BIOLOGY PAPER 1 MARKING SCHEME

INSTRUCTIONS TO CANDIDATES

- Answer ALL the questions.
- Answers must be written in the spaces provided in the question paper.
- Additional pages must not be inserted.
- The paper consists of 14 printed pages.

FOR EXAMINERS USE ONLY

Question	Maximum score	Candidate's score
1-29	80	

1. How does growth as a characteristic of living organisms differ in plants and animals?

(2marks

In plants growth occurs at meristematic tissues only ;while in animals growth occurs all over the body ;

2a) State the role of active transport in animal nutrition **(1mark)**

Reabsorbtion of sugars and some salts in the kidney

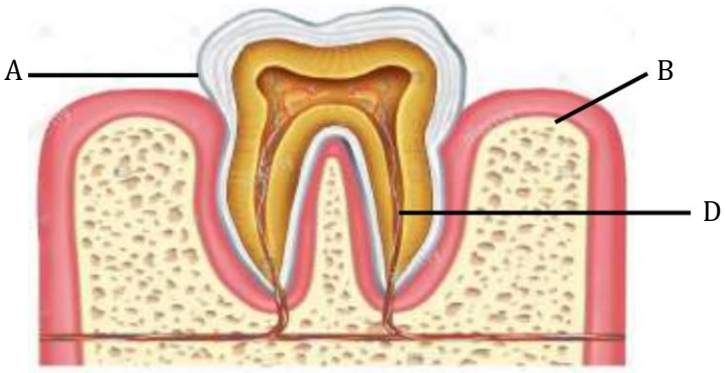
Absorption of digested food from the alimentary canal into the blood stream.

Excretion of waste products from body cells.

b) Cyanide lowers the rate of active transport. Explain? **(2marks)**

cyanide is an enzyme inhibitor, it affects the rate of active transport

3.The figure below is a diagram of a vertical section of a mammalian tooth.



(i) Name the part labelled **A** and **B**. **(2 marks)**

A *Enamel*

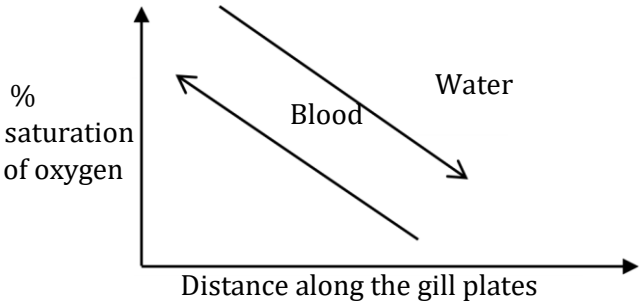
B *Gum*

(ii) State ***ONE*** ways in which structure **D** is adapted to its functions. **(2 marks)**

- Contains blood vessels which supplies food nutrients and oxygen and remove carbon IV oxide and nitrogenous waste products;

- Contains nerve endings for sensitivi

4.The figure below shows % saturation of oxygen in blood in fish as water passes along the gill plate.



(a) (i) Name the type of blood flow shown in the gill plate. **(1mark)**

Counter current flow

(ii) Explain the advantage of the type of flow named in a (i) above **(2marks)**

Creates a steep diffusion gradient; that enhances the rate of gaseous exchange across the gill filaments/ increases rate of gaseous exchange; through diffusion (Rej increases rate of gaseous exchange/enhances gaseous exchange alone

(b) State organs in humans which display the type of flow named in a (i) above

Kidney; Placenta; Ileum

(1marks)

5.The equation below shows an oxidation reaction of food substances.

