SECTION A (30 MINUTES)

Write the letter representing the most correct alternative in the box provided.

1. The following plant parts belong to the same group Except

D

A. Corm
B. Irish Potato tube
C. Rhizome
D. Cassava tuber

2. A student observed an onion epidermis under the microscope with eye piece X10 and objective lens X4. Which of the statements below is wrong?

C

A. the eye piece magnifies the specimen ten times
B. the eye piece magnified the image of the specimen ten times
C. the objective lens magnified the specimen forty times.
D. the microscope magnified the specimen forty times.

3. The overgrowth of aquatic plants resulting from an excess of nitrogenous salts reaching rivers is called

D

A. nitrification B. Pollution
C. Leaching D. Eutrophication

4. The part of a cell which is truly alive is called

C

A. Nucleus B. Nucleoplasm C. Protoplasm D. Cytoplasm

5. The development of a fruit from an ovary without fertilization is termed as;

A

A. Parthenogenesis B. Protogyny
C.Schizogany D. Phylotaxis → arrangement of leaves

6. When a plant loses water faster than it absorbs, the cells become.....and the plant structure made of such cells become ..... ;

B

A. Limp, turgid B. Flaccid, flabby
B. Inflated, turgid D. flabby, flaccid

7. The size of the soil particles of a soil having the highest capillarity is

B

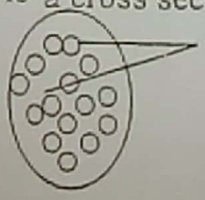
A. 0.2 to 0.02mm B. less than 0.002 mm
B. 2.0 to 0.02 mm D. 0.02 to 0.002mm

8. Re-absorption of glucose in the kidney nephron occurs in

D

A. Descending loop of Henle
B. Ascending loop of Henle
C. Distal convoluted tubule
D. Proximal convoluted tubule

9. Figure 1 is a cross section of a plant part



Which one of the following is represented in the section shown above?

A. Root of monocotyledonous plant
B. Root of dicotyledonous plant
C. Stem of dicotyledonous plant
D. Stem of monocotyledonous plant

D

10. Which of the following are the end products of sucrose hydrolysis?

A. Glucose and Galactose
B. Fructose and Glucose
C. Fructose and Galactose
D. Glucose and lactose

B

11. Which of the statements below is NOT right about identical twins?

A. They result from a zygote separating into two
B. They inherit identical genotype
C. They have different phenotype when raised in different environment
D. They have similar phenotypes even when raised in different environment.

D

12. The force thought to be responsible for the exudation of drops of water from the tips of leaves is

A. Cohesion and Adhesion
B. Root pressure
B. Capillarity
D. Transpiration pull

B

13. The removal of bacteria from an object using high temperature such as steam is called.

A. Sterilization B. Steaming C. Inoculation D. Incubation

A

14. The gradual change of neglected agricultural land back into bush over a period of ten years is an example of ;

A. Succession
B. Secondary Succession
C. Primary succession
D. Bush furrowing

B

15. The following blood vessels transport oxygenated blood except,

A. artery in umbilical cord
B. Pulmonary vein
C. Vein in umbilical cord
D. Coronary artery

A

16. Amino acid not required for building protein is

A. deaminated B. excreted C. assimilated D. Secreted

A

17. In the absorption of water by roots, water moves from

A. a cell with lower water potential
B. a cell with higher water potential
C. a cell with a higher solute concentration
D. a cell with similar solute concentration

B

18. The action of bile salts on fat forms a suspension to tiny droplets called

A. Chyme B. emulsion C. chyle D. glycerol and fatty acids

B

19. Substances which stimulate production of antibodies are called

A. Fibrinogen B. serum C. antigen D. plasma

C

20. A plant which lives on another plant but does not obtain food from it is called
A. halophyte B. parasitic plant C. Xerophyte D. epiphyte D

21. Which one of the following contains a set of cells which are all haploid?
A. pollen grain, ovules and root hair cell
B. sperms, pollen grains and ova
C. sperm, ovules and brain cells
D. cells of the anididymia, ovules and ova
B

22. Which one of the following features distinguishes insects from other arthropods?
A. three main body parts B. Jointed legs
C. two pairs of wings D. A pair of antennae
A

23. Which one of the following occurs during interphase in mitosis?
A. Division of the nucleus into two
B. Constriction of cytoplasm
C. Duplication of genetic material
D. Arrangement of chromosomes on spindle.
C

24. $20cm^3$ of soil was poured into a measuring cylinder, $50cm^3$ of water was added and the volume of the mixture was $68cm^3$ often gently stirring. What was the percentage of air in the soil?
A. 10% B. 20% C. 2% D. 30%
A

25. Mammals have a higher capacity to learn than other animals due to their enlarged.....
A. Medulla oblongata B. Cerebellum C. Hypothalamus D. cerebrum D

