

JUNIOR LYCEUM ANNUAL EXAMINATIONS 2007
EDUCATIONAL ASSESSMENT UNIT – EDUCATION DIVISION

BIOLOGY – FORM III
 TIME: 1H 30 MIN

NAME: _____ CLASS: _____

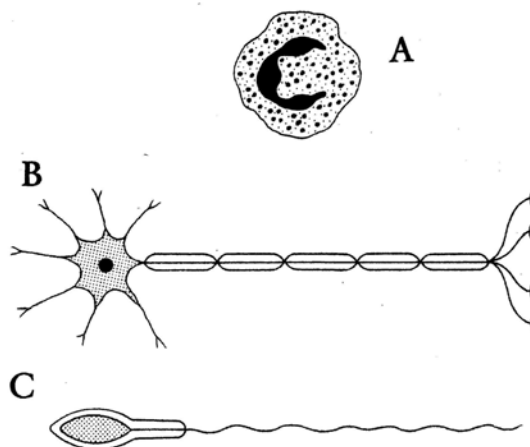
Question No.	Section A								Section B					
	1	2	3	4	5	6	7	8	1	2	3	4	5	
Max mark	6	5	5	9	7	7	10	6	15	15	15	15	15	
Actual mark														TOTAL MARK

85% Theory Paper	15% Practical	100% Final Score

Section A

Answer ALL questions in this section.

1a. Name **each** of the following cells.



A: _____

B: _____

C: _____

(3 marks)

b. Draw a well-labelled diagram of a typical plant cell.

(3 marks)

Total 6 marks

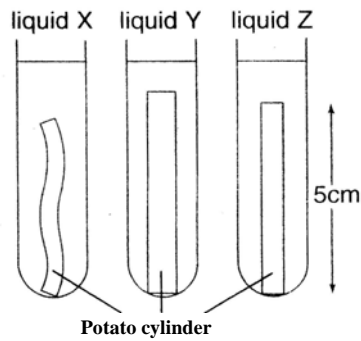
2. The following diagram shows four onion cells immersed in four different sugar solutions P, Q, R and S.



a. Write the solutions arranged in order of increasing sugar concentration.

_____ (2 marks)

- b. A biology student carried out an experiment in which potato cylinders initially measuring 5cm in length, were placed in three different liquids (X, Y, Z) for 24 hours.



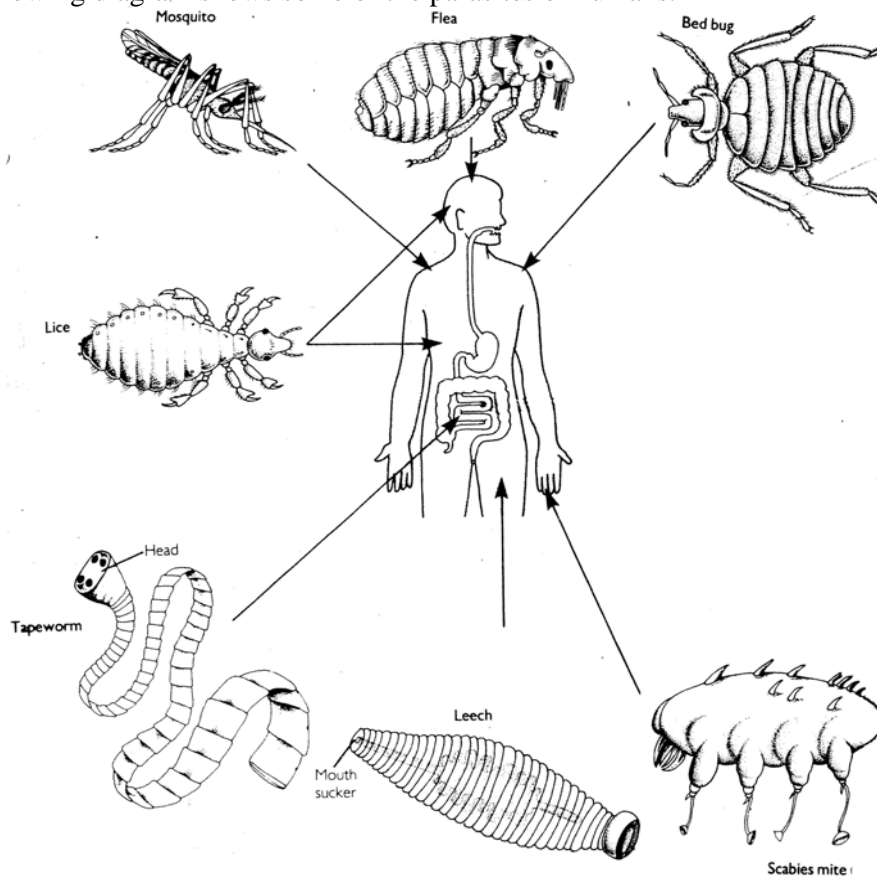
- (i) Describe what happened to the potato cylinder placed in liquid X. Give a reason for your answer.

