

Annual Examinations for Secondary Schools 2019

YEAR 11 **BIOLOGY** **TIME: 2 hours**

Name: _____

Class: _____

Question No.	Section A							Section B					
	1	2	3	4	5	6	7	1	2	3	4	5	
Max. mark	10	7	5	8	6	12	7	15	15	15	15	15	
Actual mark													TOTAL MARK

85% Theory Paper	15% Practical	Final Score

Section A: Answer all questions in this section.

1. Figure 1 below shows five protists.

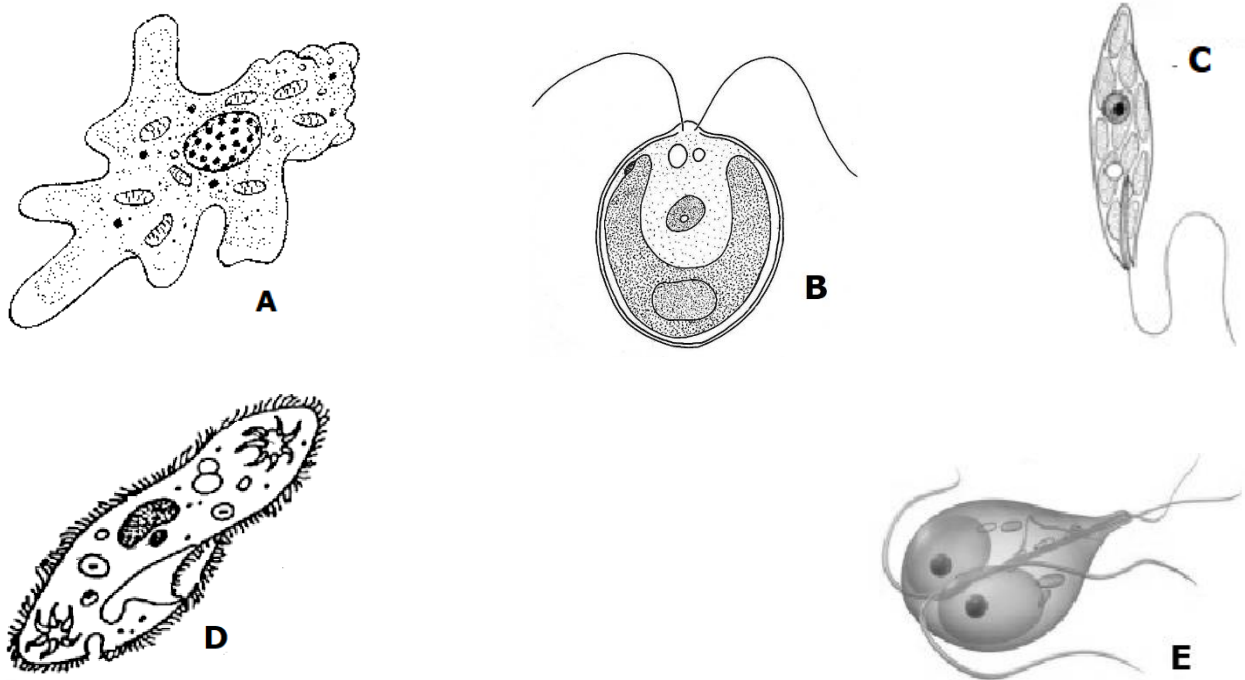


Figure 1

a. Identify protists **B**, **D** and **E** from the following dichotomous key.

1. Have flagella or cilia.....Go to 2
Do not have flagella or cilia.....**Amoeba**
2. Have flagella.....Go to 3
Have cilia.....**Paramecium**
3. Have two or more flagella.....Go to 4
Have one flagellum.....**Euglena**
4. Have an oval structure with equal sized flagella.....**Chlamydomonas**
Have oval structure with a tapering end and unequally sized flagella.**Giardia**

(3)

B _____ **D** _____ **E** _____

b. i. Protist C has a flagellum but also chloroplasts. It behaves like a plant in light but like an animal in the dark. Explain the mode of nutrition when 'It behaves like a plant in light'. (2)

- ii. Describe the function of the flagellum. (2)

- c. Protist A reproduces by binary fission.
i. State whether this mode of reproduction is sexual or asexual. (1)

