



Half-Yearly Examinations  
February 2014  
Form 3

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Subject: Biology

Level: Track 3

Time: 8.05-10.05

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Name \_\_\_\_\_

Class \_\_\_\_\_

**Section A:**

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

1. Underline the correct order of organisation in living things, starting with the **least complex (smallest)** first:

- a. Organ system, organ, tissue, cell
- b. Cell, tissue, organ, organ system
- c. Cell, tissue, organ system

(1 mark)

2. A Biology student wanted to observe the structure of a bee's wing, however, it is too small to study with the naked eye.

a. Name the instrument that the student should use to observe the bee's wing.

\_\_\_\_\_

b. Name the two sets of lenses found on this instrument.

\_\_\_\_\_

c. List two safety rules which one should follow when using this instrument.

\_\_\_\_\_

\_\_\_\_\_

(1, 2, 2 marks)

**Total: 5 marks**

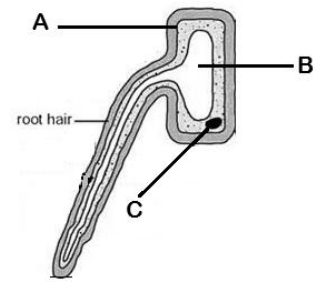
3. The following diagram shows a specialised cell (root hair cell) found in plants.

a. Name the structures labelled A, B and C.

A: \_\_\_\_\_

B: \_\_\_\_\_

C: \_\_\_\_\_



(3 marks)

b. What is the function of the structure labelled C?

\_\_\_\_\_

c. Explain why this cell is a specialised plant cell.

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

d. The root hair cell above is missing one organelle which is found in most plant cells. Name this structure.

\_\_\_\_\_

e. Explain the function of this structure.

\_\_\_\_\_

f. Explain why the root hair cells do not have this organelle.

\_\_\_\_\_

g. Draw a neat diagram to show the typical structure of an animal cell. Remember to label your diagram.

(1, 2, 1, 1, 1, 3 marks)

**Total: 12 marks**

4. Substances can move in and out of cells in 3 ways, namely, diffusion, osmosis and active transport.

a. Compare and contrast the similarities and differences between diffusion and osmosis.

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(2 marks)

b. Each statement below describes the movement of substances in cells. Underneath each statement, write the type of transport which is being described.

i. A student wearing perfume entered the classroom and sat in front. After a few minutes, the students sitting at the back row could smell the perfume.

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ii. The amoeba removes carbon dioxide gas which it produces as a waste product.

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iii. The roots of a tree take in water from the soil after a heavy rainfall.

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iv. Plant roots take up any nutrients available in a nutrient-poor soil.

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(4 marks)

c. List three ways of how one can increase the rate of diffusion.

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(3 marks)

**Total: 9 marks**

5. Bacteria are unicellular organisms. They are prokaryotic.

a. Define the terms underlined:

i. Unicellular

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ii. Prokaryotic

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(1, 1 mark)

b. Draw a neat diagram of a typical bacterium. Remember to label the diagram.

(4 marks)

c. Name the type of asexual reproduction carried out by bacteria.

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(1 mark)

**Total: 7 marks**

6. The phylum angiosperms is further divided into two classes – monocotyledons and dicotyledons.
- a. Describe the leaf structure and flower arrangement of Monocotyledons and Dicotyledons.

Monocotyledon leaf structure:

\_\_\_\_\_

Dicotyledon leaf structure:

\_\_\_\_\_

Monocotyledon flower arrangement:

\_\_\_\_\_

Dicotyledon flower arrangement:

\_\_\_\_\_

(4 marks)

- b. Fill-in the following table about plants:

Phylum	Characteristics	Example
		Pine tree
	These reproduce by means of spores on the underside of the fronds.	
Bryophytes		

(6 marks)

**Total: 10 marks**

7. Match the life processes listed in column A with its definition listed in column B.

	Column A
1	Respiration
2	Sensitivity
3	Growth
4	Nutrition
5	Excretion
6	Movement
7	Reproduction

	Column B
	The organism can change its position
	The organism produces offspring
	The organisms increases in size
	Removing waste materials such as sweat
	The organisms consumes food
	Breaking down food to release energy
	The organism responds to things

(7 marks)

8. The diagrams below show different animals. Next to each diagram write the phylum to which it belongs to.



Name: Coral

Phylum: \_\_\_\_\_



Name: Tapeworm

Phylum: \_\_\_\_\_



Name: Earthworm

Phylum: \_\_\_\_\_



Name: Scorpion

Phylum: \_\_\_\_\_

(1, 1, 1, 1 marks)

