cell'.

2 marks

c. Name **ONE** specialised cell found in animals.

1 mark

2. All living things are classified into groups called kingdoms, according to their characteristics.

a. Name **ONE** kingdom in which the organisms reproduce by binary fission.

1 mark

b. Briefly explain why viruses are considered borderline between living and non-living.

2 marks

c. Most bacteria are surrounded by a slime capsule. Briefly explain the function of the slime capsule.

1 mark

d. Describe the function of the red eyespot found in the plant-like protist Euglena.

2 marks

3. All living organisms carry out seven life processes.

a. For each statement listed below, write the life process being described.

i. Plants carry out photosynthesis during the day

1 mark

ii. Plants release oxygen into the air

1 mark

iii. Plants grow towards the sun

1 mark

b. Respiration is one of the seven life processes. Define the term 'respiration'.

1 mark

c. Name the organelle within the cell, where respiration occurs.

_____ 1 mark

4. Diffusion involves the movement of particles from a high concentration to a low concentration.

a. Briefly explain why diffusion is often referred to a passive type of transport.

_____ 1 mark

b. Describe **ONE** situation where diffusion takes place in:

i. Animals: _____

_____ 1 mark

ii. Plants: _____

_____ 1 mark

c. A block of gelatine was cut into 3 cubes of different sizes as shown below.

Cube 1: 5cm x 5cm x 5cm

Cube 2: 3cm x 3cm x 3cm

Cube 3: 1cm x 1cm x 1cm

They were each placed in a beaker filled with 250ml of red dye. The time taken for the blocks to turn red was measured. The table below shows the results obtained.

Cube	Size / cm	Surface area /cm ²	Volume / cm ³	Surface Area to Volume Ratio	Time taken / minutes
1	5 x 5 x 5	150	125	1.2 : 1	6
2	3 x 3 x 3				4
3	1 x 1 x 1	6	1	6 : 1	1.5

- i. Work out the surface area, volume and ratio for cube 2. Show your working.

3 marks

- ii. Compare the 'time taken' to the 'surface area to volume ratio'.

1 mark

- iii. Name the process taking place when the red dye moves into the gelatine cube.

1 mark

- iv. List **TWO** factors that affect the rate of the process named above in question 4c iii.

2 marks

5. All living organisms are given a scientific name using the Binomial system.

a. Briefly describe the importance of using the Binomial system for naming organisms.

1 mark

b. The following table shows the scientific name for the Vampire Bat. Fill-in the table with the correct taxonomic group.

Kingdom	<i>Animalia</i>
	<i>Chordata</i>
	<i>Mammalia</i>
	<i>Chiroptera</i>
Family	<i>Phyllostomidae</i>
	<i>Desmodus</i>
Species	<i>rotundus</i>

4 mark

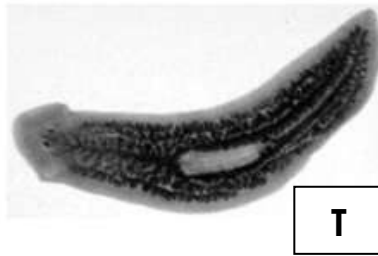
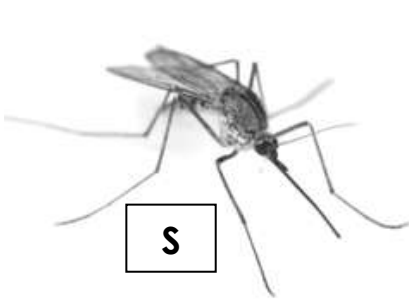
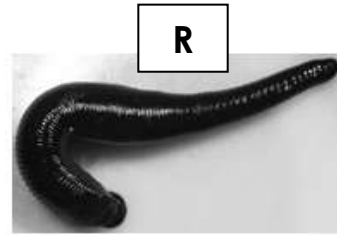
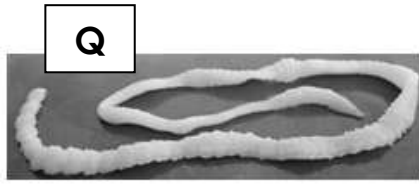
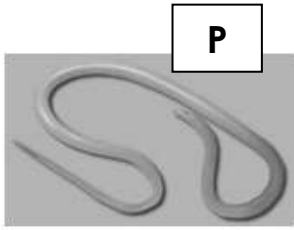
c. Describe the body covering of bats.

1 mark

d. Describe the typical feeding in new-born bats.