26. When a seedling is placed on a klinostat, no curvature occurs because;
A. Auxins are not produced B. auxins are uniformly distributed in the growth parts
C. Growth is accelerated D. all parts of the seedlings are uniformly lit.
B

27. Which one of the following is a long term adaptation of mammals to low temperature environment?
A. Raising of hair B. Increase in metabolic rate
C. Deposition of fats under the skin D. Reduction of blood flow to the skin
C

28. Which one of the following parts is vestigial organ?
A. Breast in man B. Eye C. Hand D. Ear
A

29. Water –logged soils may lack nitrates because?
A. Water-logged soils lack nitrifying bacteria
B. Water-logged soils lack ammonium salt
C. nitrates dissolve in water and evaporates
D. Water-logged soils are short of oxygen
D

30. The following organisms can be grouped together EXCEPT
A. Butterfly B. Grasshoppers C. Beetles D. Spider
D

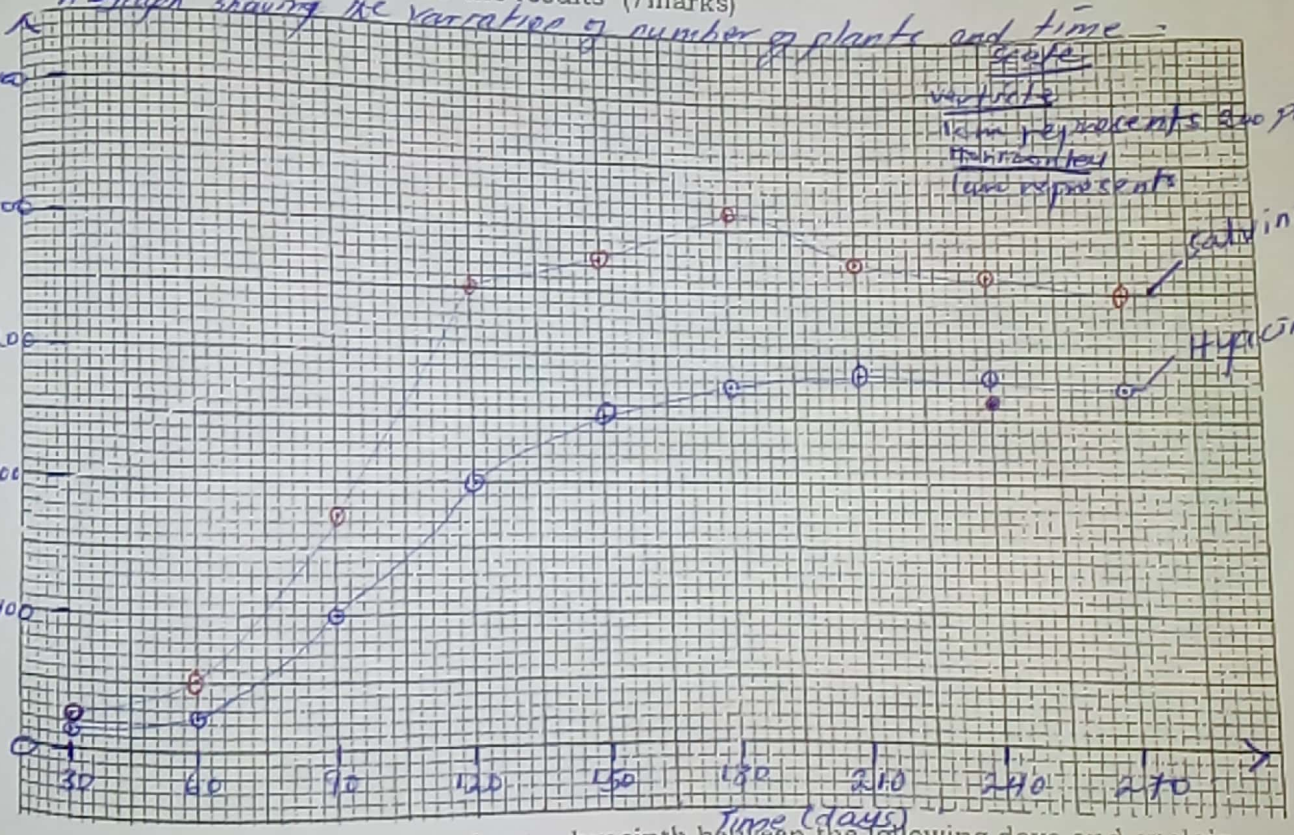
SECTION B (40MARKS)

1. In a study to compare the rate of population growth of two plant species, water hyacinth and salvinia. They were introduced into a pond and the number of plants of each kind counted and recorded as shown in the table below.