- (ii) Which liquid would you expect to be pure water?

(2, 1 mark)

Total 5 marks

3. The following diagram shows some of the parasites of humans.



- a. Define the term parasite.

(1 mark)

b. From the parasites shown in the diagram name:

(i) ONE flatworm _____

(ii) ONE segmented worm (annelid) _____

(iii) ONE insect. _____

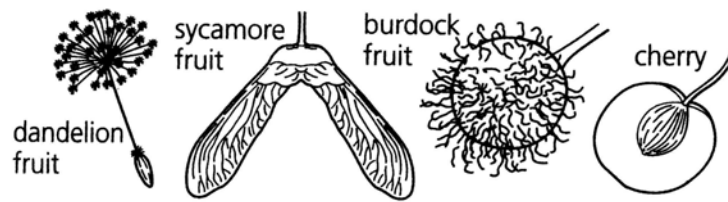
(1, 1, 1 mark)

c. Explain why all viruses are considered as parasitic.

_____ (1 mark)

Total 5 marks

4. The following diagram shows some fruits and seeds.



a. Which TWO fruits are carried by the wind? Give a reason for **each** answer.

(2, 2 marks)

b. Explain why burdock fruits have hooks.

_____ (1 mark)

c. If a seed is given the right conditions it will germinate.

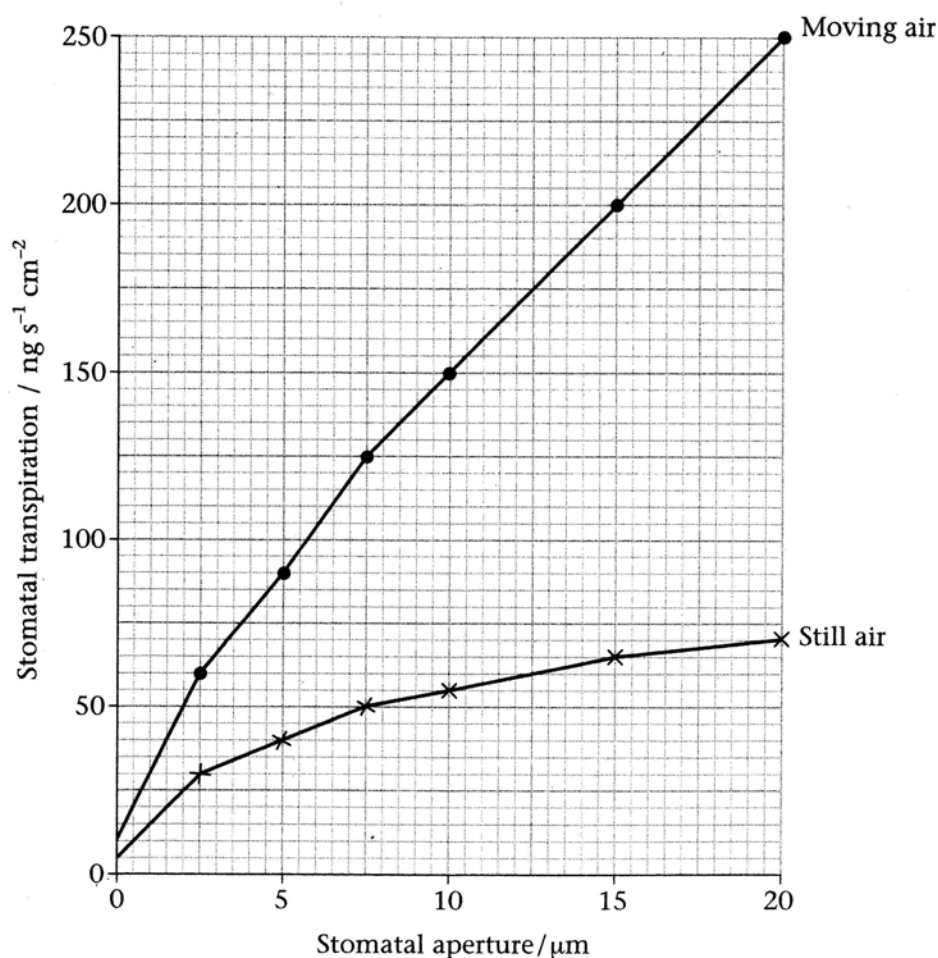
(i) Define the term germination.

