



**Annual Examinations for Secondary Schools 2019**

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**YEAR 9** **BIOLOGY** **MARKING SCHEME**

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**Section A**

- 1.** a. Mitochondrion (1)  
b. It is responsible for cellular respiration and production of energy in the cell. (1)  
c. Root hair cell in plants (1)  
as energy is required for absorption by active transport. (1)  
*or equivalent*  
d. The mitochondrion is a very small organelle (1)  
and the light microscope's magnification is limited, making it difficult to  
observe details. (1)

**[Total: 6 marks]**

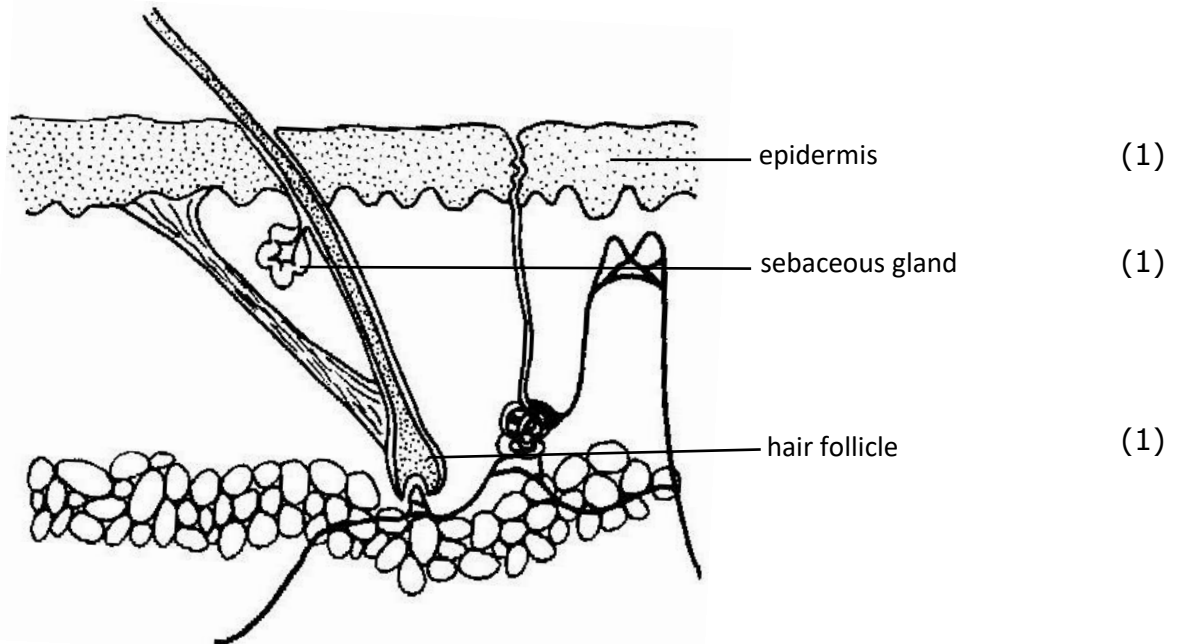
- 2.** a. The cell wall of plant cells is made up of cellulose, (1)  
while the cell wall of fungal cells is made of chitin. (1)  
b. i. Photo 'D' (1)  
ii. A mutualistic relationship is when two organisms of different species  
collaborate for the benefit of both organisms. (1)  
iii. Reproductive structures in gymnosperms are in the form of cones  
carrying naked seeds (not enclosed in an ovary). (1)  
c. A filamentous fungus consists of multicellular branching structures  
called hyphae (1)  
that secrete enzymes to digest food outside the organism. (1)

**[Total: 9 marks]**

- 3.** a. Arthropods (1)  
Insects (1)  
b. The organism appears to have 3 pairs of jointed legs. (1)  
c. Abdomen (1)  
d. This organism lives in a cave with little or no light where eyes would not  
have served a purpose. (1)  
Therefore the organism lost the ability to see to save energy and resources  
on maintaining functional eyes. (1)  
e. The adult organism lays eggs. (1/2)  
Eggs hatch and a larva comes out. (1/2)  
The larva becomes a pupa, (1/2)  
from which the adult organism develops. (1/2)

**[Total: 8 marks]**

4. a. i.