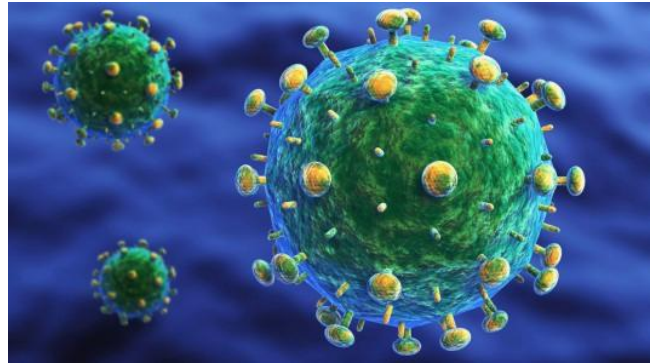
**Total: 4 marks**

## Section B

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

### **New Knowledge About the Body's Fight Against HIV**

When a person is infected with HIV the virus infects the cells of the immune system. From here the virus spreads around the body, while at the same time breaking down important parts of the body's defence system. HIV's ability to avoid being eliminated by the body's immune system -- as opposed to many other



types of virus -- is one of the main problems associated with this widespread virus. But Danish researchers have now found out how the body's own defence system is activated when the HIV virus infects a cell, and how this helps to protect against uncontrolled virus growth. The new knowledge can potentially be used to help the immune system defend itself more effectively against HIV.

### **Assisting the immune system**

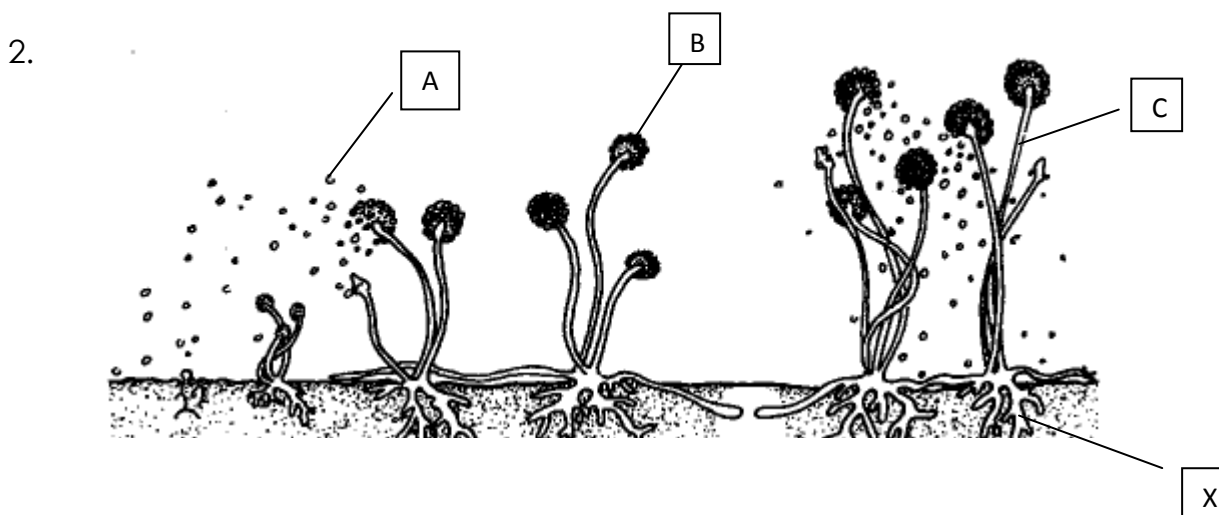
Researchers around the world have spent many years working to develop medicine that inhibits the body's production of viruses. The new study is crucial because it is one of the first in the area, which focuses on the so-called innate immune system. This part of the immune system is inborn and is the first, which is activated when we are attacked by an infection. The second part of the immune system -- the adaptive -- is first activated at a later stage. This is also the system which may be influenced by vaccines. HIV research has therefore been almost exclusively focused on the adaptive immune in the attempt to develop an HIV vaccine. However, the new findings suggest that part of the solution to better treatment must be found in the innate immune system.

Science Daily

Oct. 31, 2011

- a. Comment on the difficulty of defining viruses as living organisms (1)
- b i. What are the two main structures of a virus particle? Explain your answer with the help of a labelled diagram (5)
- ii. Name two diseases caused by viruses. (2)
- iii. Briefly describe viral reproduction with the help of a diagram. (5)
- c. Antibiotics should not be prescribed for a person suffering from a viral infection. Suggest a reason for this. (2)

**Total 15 marks**



- a(i) Identify the organism shown in the diagram. (1)
- (ii) To which kingdom does this organism belong? (1)
- (iii) Name the parts labelled A, B and C. (3)
- (iv) Give a role, other than anchorage, for structure X. (2)
- b. Describe how X carries out this role. (2)
- (i) Which term describes the mode of nutrition of this organism. (2)
- (ii) The cells of this organism are described as eukaryotic. Give one characteristic features of eukaryotic cells. (2)
- (iii) What corresponding term is used to describe bacterial cells? (2)

**Total 15 marks**



3. Compare and contrast each of the following

- a. Diffusion and Active Transport
- b. Hypertonic and hypotonic solutions
- c. Millipedes and caterpillars
- d. Saprophytic and Parasitic mode of nutrition
- e. Binary Fission and Budding

(3,3,3,3,3 marks)