Time(days)	30	60	90	120	150	180	210	240	270	
Number of plants	50	100	400	800	1000	1100	1150	1140	1100	Hyacinth
	100	200	700	1400	1500	1650	1500	1450	1400	Salvinia

a). Plot suitable graphs to show the results (7marks)

A graph showing the variation of number of plants and time.



Scale:
Vertical
1cm represents 200 plants.
Horizontal
1cm represents 30 days

b). Calculate the growth rate of water hyacinth between the following days and explain each (9marks)

(i). 30th to 60th day

Growth rate = change in number of plants / change in time

= 100 − 50 / 60 − 30 = 50 / 30 = 1.67 plants per day.

From 30th to 60th day, the number of hyacinth increased gradually because they are still adapting to their new environment. The plants are also synthesizing new substances.

ii). 60th to 120th day

Growth rate = change in number of plants / change in time = 800-100 / 120-60 = 700/60 = 11.67

From 60th to 120th day the population of hyacinth increases rapidly because they have adapted to the environment, nutrients are still available in large quantities, rate of reproduction is high, and competition is still low.

iii). 240th to 270th day

Growth rate = change in number of plants / change in time = 1100-1140 / 270-240 = -40/30 = -1.33 plants per day.

From 240th to 270th day the population decreased gradually due to, stiff competition for the available nutrients & light, therefore some die due to lack of nutrients

c). Explain the change in population of Salvinia between 210 and 270 days (2marks)

From 210 and 270 days, the population of Salvinia decreases gradually because the reduced nutrients to the pond due to stiff competition for the few remaining nutrients as a result some die out

d). State two human activities that may lead to rapid population growth of the two plants (2marks).

- Fertilizer application.
- Waste and sewage disposal into water bodies.

32. An experiment was set up as shown below to investigate a physical process. it was left for 15 minutes on a flat surface.

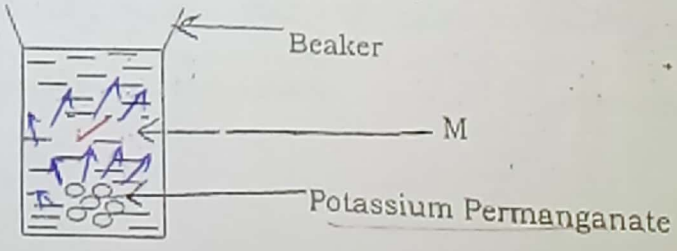


fig 2

a). Name part marked M

water / liquid. (1mark)

b). State the purpose of the experimental set up above

To demonstrate diffusion in liquids. (1mark)

c)(i). Using arrows indicate what was observed during the 15 minutes on the diagram. (1mark)

(ii). Explain the observation after 15 minutes (3marks)

After 15minutes, the whole water turned purple due to diffusion or spreading of potassium permanganate particles from a region of high to low concentration.

d). Draw a set up for a control experiment in the space below (2marks)

e). Giving one example, suggest the importance of the physical process being investigated in figure 2 in living organisms. (2marks)

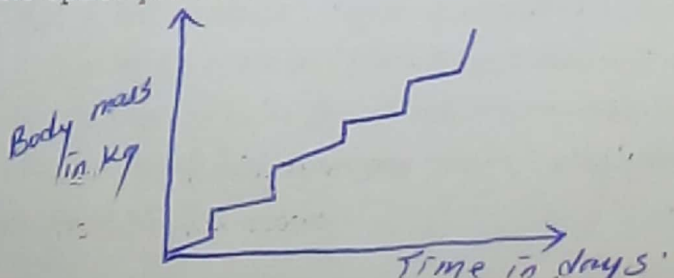
It is important in exchange of gases at the respiratory surfaces eg at the alveoli of the lungs and blood.

In absorption of mineral salts by plant root hairs from the soil.

33. a). With examples distinguish between Complete metamorphosis and incomplete metamorphosis (3marks)

Complete metamorphosis are a series of developmental stages of an insect from eggs to larva to pupa and then adult eg in housefires, Bees while Incomplete metamorphosis are a series of developmental stages from eggs to Nymph then to adult stage eg in grass hoppers.

b). In the space provided sketch the growth pattern in insects. (3marks)



c). i) State **one** reason why Dicotyledonous plants are noticed to be taller and thicker than Monocotyledonous plants (1mark)

Because they undergo secondary growth.

ii). Which structure in the woody plant is used to estimate the age of a tree (1 mark)

.....Tree ring.....

d). Name the process and the structure where the manufactured food move from the leaves to the sink. (2mrks)

Process: .....Translocation.....

Structure: .....Phloem.....

SECTION C (30 MARKS)

Attempt only **Two** questions from this section.