(ii) List THREE conditions necessary for germination to take place.

(1, 3 marks)

Total 9 marks

5. The following graph shows the results of an investigation into the relationship between the diameter of the stomatal aperture and the rate of transpiration in still and moving air.



- a. Describe the relationship between stomatal transpiration and stomatal aperture in **still** air.
_____ (1 mark)
- b. Compare the transpiration results obtained for moving air and those obtained for still air. Give a reason for your answer.

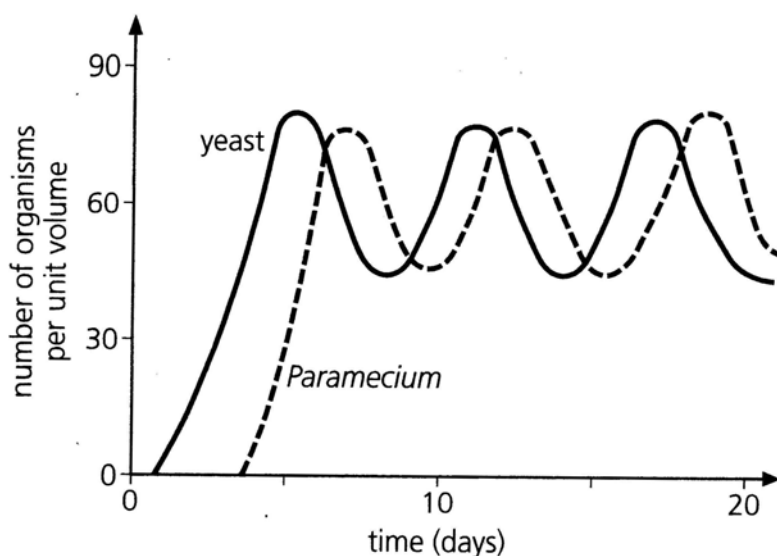
_____ (2 marks)
- c. Suggest ONE environmental factor which needs to be kept constant during this investigation. Give a reason for your answer.

_____ (2 marks)
- d. Using data from the graph calculate the percentage change in stomatal transpiration in moving air compared to still air when the stomatal aperture is $2.5\mu\text{m}$.

_____ (2 marks)

Total 7 marks

6. The following graph shows what happens when a number of single celled organisms called Paramecium are added to a population of yeast. The Paramecia feed on yeast.



- a. Name the kingdom of the organisms below

(i) yeast

(ii) Paramecium.

(1, 1 mark)

- b. What happens to the yeast population after the Paramecium are added? Give a reason for your answer.