1 mark

6. The following pictures (P, Q, R, S, T, U) show different parasites.



a. Using the letters above, identify **ONE**:

i. Flatworm: _____

ii. Insect: _____

iii. Segmented worm: _____

iv. Roundworm: _____

4 marks

b. Briefly explain why all viruses are considered as parasites.

1 mark

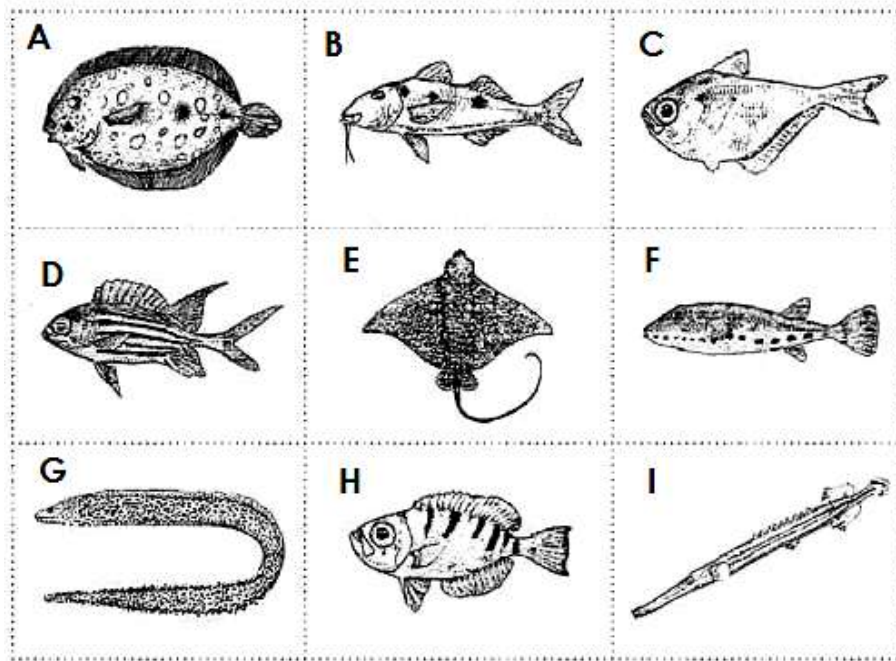
7. Lizards and crocodiles are reptiles which have similar characteristics.

a. List **ONE** characteristic feature of reptiles.

1 mark

b. Use the following biological key to identify the name of each organism.

9 marks



1	Body shape is long and skinny Body shape is not long and skinny	Go to 2 Go to 3
2	Fish has pointed fins Fish has smooth fins	Trumpet fish Spotted moray eel
3	Fish has both eyes on top of the head Fish has one eye on each side of the head	Go to 4 Go to 5
4	Fish has long whip-like tail Fish has short, blunt tail	Spotted eagle ray Peacock flounder
5	Fish has spots Fish does not have spots	Go to 6 Go to 7
6	Fish has chin 'whiskers' Fish does not have chin 'whiskers'	Spotted goat fish Band-tail puffer
7	Fish has stripes Fish does not have stripes	Go to 8 Glassy sweeper
8	Fish has v-shaped tail Fish has a blunt tail	Squirrel fish Glass-eye snapper

Organism	Name
A	
B	
C	
D	
E	
F	
G	
H	
I	

8. The following statements describe different organisms from the plant kingdom. For each statement, write the phylum that best suits the description.

a. These plants have proper roots and stems. Their leaves are called fronds.

_____ 1 mark

b. These are flowering plants that produce seeds inside fruits.

_____ 1 mark

c. These plants have a simple structure called a thallus and absorb water using rhizoids.