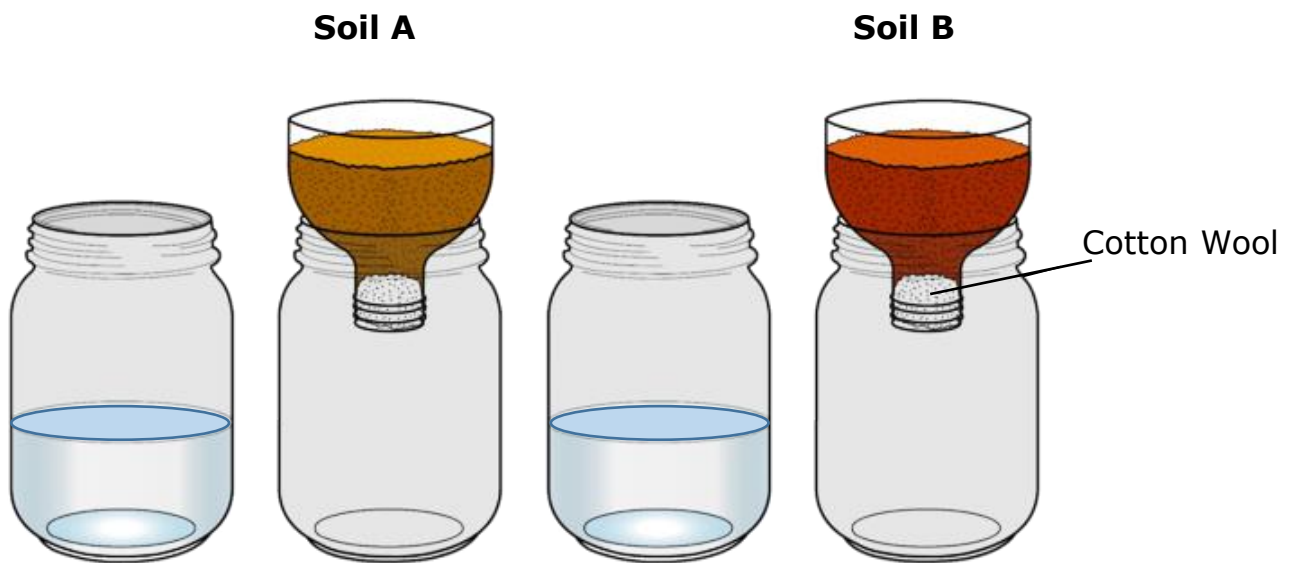
- ii. Give **one** advantage and **one** disadvantage of this mode of reproduction. (1, 1)

Advantage _____

Disadvantage _____

Total: 10 marks

- 2a. In an investigation on the retention of water by soil, the following apparatus is used. The water in the jars is slowly tipped into each soil.



<http://www.thunderboltkids.co.za/Grade5/04-earth-and-beyond/chapter2.html>

Figure 2

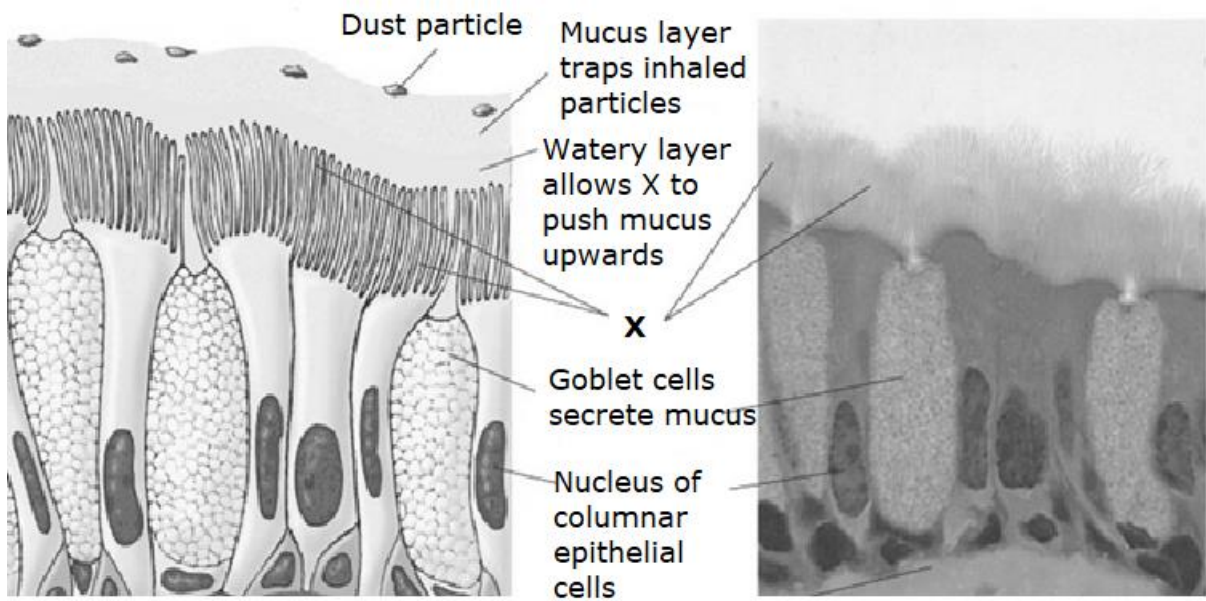
- i. Given that soil A is loam soil and soil B is clay soil, draw on the diagram the level of water that passes through into **each** jar. (2)
- ii. Explain the reason to your answer to ai., in terms of particle size and air spaces of soils A and B. (2)