34. (a). Explain the features which make flowers to be self pollinated. (10marks)

(b). Explain how the placenta is adapted as an exchange surface. (4marks)

(c). Name the hormone which maintain the uterine lining during implantation and pregnancy. (1 mark)

35. a). Describe the digestion of beans in the human alimentary canal. (12marks)

b). How are the products of the above digestion important to human life? (3marks)

36. a). Explain how anaerobic respiration occurs (7 marks)

b). Explain how the following structures have helped the fish to live in water.(8mrks)

i). Swim bladder

ii). Streamlined body

iii). Mucus

37. Distinguish between the following terms;

a). Exploitation of natural resources and conservation of natural resources. (2mrks)

b). State the purpose of conserving natural resources. (5mrks)

c). i. Differentiate between genotype and phenotype. (2mrks)

ii. When a tall pea plant was crossed with a short pea plant, only tall pea plants were produced in F1 generation, when crossed F1s, the resulting generation had a mixture of tall and short pea plants. Using suitable symbols, show genetic crosses to produce F2 generation. (6mrks)

END

34 (a)

✓ Bisexual/hermaphroditic flowers, where flowers have both stamens and pistil eg beans
✓ When the anther is situated above and close to the stigma
✓ When the stamen and carpel mature at the same time
✓ When bisexual flowers do not open until pollination is done.
✓ Genetic Compatibility, when the pollen can easily germinate on the stigma of the flower.

34 (b)

✓ Numerous chorionic villi which provide a large surface area for exchange of materials between maternal blood and foetal blood.
✓ Thin placenta membrane which provides a short distance for rapid diffusion of materials between maternal and foetal blood.
✓ The placenta membrane is selectively permeable and does not allow passage of large molecules like pathogens.
✓ Has umbilical artery for transporting wastes from foetus to maternal blood.
✓ Has umbilical vein for transporting nutrients and O_2 from maternal to foetal blood.

34 (c)

progesteron.

35

(a) In the mouth, food is chewed by teeth breaking it down into smaller particles. During chewing, food is mixed with saliva to make it soft and easy to swallow. The food is then pushed down the oesophagus by a process of peristalsis.

In the stomach, the stomach walls secrete gastric juice which contains hydrochloric acid that activates pepsin from pepsinogen, it also kills germs contained in food. Gastric juice also contains pepsin that catalyzes the break down of proteins to peptides.

The acidic food is then allowed into the duodenum where bile juice is secreted to neutralize the acidic food. Pancreatic juice is also secreted from the pancreas which contains pancreatic trypsin that catalyzes the break down of proteins to peptides. Then the food goes to the ileum where the intestinal walls secrete intestinal juice which contains peptidase enzyme that catalyzes the breakdown of peptides to amino acids which are then absorbed into the blood stream.

(b)

- Amino acids are used in the synthesis of new proteins especially enzymes and hormones.
- Some amino acids are used in body growth.
- Some are used in the repair of damaged cells and tissues.
- In absence of carbohydrates and fats, proteins are oxidized to generate energy during times of starvation.

No 36

(a) i

Anaerobic respiration is the breakdown of food substances within the body cells to release energy in absence of oxygen.
It occurs in both plants and animals.
In animals;
During high rate of activity, the muscle cells respire faster; than it can get O_2; and thereby blood cannot supply enough oxygen to cater for the highly respiring muscles; at the same pace.
Therefore some glucose is broken down in the absence of oxygen ~~it~~ producing lactic acid; and some little energy; which eventually accumulates; in muscles and it is harmful because it causes muscle fatigue; and muscle cramps / pain.
The levels of lactic acid continues to rise shortly after the exercise; but it later reduces as it is being oxidized; ~~by~~ in the liver in the presence of oxygen.

b (i) Swim bladder; This is for depth adjustment or ~~bye~~ buoyancy; ie when it is filled up with air; the volume of the fish increases and weight reduces thus the fish floats on the water surface.
But when it is emptied, the volume of the fish reduces and weight increases and thereby sink to the bottom of the water.

(ii)
streamlined body; This reduces water resistance and therefore the fish uses less energy when moving forward or backwards.

(iii) mucus;
It is for protection from predators since it makes the body of the fish slippery and not easily captured by predators.
It also minimizes water resistance

37 (a)

Exploitation of natural resources refers to the ~~act~~ unsustainable and often harmful use of natural resources such as minerals, water resources and fossil fuels. whereas Conservation refers to the sustainable use and management of natural resources such as water, forests to ensure their availability for future use.

(b) - For sustainable use and preservation of biodiversity for future use
- To avoid climatic changes by reducing green house gas emissions.
- To prevent envitral degradation such as deforestation, soil erosion & water pollution.
- To ensure balance of the ecosystem to ~~*~~ maintain the fauna and ~~flora~~ vegetation cover.
- To avoid ~~the~~ their depletion since some are regenerated at avery slow rate.

(c) (i) Genotype is the ~~pe~~ genetic Composition of an organism. whereas phenotype is the physical appearance or the outward expression of an individual.

C (ii) Do the crossing.