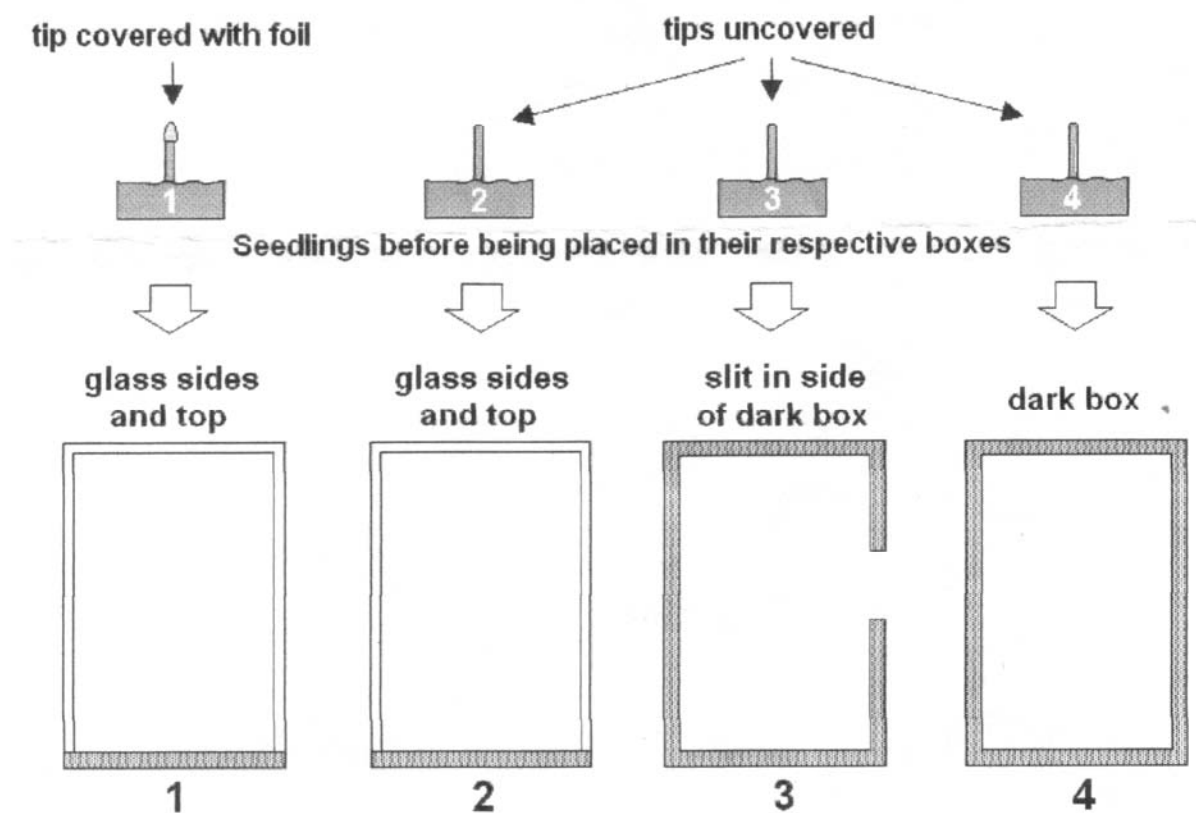
 _____ (2 marks)

- c. Suggest what would happen to the yeast population over a period of 20 days, if the Paramecium were taken away.

 _____ (3 marks)

Total 7 marks

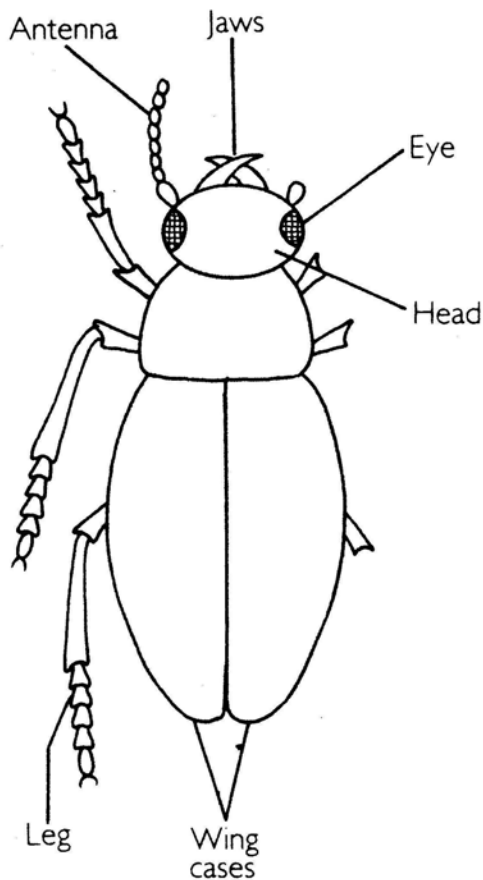
7. A student set up the following experiment. Each of the seedlings was put in its corresponding box, and their growth was observed a couple of days later. Each of the boxes was placed in the same uniform environment.



