



Annual Examinations for Secondary Schools 2019

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

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]

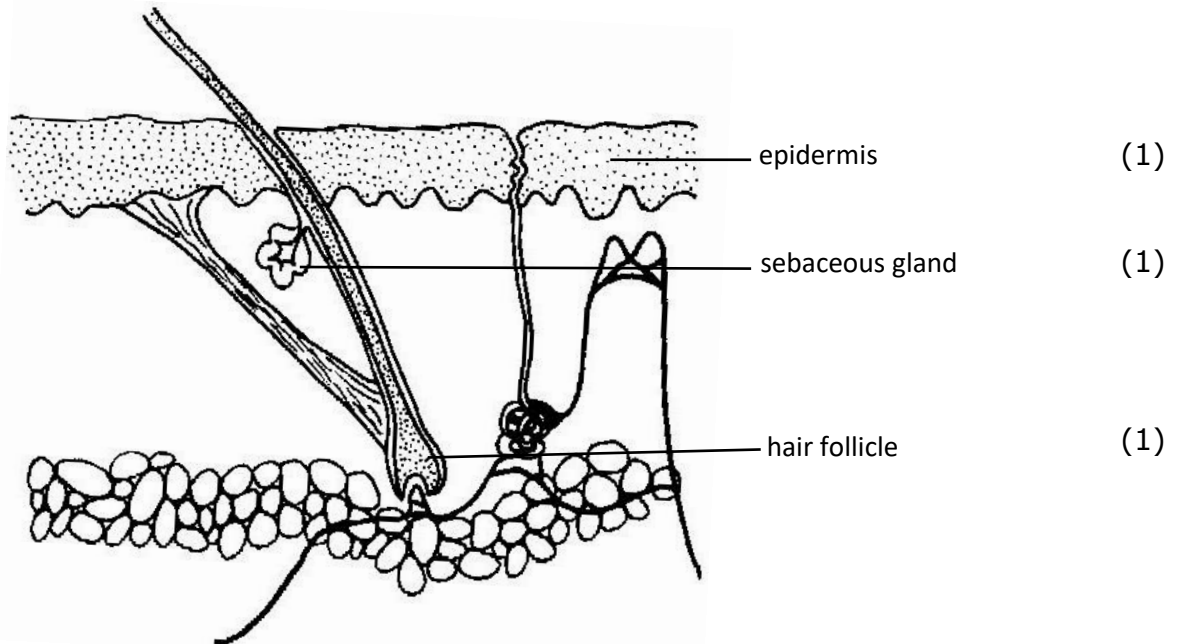
- 2.** a. The cell wall of plant cells is made up of cellulose, (1)
while the cell wall of fungal cells is made of chitin. (1)
b. i. Photo 'D' (1)
ii. A mutualistic relationship is when two organisms of different species
collaborate for the benefit of both organisms. (1)
iii. Reproductive structures 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 and provides a waterproof barrier preventing water loss. (1)
- ii. Receptors (Accept sensory nerve endings) (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. 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 or white blood cell or muscle cell or sperm or neurone or any equivalent (1)
- 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)

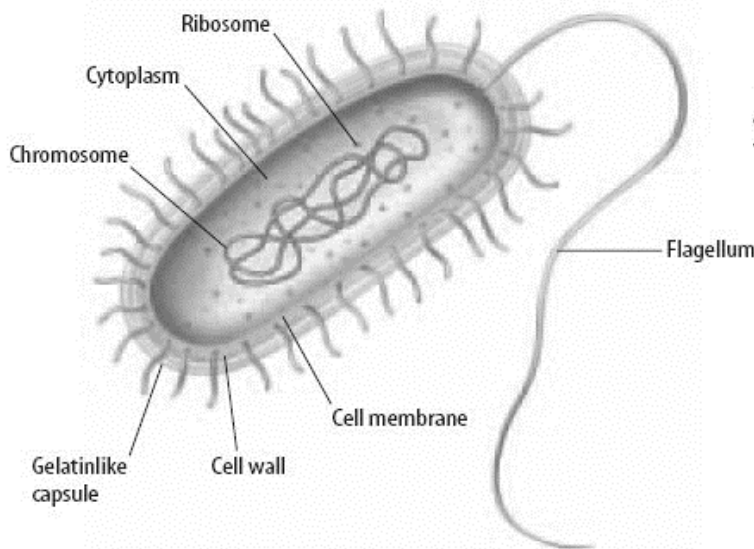
[Total: 6 marks]

Section B

1. a. i. light (1)
In its absence a plant cannot produce enough food. (1)
or
moisture (*accept: water*)
In its absence the plant experiences reduced photosynthesis, nutrient transportation issues and reduced support.
or
temperature
Too low or too high temperatures can make the plant work less efficiently.
- ii. bacteria (1)
or (1)
humans
or
insects

b. A tissue is a group of similar cells that together carry out a specific function. (1)

c. i.