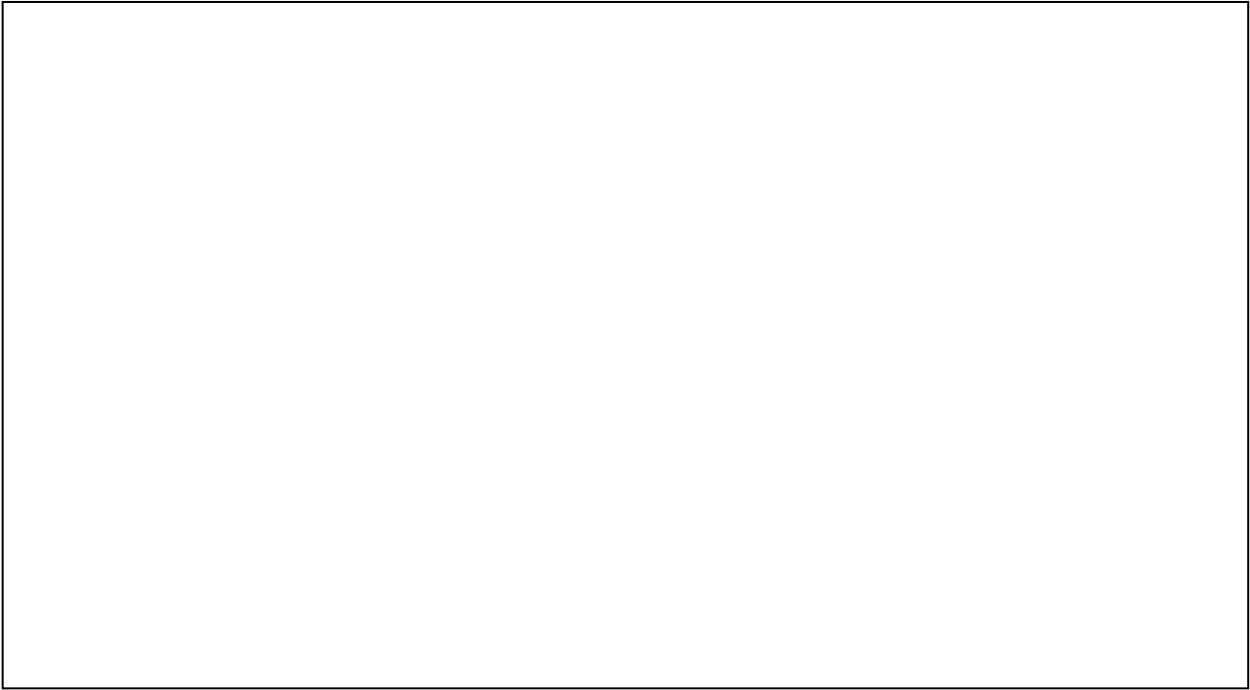
_____ 1 mark

d. These plants have needle-like leaves and can grow in dry climates.

_____ 1 mark

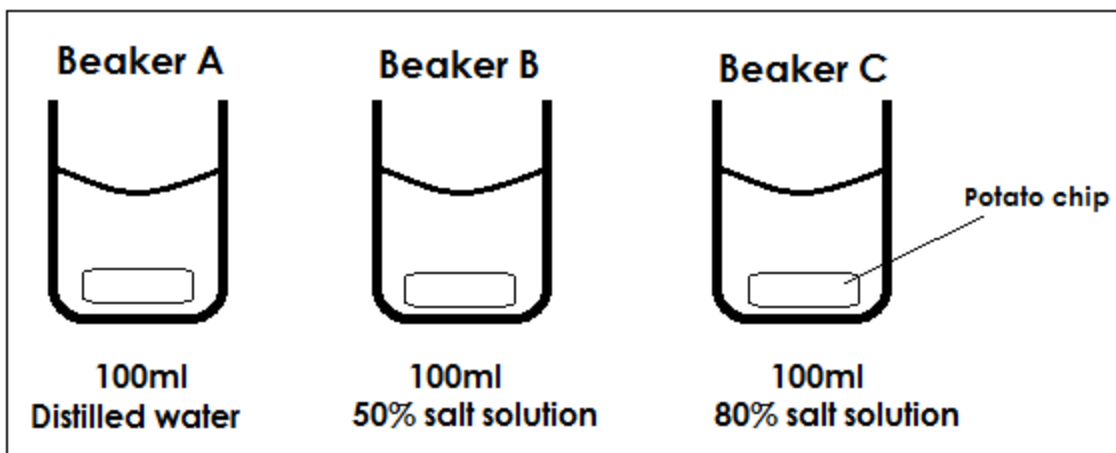
- e. Draw a labelled diagram to show the structure of a typical plant cell.

3 marks



Section B: Answer Question ONE and any other TWO questions.

1. A group of Biology students were investigating the effect of different salt solutions on the length of potato chips. They prepared 3 potato chips of the same length and mass and placed them into 3 separate beakers. The diagram below shows the solutions poured into each beaker.



The students took measurements of the length of each potato chip at the start of the investigation and every 30 minutes for 2 hours. The table below shows the results they obtained.