$C_{51}H_{98}O_6 + 145O2$ ------- X CO2 + 98 H2O + energy

a) What do you understand by the term respiratory quotient? **(1mark)**

Volumetric relationship between Carbon (IV) oxide produced and oxygen consumed

b) Determine respiratory quotient of the oxidation of food substance. **(2marks)**

$$R.Q = \frac{CO_2 \text{ produced}}{O_2 \text{ used up}}$$

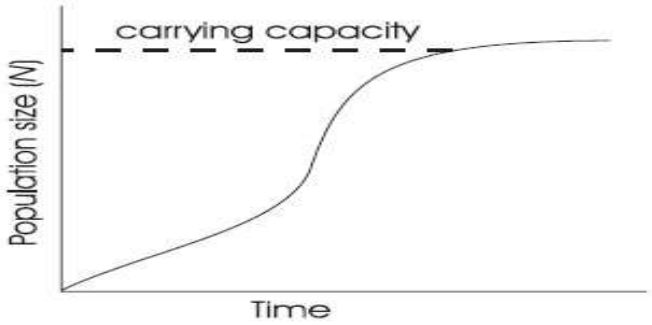
$R.Q = 102/145$

$R.Q = 0.7034$

c) Identify the food substances. **(1mark)**

Fat/ Lipid

6.When any one of the growth parameters such as growth in size or weight, increase in number of cells are plotted in a graph against time like below, a clearcurve isobtained



State its name **sigmoid curve** **(1mark)**

7.The embryo of a dry, fully developed seed usually passes through a period of rest after ripening period and it cannot germinate even when provided with all favorable conditions. State the significance of this. **(2marks)**

Provides the seeds with enough time for dispersal so that they can germinate in suitable environment
Enables seeds to survive during adverse seeds to survive during adverse environmental conditions
The embryo has time to develop until favourable conditions are available

8.a) Cowpeas seeds were place in a vacuum flask and left for five days. What is the expected change in composition of gases in the flask on the sixth day? **(1mark)**
Decrease in oxygen and increase in carbon(1V)oxide

b) Give a reason for your answer in (a) above **(1mark)**

Germinating seeds respire using oxygen and release carbon(IV)oxide

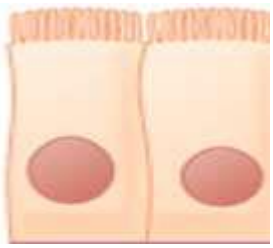
9.Biotechnologist works day a night to curb food insecurity using the knowledge of polyploidy in genetics. Explain the economic importance of such practice? **(2marks)**

Increases yields in plants
Cause early maturity in plants
Enhance resistance to pest, disease and drought

b) Define a backcross? **(1 mark)**

A cross between an offspring with one of its parents

10.The structure below was obtained from an animal cell



a)What is the name of the hair like processes and state its function? **(2marks)**

Name

Cilia

Function

Propel mucus

fertilised ovum

b)From which parts of the mammalian body are these structures found? **(1mark)**

Trachea

oviduct

11. A student was found to have blood group B+

a) What type of antibody is present in his plasma? **(1mark)**

a

b) Which antigens are present in this blood group? **(1mark)**

B and Rhesus antigens

12.Plants relatively have less waste to excrete than animals. Give two reasons to explain this observation **(1marks)**

Plants reuse some of their waste products;

Plants produce their waste products slowly compared to animals that produce slowly ;

13.State **two** methods by which plants get rid of their waste products **(2marks)**

Diffusion

Transpiration

Guttation

Exudation

Deposition **(any two)**

14. To estimate the population size of mosquitoes in Banji village that covers an area of 25km^2, visiting researchers caught 400 mosquitoes which they marked and released. After 24 hours, 200 mosquitoes were caught out of which 120 had not been marked.

(a) Suggest the sampling method described above. **(1 mark)**

Capture recapture method

(b) What are the disadvantages of this method? **(2 marks)**

-*Some organism may die during the study period;*

-The mark may come the out during the study period;owtt

15. The table below shows stomatal distribution on leaves A and B and their surface area. Use the information to answer the questions.

	Leaf surface	A	B
Number of stomata	Upper leaf surface	20	5
	Lower leaf surface	0	15
Surface area		25 cm^2	18cm^2

Identify with reasons the habitats of the plant from which the leaves were obtained.