iii. State **one** variable that must be kept constant throughout this investigation. (1)

b. Organic matter is a source of mineral nutrients in soil. Give **one** other advantage of organic matter in soil. (2)

Total: 7 marks

3. Figure 3 shows the inner lining of the trachea of the respiratory system.



Adapted from <https://socratic.org/questions>

Figure 3- Drawing and photomicrograph of inner lining of trachea

a. The inner lining of the trachea is defined as a tissue. Define the term tissue. (2)

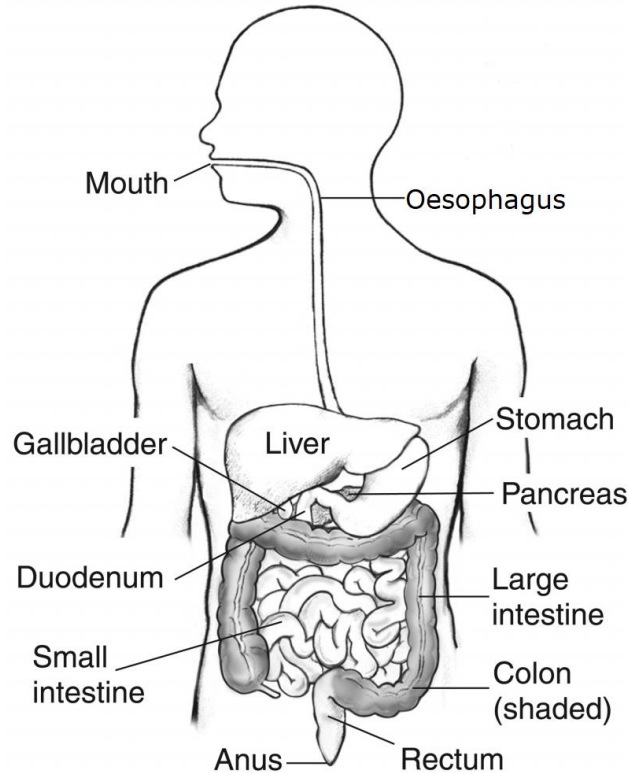
b. i. Name the structures labelled X. (1)

ii. Describe the function of structures X in terms of defence against disease. (1)

c. Identify the function of the nucleus of these cells. (1)

Total: 5 marks

4. Figure 4 shows the diagram of a human alimentary canal.



<http://humananatomyly.com/>

Figure 4

a. List the structure that matches the following statement: (4)

Statement	Structure
Secretes the enzyme trypsin	
Secretes an acidic juice that destroys bacteria in food	
The site where absorption of digested food occurs	
Produces bile	

b. Explain why the following statements are **incorrect**.

i. The human colon contains bacteria that digest cellulose. (2)

ii. Digestive enzymes act more easily on food that is not chewed. (2)

Total: 8 marks

5. The Algerian hedgehog (Maltese: Qanfud) is a terrestrial mammal found on the Maltese Islands. It feeds on snails, slugs, insects and small vertebrates such as frogs and lizards.

a. Define the term vertebrate. (1)

b. i. List **two** characteristics of mammals. (2)

ii. The binomial name of the Algerian hedgehog is *erinaceus algerius*. Write down the binomial name in the correct form. (2)

c. From the initial statement above, name the animal that is an endotherm. (1)