**Total 15 marks**

4. Ben and Victoria are two biology students who have just learnt the concept of osmosis. Their teacher asked them to devise an experiment using potato strips in order to describe osmosis.

a) What materials and apparatus do they need to setup the apparatus? Explain your answer with the help of a labelled diagram (5)

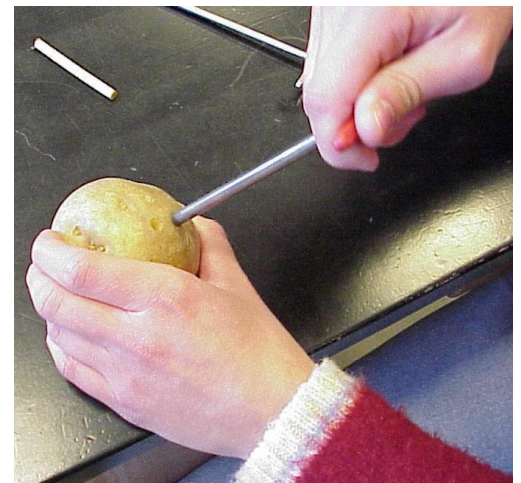
b) What do you expect to happen to the potato strips? (3)

c) Ben and Victoria need to take precautions when doing the experiment. Mention 2 precautions. (2)

d) Define the term osmosis (1)

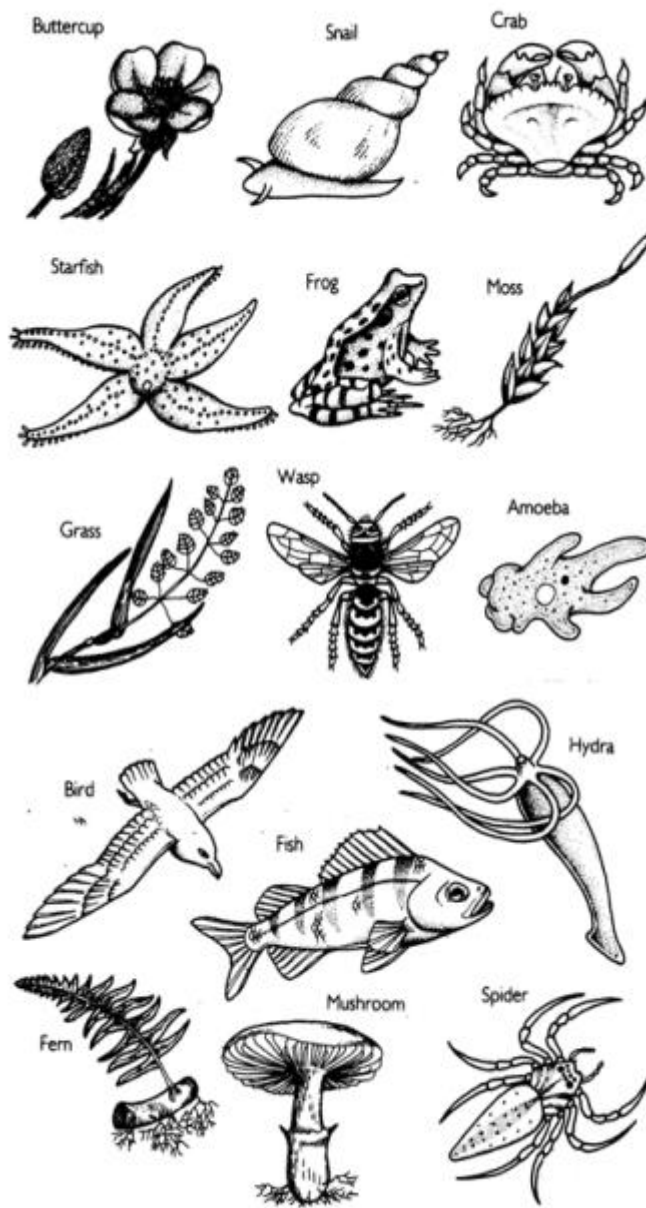
e) Why does an animal cell burst in a hypotonic solution while a plant cell doesn't? (2)

f) Explain the terms turgid and plasmolysed. (2)



**Total 15 marks**

5. The following diagram shows organisms from different kingdoms



a. Name 2 differences between the buttercup and the moss (2 marks)

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b. To which kingdom does the mushroom belong? Name one characteristic of this kingdom (2 marks)

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c. Name 3 invertebrates and 2 vertebrates (3, 2 marks)

Invertebrates: \_\_\_\_\_

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Vertebrates: \_\_\_\_\_

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d. From the diagram list ONE organism belonging to the

i. phylum Coelenterata (Cnidaria) : \_\_\_\_\_

ii. phylum Mollusca: \_\_\_\_\_

(2 marks)

e. Explain the importance of the:

i. swim bladder in fish

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ii. streamlined shape in birds

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iii. pseudopodia in Ameoba

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iv. tentacles with stinging cells in Hydra.

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(4 marks)

**Total 15 marks**