- ii. It helps keep the skin moisturised and the hair lubricated. (1)
- b. i. It provides protection against bacterial attack (1)  
and provides a waterproof barrier preventing water loss. (1)
- ii. receptors (1)
- c. When the temperature increases, the skin releases sweat from the sweat glands for a cooling effect and the blood capillaries vasodilate and move upwards to lose heat from the blood to the surroundings. (1)
- When the temperature decreases, the blood capillaries vasoconstrict and move downwards to reduce heat losses from the blood to the surroundings. (1)
- Skin insulates the body from heat losses with the adipose tissue and by trapping a layer of air when skin hairs are erected. (1)

**[Total: 11 marks]**

5. a. i. Shoot is growing and bending towards the light source. (1)
- ii. phototropism (accept: positive phototropism) (do not accept: tropism) (1)
- b. When light hits the plant shoot a chemical called auxin moves to the opposite side where it promotes growth of the side in the shade. (1)
- Increased growth on the shady side of the shoot induces bending towards the light source. (1)
- c. This function ensures that the plant is in the best position possible to expose itself to light, ensuring that it can perform photosynthesis efficiently. (1)

**[Total: 8 marks]**

6. a. Diffusion (1)
- b. Being multicellular and bigger than *Euglena* the frog has a lower surface area to volume ratio and therefore, requires a specialised organ to help in this process. (1)
- c. i. Specialised cells are cells that have developed certain features to perform a particular biological function. (1)
  - ii. red blood cell (1)  
or white blood cell or muscle cell or sperm or neurone  
or any equivalent
- d. chloroplast (1)

**[Total: 7 marks]**

7. a. i. Bryophytes do not have vascular tissue, while pteridophytes do, allowing pteridophytes to transport water as far away from the ground source as needed. (1)
- ii. They have better exposure to the light source. (1)
- b. i. They have a waxy layer covering their leaf-like fronds. (1)
- ii. Pteridophytes can colonise drier areas, while bryophytes are restricted to damp environments. (1)

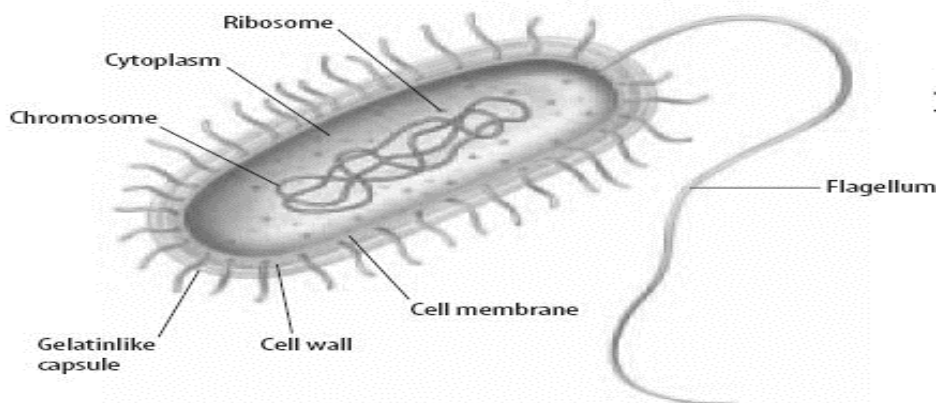
**[Total: 6 marks]**

**Section B**

1. a. i. light (1)  
moisture (*accept: water*) (1)  
or temperature (*accept: heat*) (1)
- ii. fungi (1)  
bacteria (1)

b.

i.



- (1)  
(1)  
(1)  
(1)  
(1)

Accept:

2 marks for correct drawing  
3 marks for three correct labels

- ii. nucleus (*accept: nuclear membrane*) (1)
- iii. Xylella (*award half a mark only if not underlined*) (1)
- c. Binary fission is a form of asexual reproduction where a cell divides to form two identical daughter cells. (1)
- d. Bacteria are living, while viruses are considered borderline. (1)  
or Bacteria are bigger than viruses. (1)  
or Bacteria can be controlled by antibiotics, while viruses cannot. (1)  
or Bacteria do not require a host to reproduce, while viruses do. (1)  
or equivalent

**[Total: 15 marks]**

2. a. i. vegetative reproduction (1)
- ii. does not require fertilisation (faster process) (1)  
or lack of variation can mean that characteristics enabling survival in the specific habitat can be replicated.  
or equivalent
- b. Allows variation and seed dispersal that provides potential for colonising new areas. (1)
- c. i. exposes flowers to pollination and fruit to more efficient seed dispersal. (1)
- ii. produces the male sex cell pollen (1)

- and is adapted to its distribution. (1)
- iii. it produces and houses the ovule (1)  
and is adapted to receive the pollen for fertilisation. (1)  
(*accept: it will become the fruit*)
- d. i. long slender leaves (1)  
parallel venation (1)  
or fibrous root system  
or one seed cotyledon  
or floral parts in multiples of 3
- ii. succulent leaves (1)  
or succulent stem (1)  
or stomata in sunken pores  
or thicker waxy cuticle  
or leaf able to roll  
or leaf has hairs  
or leaves have reduced surface area (*accept: spine-like leaves*)  
or long widespread roots  
or stomata only on underside of leaf  
or stomata close during the day  
(*or equivalent*)
- e. space (1)  
water (1)  
or nutrients  
or light  
or oxygen  
(*or equivalent*)