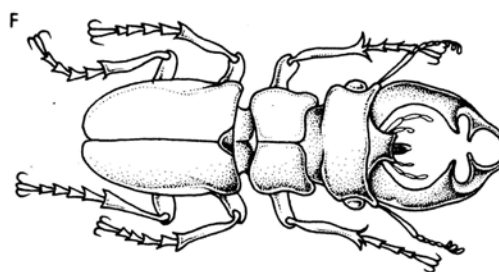
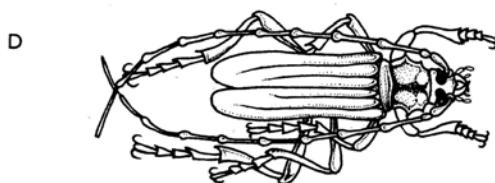
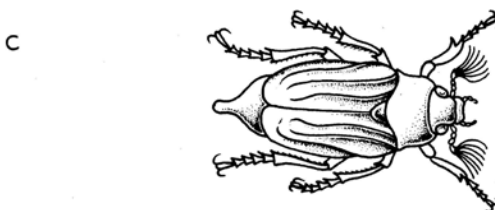
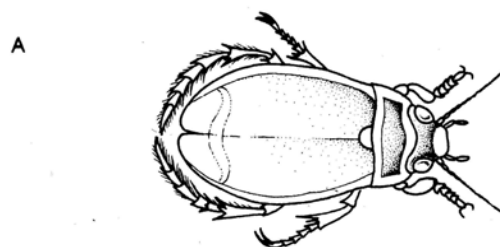
- In **each** box draw the appearance of the seedlings as you would expect them after a few days.
(4 marks)
- For each box write a explanation for the pattern of growth you have drawn.
 Box 1: _____
 Box 2: _____
 Box 3: _____
 Box 4: _____
 (4 marks)
- Suggest why each box was placed in the same uniform environment.
 _____ (1 mark)
- What was the student trying to study during the experiment?
 _____ (1 mark)

Total 10 marks

8a. Study the following diagram of the beetle and then use the identification key below to name the beetles A to F.



1 Hind legs pointed and fringed with hairs	Diving beetle
All legs in two claws	2
2 Wing cases very small	Rove beetle
Wing cases large	3
3 Large jaws	Stag beetle
Jaws small, or jaws not shown in drawing	4
4 Antennae have brush-like tufts of hairs at tip	Cockchafer
Antennae not like above	5
5 Antennae longer than body	Long-horned beetle
Antennae shorter than body	Weevil



A: _____

D: _____

B: _____

E: _____

C: _____

F: _____

(6 marks)

Total 6 marks

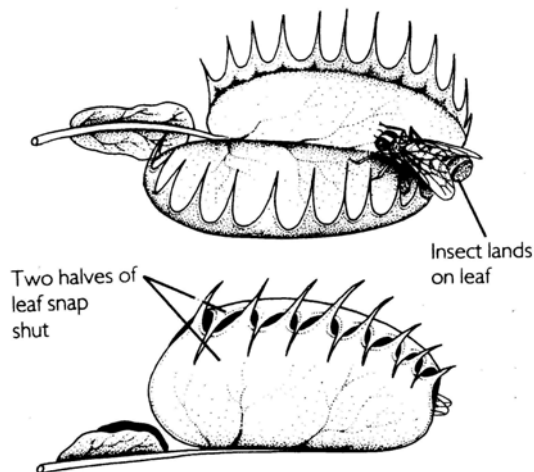
Section B

Answer question 1 in this section and any TWO others. Answer the questions of this section on a foolscap.

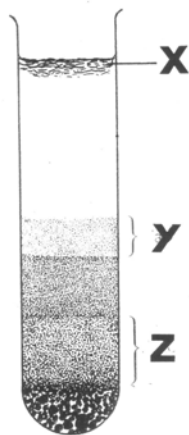
1. Read the following passage and then answer the questions that follow.

Insect-eating Plants

Insect-eating plants have chlorophyll and are capable of photosynthesis but they live in waterlogged and acid soils which contain very little nitrate. Nitrate is a chemical containing nitrogen which plants need to make proteins. Insect-eating plants obtain nitrogen from the bodies of insects which are caught in various ways. For example the Venus fly-trap has leaves with a hing-like midrib and a row of spikes around the edge. When an insect lands on a leaf the two halves snap together and the spikes interlock. After the insect has been digested the leaf opens and the undigested remains dry up and blow away.