	Length of potato chip / cm		
Time / min.	Potato chip A	Potato chip B	Potato chip C
0	3.50	3.50	3.50
30	3.90	3.50	3.45
60	4.20	3.50	3.37
90	4.75	3.50	3.25
120	4.90	3.50	3.20

- a. Draw a graph to show the three sets of results obtained. **Use the same set of axes for the three graphs.** 6 marks
- b. Name the process that was taking place in this investigation. 1 mark

- c. Explain the shape of the graph obtained for potato chip C and why this result was obtained. 4 marks
- d. Briefly explain the results you would expect if red blood cells were used in this investigation, instead of the potato chips. 3 marks
- e. Name the organelle responsible for osmoregulation in freshwater protists. 1 mark

Total 15 marks

2. Compare and contrast between:

- a. Monocotyledons and dicotyledons 3 marks
- b. Prokaryotic and eukaryotic cells 3 marks
- c. Growth and reproduction 3 marks
- d. Complete metamorphosis and incomplete metamorphosis 3 marks
- e. Arachnids and insects 3 marks

Total 15 marks

3. Anthrax is an infection caused by bacteria called *Bacillus anthracis*. These bacteria make spores which can live for years in the soil, and they cause anthrax when they enter the body.

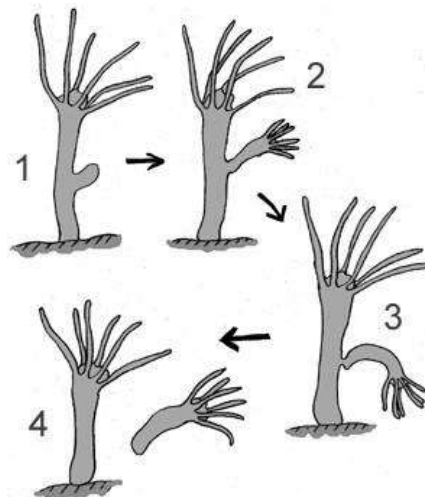
- a. Write the genus name of the bacteria that causes anthrax infection. 1 mark
- b. Draw a labelled diagram showing the typical structure of a bacterium. 3 marks
- c. The bacteria causing anthrax reproduces by producing spores.
- i. Name **ONE** other organism that reproduces by producing spores which belongs to the fungi kingdom. 1 mark

- ii. Draw a labelled diagram to show the structure of the organism named above. 2 marks
- d. Bacteria and fungi can be saprophytic and pathogenic.
- i. Define the terms 'saprophytic' and 'pathogenic'. 2 marks
- ii. Give **ONE** example of each of the following a saprophytic fungi, saprophytic bacteria, pathogenic fungi and pathogenic bacteria. 4 marks
- e. Name **TWO** methods which stop the growth of bacteria. 2 marks

Total 15 marks

4.

Hydra is the name of an invertebrate organism that lives in freshwater. It is relatively small, being only a half centimetre long on average. *Hydra* has a tubular body with a 'head' and a 'foot'. The foot is used for sticking to rocks. There is a ring of tentacles around the head that are used to catch food. It reproduces asexually by budding as shown in the diagram below.



- a. Name the kingdom and phylum that the *Hydra* belongs to. 2 marks
- b. List **TWO** characteristics of the phylum named above. 2 marks

- c. Briefly describe the asexual reproduction method shown by *Hydra*. 4 marks
- d. Name **ONE** other organism that reproduces by budding and name the kingdom it belongs to. 2 marks
- e. List **ONE** advantage of asexual reproduction. 1 mark
- f. The *Hydra* lives in freshwater. Briefly describe what will happen if it is placed in saltwater. 4 marks

Total 15 marks

5. There are many creatures that make butterflies part of their diet. Some of the common predators of butterflies include wasps, ants, flies, birds, snakes, toads, rats, lizards and dragonflies.
- a. State the phylum and class which butterflies belong to. 2 marks
- b. List **THREE** structural features common to the organisms in the class you named above. 3 marks
- c. Butterflies and toads undergo metamorphosis.
- i. State the type of metamorphosis that butterflies undergo. 1 mark
- ii. Outline the stages involved in the type of metamorphosis named above. 4 marks
- d. Birds, snakes and rats belong to the phylum chordates. Briefly explain why. 1 mark
- e. Give a biological explanation for the following statement: "Birds fluff up their feathers when their environment is cold while reptiles, such as lizards, bask in the sun to warm up". 4 marks

Total 15 marks