**[Total: 15 marks]**

- 3.**
- a. osmosis (1)
  - b. i. Test tube A (1)
  - ii. This beetroot disc, by means of its cells, absorbed a lot of water (1)  
in an attempt to reduce the sucrose concentration inside the beetroot. (1)  
This resulted in the beetroot gaining mass. (1)
  - c. In beetroot B there was the lowest gain in mass, (1)  
while in beetroot C there was the lowest loss in mass. (1)  
No net change in mass indicating a balance between concentrations of  
sucrose inside and outside beetroot cells would have occurred between 0.2  
mol/dm<sup>3</sup> and 0.4 mol/dm<sup>3</sup>. (1)
  - d. i. Test tube A (2)
  - ii. Test tube F (2)
  - e. Being plant cells, beetroot cells will not burst even when they absorb a lot  
of water (1)  
because they have a cell wall that can withstand turgor pressure. (1)
  - f. So that the same size and length of the beetroot discs would contribute to (1)  
the experiment being a fair test. (1)

**[Total: 15 marks]**

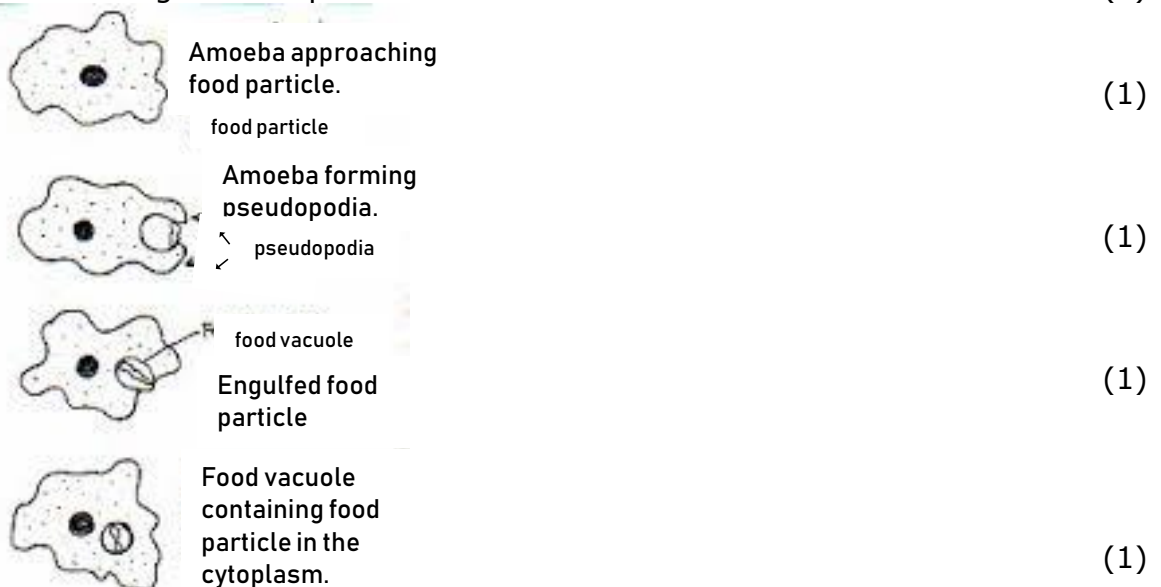
- 4.**
- a. i. water (1)  
oxygen (1)  
or  
the right temperature  
or  
the right substrate  
(*accept: the right presence or absence of light*)
  - ii. Under the soil surface the plumule is not exposed to light (1)  
and therefore, it cannot photosynthesise. The store of food is used instead. (1)

- iii. Active transport is the movement of mineral ions or molecules across a cell membrane against a concentration gradient, a process requiring energy. (1)
- iv. Keeps their body light enough to be able to fly. (1)
- v. feathers covering their skin (1)
- lay eggs with a hard shell *or* endotherms *or* forelimbs modified into wings (1)
- or* have toothless beaks
- b. i. aquatic (*accept: water*) (1)
- ii. a streamlined body with fins (1)
- to help with efficient swimming (1)
- gills (1)
- allowing gas exchange in water (1)
- or* scales covering the body. (1)
- protection and reduce water resistance

**[Total: 15 marks]**

5. a. i. organic – humus (*accept: dead decaying matter*) (1)
- inorganic – rock particles (*accept: minerals*) (1)
- or equivalent*
- ii. If the gaps between particles fill up with water, air (including gaseous oxygen) will be completely displaced and the roots will not have a good supply for respiratory purposes. (1)
- A thin film of water around soil particles is just enough for the roots to absorb water while having oxygen still abundantly available. (1)
- b. i. They have a long thread-like body. (1)
- or*
- They are round in cross-section.
- ii. An organism that has a relationship with another species, living on it or in it, while harming it in the process. (1)

c.



- d. Earthworms are beneficial to soil because while burrowing they aerate it. (2)
- They also eat the soil, egesting it as casts and making it more fertilised. (2)
- or* Earthworms pull leaf litter beneath the soil surface to eat away from sunlight, thus increasing the soil fertility.

**[Total: 15 marks]**