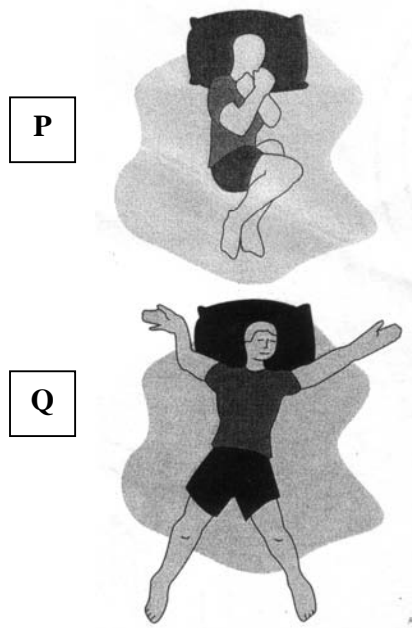


- a. From the passage name:
- (i) the pigment that absorbs sunlight
 - (ii) the process by which plants make their own food
 - (iii) the substance plants obtain from the insects they catch. (1, 1, 1 mark)
- b. (i) List THREE ways in which insects might be attracted to the Venus fly-trap.
- (ii) Explain why the spikes of the leaves of the Venus fly-trap interlock once the insect lands on a leaf. (3,1 mark)
- c. Name TWO disadvantages of waterlogged soils. (2 marks)
- d. The most fertile soil is called Loam. Loam contains 50% sand, 30% clay and 20% humus.
- (i) What is humus?
 - (ii) List TWO ways in which humus improves soil.
 - (iii) A biology student shakes up some soil in water and leaves it to settle. The following diagram shows the settling of the soil particles. Use the letters X, Y and Z to identify which layer is sand, clay and humus. (1, 2, 3 marks)



Total 15 marks

2. The skin is a large organ.
- a. What is an organ made up of? (1 mark)
- b. Write the function of **each** of the following:
- (i) epidermis
 - (ii) fat layer underneath the skin
 - (iii) hair erector muscles
 - (iv) sebum (oily secretion) produced by the sebaceous gland. (1, 1, 1, 1 mark)
- c. The production of sweat changes according to the weather.
- (i) Compare the changes taking place in sweat production in hot and cold weather.
 - (ii) Give a reason for your answer in b (i). (2, 2 marks)
- d. Explain when and why a person shivers. (3 marks)
- e. The following diagrams (P and Q) show different positions taken by an individual in different temperatures



Which position would be taken by the individual in a hot room? Give a reason for your answer. (3 marks)

Total 15 marks

3. Butterfly caterpillars are commonly seen in gardens.
- a. What stage of the process of metamorphosis is the caterpillar representing? (1 mark)
- b. Explain why
- (i) some caterpillars resemble bird droppings or twigs
 - (ii) farmers consider most caterpillars as their enemy. (1, 1 mark)
- c. Farmers are using the bacterium *Bacillus thuringiensis* to control large infestations of butterfly caterpillars. Farmers spray their crops with water containing this bacterium. Caterpillars eating the leaves are infected by the bacterium and die.
- (i) What is the term used to describe this method of controlling large numbers of butterfly caterpillars?
 - (ii) List TWO benefits of using a bacterium to control the numbers of butterfly caterpillars. (1, 2 marks)

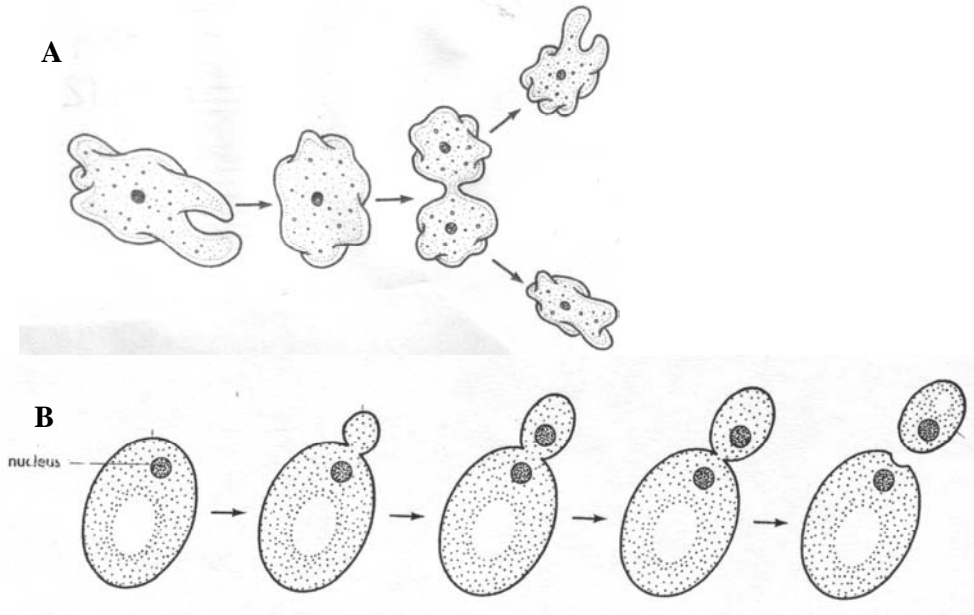
- d. Gardeners are encouraged to grow flowers such as marigolds in order to attract hoverflies. Hoverflies are welcomed garden predators of greenflies and blackflies.
- Write the term used to describe insects such as greenflies and blackflies on which the hoverfly feeds.
 - Draw a diagram to show the different parts of an insect pollinated flower.
 - Explain why plants that have been watered look upright but plants that have not been watered start to wilt.