Leaf A: *Habitat* *Fresh water;* *(1 mark)*

Reason*; Maximum number of stomata on the upper leaf surface for quick loss of excess water by transpiration;* (1 mark)

Leaf B: Habitat: *arid areas* (1 mark)

Reason : *More stomata on loer surface than on the upper to reduce the surface area exposed to excessive loss of water by transpiration*

(1 mark)

16. Name the causative agent of the following diseases **(2 marks)**

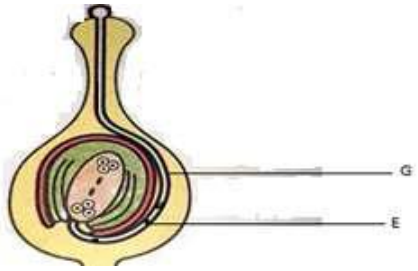
(i) Trichomoniasis.

Trichomonas vaginalis

(ii) Gonorrhea

Neisseria gonorrhoea

17. The diagram below shows a pollen tube as it develops down the style. Use it to answer the questions that follows;



(i) Name the part labelled **G**. **(1 mark)**

Pollen tube;

(ii) State ***two*** functions of structure labelled **E**. **(2 marks)**

-Fuse with the egg cell nucleus to form zygote

-Fuse with polar nuclei to form a triploid endosperm nucleus;

18. (a) Define parthenogenesis? **(1 mark)**

formation of fruits without fertilization;

(b) Name the plant hormone that induces fruit ripening. **(1 mark)**

Ethylene;

19. A group of Form Three students collected a certain specimen for study as shown below. Study it carefully and use it to answer the questions that follow.

(i) Name the type of metamorphosis in the above specimen. **(1 mark)**

Complete metarmophosis;

(ii) Give any ***two*** advantages of the above metamorphosis. **(2 marks)**

Each stage occupies a different ecological niche; hence there's no competition for resources e.g food;

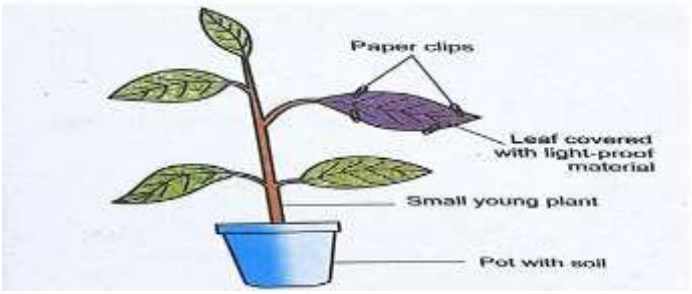
20. (i) Give ***two*** structural features in a leaf that adapts it to absorb Carbon (IV) Oxide. *Broad lamina;*

- Many stomata

(ii) Name the cell organelle in which Carbon (IV) oxide combines with water to form a complex organic compound takes place **(1 mark)**

Chloroplast

21 In an experiment to investigate a factor affecting photosynthesis; leaf of a potted plant, which had been kept in the dark overnight was covered with an aluminum foil as shown in the diagram below. The set up was kept in the sunlight for three hours after which a food test was carried out on the leaf.



(a) Which factor was being investigated in the experiment? **(1 mark)**

Light;

(b) Which food test was carried out? **(1 mark)**

Starch test;

(c) State the results of the food test. **(1 mark)**

Starch absent/Iodine retains its brown colour/starch test negative;

22. Explain how the following plant adaptations minimizes rate of transpiration **(2marks)**

a) Sunken stomata

Water vapour accumulates in the pits reducing water vapour diffusion gradient hence reduced transpiration rate;

b) Thick cuticle

Reduces permeability of the leaf to water thus reducing water loss;