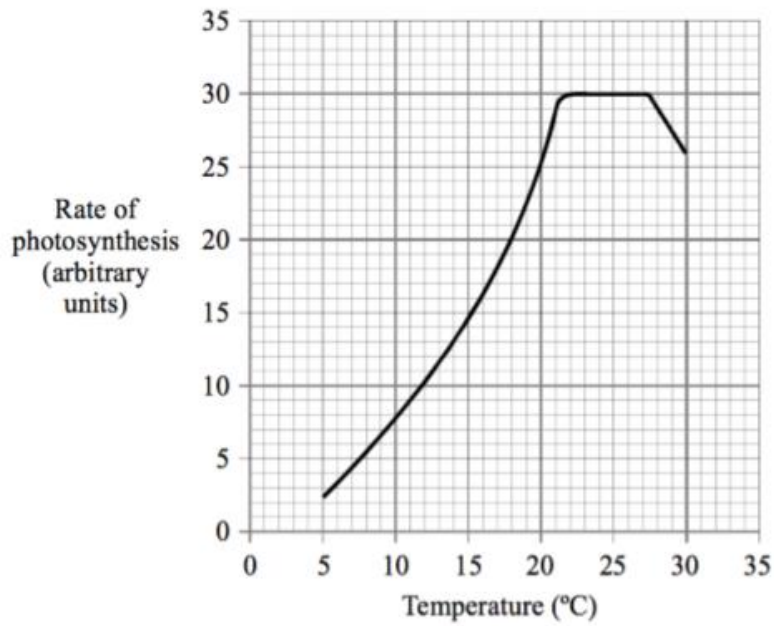
Total: 6 marks

6a. Table 1 below summarises photosynthesis and respiration reactions at different 24-hour conditions. Fill in the missing sections with appropriate biological content. (6)

Condition	Rate of Photosynthesis vs Rate of Respiration	Overall result
Dark (Night)		
	Photosynthesis rate equals respiration rate	
		Carbon dioxide taken in from air and oxygen released in air

Table 1

b. The graph below shows the effect of temperature on the rate of photosynthesis.



Graph 1

Explain why:

- i. The rate of photosynthesis increases between 5°C and 21°C. (2)

- ii. There is no change in the rate of photosynthesis between 21°C and 27°C. (2)

- iii. Above 30°C, there is no photosynthesis occurring. (2)

Total: 12 marks

7. Hypophosphatemia is a form of rickets caused by an X-linked dominant allele. The action of this allele stops the effect of vitamin D on the body, resulting in bow shaped legs.

a. The phenotypic ratio of a cross between an affected mother and an unaffected father is the following:

25% unaffected son
25% affected son

25% unaffected daughter
25% affected daughter

Using a genetic diagram in the space below, show how the results of this cross is obtained. (4)

Parents' Genotype: Mother _____ Father _____

Gametes:



Cross:

Results:

b. Explain why when an affected male is crossed with an unaffected female all the sons born to this couple are unaffected. (2)

c. Name **one** food that is rich in vitamin D. (1)

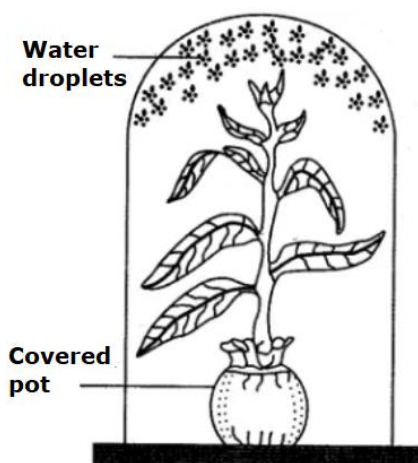
Total: 7 marks

Section B: Answer any THREE questions from this section on the foolscaps provided.

1. An article on predator-prey interactions in the Arctic carried the following statements.
 - a. Wolf spiders don't make webs. This type of spider hunts on the ground and can eat almost anything smaller in size, from plant-eating bugs to other predators. But they really love to eat *Collembola*, the small arthropods commonly called springtails. It's this spider's snack that connects them to the below ground environment. Springtails eat both decaying plants and fungi.
 - i. List **two** characteristics of Arthropods. (2)
 - ii. Springtails are insects while spiders are arachnids. Distinguish between insects and arachnids. (2)
 - iii. Plants and Fungi are two different kingdoms. State **one** characteristic of each kingdom. (2)
 - b. Arctic wolf spiders are thus said to have an "indirect" effect on decomposition. The spiders eat animals (springtails) that eat plants. But springtails also eat fungi; if more fungi-eaters get eaten, then fungi grow unchecked. When there is a lot more fungal activity, there is faster decomposition.
 - i. Define the term decomposition. (2)
 - ii. From the text, write down a food chain. (2)
 - iii. Describe a food web. (2)
 - c. Carbon is an element released during decomposition. Describe how carbon is recycled in the environment. You may use a diagram to describe the carbon cycle. (3)

Total: 15 marks

- 2a. Below is a simple apparatus showing the process of transpiration.