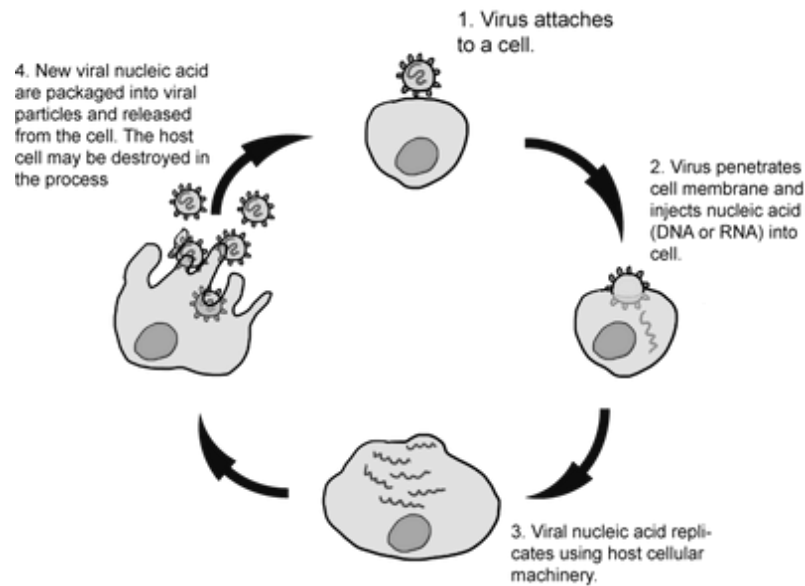


Accept:
1 mark for correct diagram;
2 marks for 4 correct labels
(1/2 mark each).

- ii. Bacteria do not have a nuclear membrane, making them prokaryotes. (1)
- iii. Xylella (*award half a mark only if not underlined*) (1)

d. Binary fission is a form of asexual reproduction where a cell divides to form two identical daughter cells. (1)

- e. Viruses need to invade cells to reproduce using the cell's resources. (1)



(1)

[Total: 15 marks]

2. a. Vegetative reproduction is an asexual mode of reproduction that can be rapid (1)
as it does not require fertilisation. (1)
- b. Sexual reproduction followed by seed dispersal assists the plant to colonise new areas, increasing variation and avoiding intraspecific competition. (1)
- c. This increases exposure for pollination (1)
as well as seed dispersal. (1)
- d. The stamen is the male sex organ in the flower (1)
that produces and sheds pollen. (1)
The ovary is the female sex organ in the flower (1)
that receives pollen and facilitates its encounter with the ovule. (1)
- e. fibrous root system (1)
lacking a main root, roots branching directly from the base of the stem. (1)
- f. Succulent leaves are thick and store water. (1)
This ensures that every drop of water available is absorbed, to be used whenever needed if there is a lack of water supply. (1)
- g. i. interspecific competition (1)
ii. food (1)
or space
or water
(accept: nutrients)

[Total: 15 marks]

3. a. i. F (1)
ii. Test tube F was the one that lost most mass (1)
and that is because the beetroot lost a lot of water and other substances from the contents of the test tube. (1)
- b. i. Test tube A (1)
ii. The concentration of the sucrose solution in the beetroot cells must have been higher than that of the test tube contents (no sucrose). (1)
Therefore, water from the solution entered the beetroot cells to dilute the cell contents, making the beetroot disc heavier. (1)
- c. i. This was not correct. (1)

- ii. When the sucrose concentrations inside the cells and the surroundings are similar there will be very little net movement of water in and out of cells and therefore, there will be very little change in the mass of the beetroot disc. (1)
- The change in mass must be lowest at a solution between 0.2 mol/dm³ and 0.4 mol/dm³ which are the lowest increase and lowest decrease in mass recorded. Therefore, it cannot be 0.7 mol/dm³. (1)
- d. i. Test tube F, (1)
- because plasmolysis takes place when cells lose a lot of water to their surroundings. (1)
- ii. Being plant cells, beetroot cells will not burst even when they take in a lot of water (1)
- because they have a cell wall that can withstand turgor pressure. (1)
- e. Same amount of solution of each concentration was poured. (1)
- or Beetroot discs were cut to the same size and length. (1)
- or equivalent

[Total: 15 marks]

- 4.**
- a. i. Fish have gills that allow them to obtain oxygen in an aquatic environment. (1)
 - Their body is streamlined ensuring that while moving, water resistance is kept to a minimum. (1)
 - The body has a tail and fins that are adapted to help fish swim including moving forward, turning, keeping an upright position or stopping. (1)
 - ii. Active transport is the movement of mineral ions or molecules across a cell membrane against a concentration gradient, (1)
 - a process requiring energy. (1)
 - iii. Uptake of glucose in the intestines in humans. (1)
 - or Uptake of mineral ions into root hair cells of plants. (1)
 - or equivalent
 - b. i. Birds are adapted to flight by having their body covered with feathers, (1)
 - front limbs adapted to flight by having evolved into wings, (1)
 - (accept: hollow bones which make them light enough to take flight).
 - ii. water (1)
 - oxygen (1)
 - or
 - the right temperature
 - or
 - the right substrate
 - (accept: the right presence or absence of light)
 - iii. In epigeal germination the cotyledons emerge out of the soil, while (1)
 - in hypogeal germination the cotyledons remain under the soil surface. (1)
 - iv. Seeds have a food store called a cotyledon (1)
 - that supplies the growing parts with food while the plant is still underground and unable to photosynthesise. (1)
 - If the seed is buried too deep, the food in the cotyledon will run out before the shoot surfaces and is ready to photosynthesise. (1)

[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)

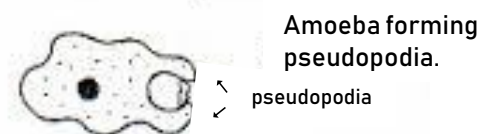
A thin film of water around soil particles is just enough for the roots to absorb water while having oxygen still abundantly available. (1)

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. Adding too much fertilisers in the soil would increase the concentration of minerals in the soil significantly, (1)
inducing amoeba to lose too much water by osmosis in an attempt to balance concentrations. (1)

This would lead to amoeba being killed due to lack of water. (1)

e. Earthworms are beneficial to soil because while burrowing they aerate it. (1)

They also eat the soil, egesting it as casts and making it more fertilised. (1)

Earthworms pull leaf litter beneath the soil surface to eat away from sunlight, thus increasing the soil fertility. (1)

[Total: 15 marks]