23. Explain how drooping of leaves on a hot sunny day is advantageous to a plant **(2marks)**

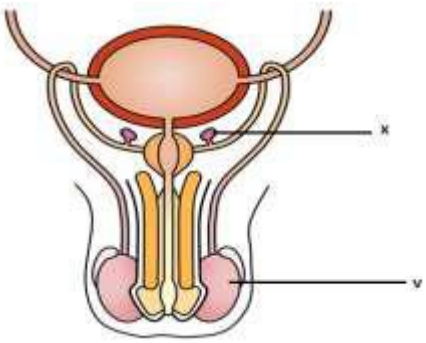
The leaves expose a smaller surface area to the sun thus reducing excessive water;

24. Name **two** tissues in plants which are thickened with lignin **(2marks)**

Parenchyma cells;

Xylem vessels;

25. The diagram below shows the front view of a male reproductive system.



a)Give the functions of the structures labelled **X** and **V** **(2marks** X. Provide an alkaline fluid which contains nutrients for the spermatozoa;

V. Seminiferous tubules which provides a large surface area for production of sperms;

b)What is the role of Follicle Stimulating Hormone in male reproduction? **(1mark)**

Stimulates the synthesis and maturation of sperms;

26. How do the following factors hinder self-pollination in flowering plants? **(3marks)**

a) Self-sterility

It is a condition where pollen grains from the anthers cannot grow on the stigma of the same flower of plant/ are incompatible to stigma of the same plant/flower;

b) Heterostyly

Is a condition of having different arrangements of style and stigma i.e. shorter stamen than pistil;

c)Protogyny

it's a condition where the female matures an its ready to receive the pollen grains before the male parts mature;

27 The table below shows the concentration in parts per million of sodium and iodide ions in sea water and cell sap of a plant.

	Sodium ions concentration	**Iodide ions concentration**
Sea water	326	39
Cell sap	162	574

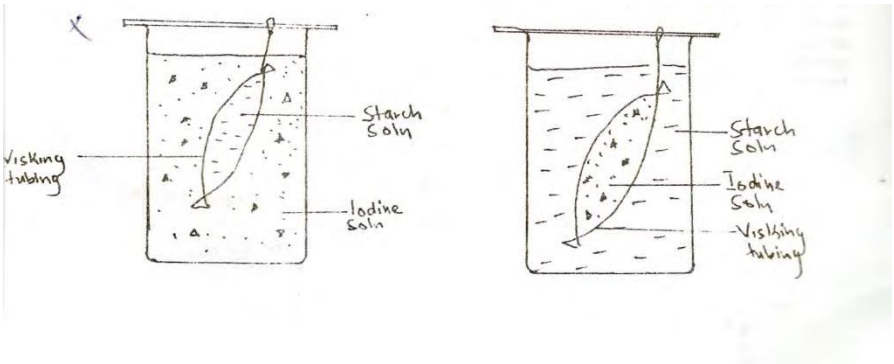
a)i) Which of the two ions intake will be affected if the plant was sprayed with a chemical that inhibits respiration. (1mk)

iodide ions

ii) Explain your answer in 27(a)(i) above. (1mk)

less energy produced; active transport is low

b) An experiment was set up as shown in the diagram below.



At the end of the experiment, it was observed that the starch turned blue black while the color of iodine solution in the beaker did not change. Account for this observation. (2mks)

Iodine particles are smaller in size;thus moves from beaker to the visking tubing by diffusion;

28. 14 State the role of the following organelles: (3mks)

a)Ribosomes Protein synthesis

b)Chloroplast site for photosynthesis

c)Nucleus control activities of the cell

29. A process that occurs in plants is represented by the equation below.

$C_6H_{12}O_6$ $2C_2H_5OH + 2CO_2$ + Energy

(Glucose) (Ethanol) (Carbon dioxide)

a) Name the process. (1mk)

anaerobic respiration acc fermentation

b) State **two** economic importance of the process named in (a) above. (2mks)

brewing industry

baking industry

silage treatment

30. Below is a diagram of an organism.

a) Identify the Class to which the organism belongs. (1mk)

Chilopoda

b) State **two** features shown on the diagram that are characteristics of this Class. (2mk)

Two legs per segment

a pair of antennae

Two body parts,head and trunk

Body is dorso-ventrally flat FIRST 2