<https://www.aplustopper.com/transpiration-icse-solutions-class-10-biology/>

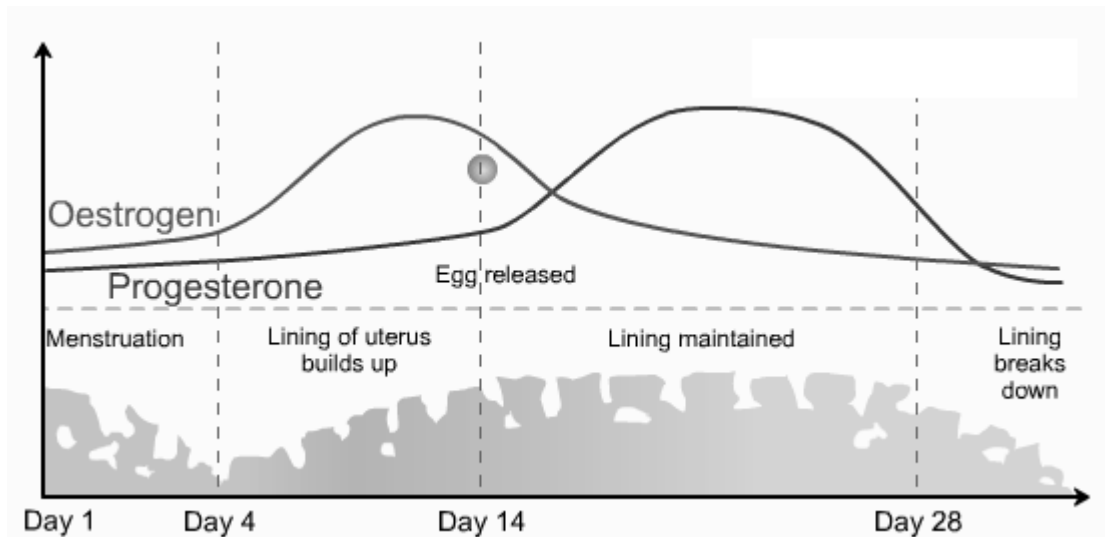
Figure 5

- i. Explain why transpiration is important to vascular plants. (3)
- ii. Covering the pot is a precaution. Explain the importance of this precaution. (2)
- iii. List **two** factors that may affect transpiration. (2)

- b. Draw a cross-section of a dicot stem and label the tissues forming a vascular bundle. (5)
- c. i. Name the tissue that transports water up the stem. (1)
 ii. Describe the structure of this tissue. (2)

Total: 15 marks

3. The graph below shows the fluctuations of the hormones oestrogen and progesterone involved in a menstrual cycle.



<http://www.frankswebpace.org.uk/ScienceAndMaths/biology/menstrual.htm>

Graph 2

- a. Name the organ that secretes both oestrogen and progesterone. (2)
- b. From the graph describe the fluctuations of oestrogen in a 28 day cycle. (3)
- c. i. Define menstruation. (2)
 ii. Explain the importance of the building up and maintaining of the uterine wall. (4)
- d. i. Fertilisation can occur up to 24 hours after ovulation. Explain. (2)
 ii. Name the first cell produced after fertilisation. (1)
 iii. Name the organ where implantation occurs. (1)

Total: 15 marks

4. Osmoregulation in humans is a mechanism to maintain volume and composition of body fluids.

- a. Draw a cross-section of the mammalian kidney. Label the cortex, medulla, pelvis, blood vessels and ureter. (6)
- b. i. Name the structure in the kidney that performs osmoregulation. (2)
 ii. Define the term osmoregulation. (2)
- c. Blood vessels leading to and away from an organ consist of arteries and veins.
 i. List **two** structural differences between an artery and a vein. (4)
 ii. Name the tiny one cell thick vessels that allow diffusion of nutrients from the blood to the cells. (1)

Total: 15 marks

5a. Mention **one** similarity and **one** difference between the following biological terms:

- i. parasitism and mutualism; (4)
- ii. mitosis and meiosis; (4)
- iii. mosses and conifers. (4)

b. Explain the following statement: Organisms cannot survive without water. (3)

Total: 15 marks