(1, 5, 3 marks)

Total 15 marks

4. Diagrams A and B show two different methods of reproduction. Name the process that is being illustrated in each of the diagrams A and B.

(2 marks)



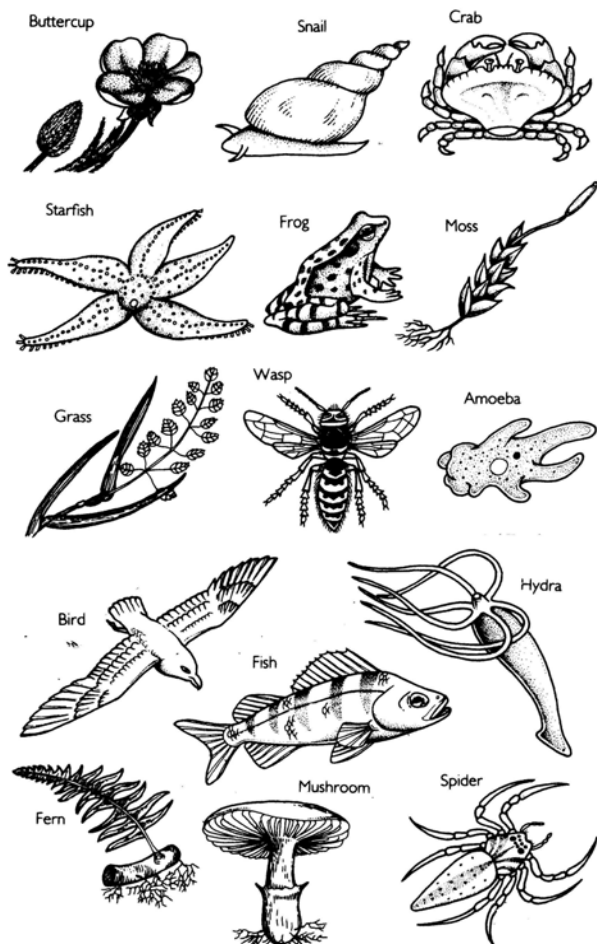
- What type of reproduction is taking place in both processes shown in diagrams A and B.
 - List TWO advantages of the methods you name in b (i).
- Name and describe the process that follows pollination.
 - Distinguish between self-pollination and cross-pollination.
- All living things respire and excrete.
Explain why **each** of these two processes are necessary.
- List TWO other vital functions carried out by all living things.

(2 marks)

(2 marks)

Total 15 marks

5. The following diagram shows organisms from different kingdoms.



- a. The moss, the fern, the buttercup and grass all belong to the plant kingdom.
Name
 (i) ONE characteristic of the fern
 (ii) the phylum to which both the buttercup and the grass belong.
 (1, 1 mark)
- b. From the diagram list ONE organism belonging to the
 (i) phylum Coelenterates
 (ii) phylum Molluscs.
 (1, 1 mark)
- c. Name the other TWO kingdoms (besides the plant and animal kingdoms) that are represented by the organisms shown in the diagram.
 (2 marks)
- d. Explain the importance of the
 (i) swimbladder in fish
 (ii) streamlined shape in birds
 (iii) pseudopodia in Ameoba
 (iv) tentacles with stinging cells in Hydra.
 (1, 1, 1, 1 mark)
- e. Generally fish carry out external fertilisation while birds have internal fertilisation. Distinguish between external and internal fertilisation.
 (2 marks)
- f. (i) Explain why garden snails live in cool, damp places such as under stones.
 (ii) Explain why the wasp, the crab and the spider are all classified as arthropods. (1, 1 mark)
- g. List ONE structural difference between the spider and the wasp.
 (1 mark)

Total 15 marks