PAPER 1

1. Name any two branches of microbiology. (2marks)
   Bacteriology;

   Virology;

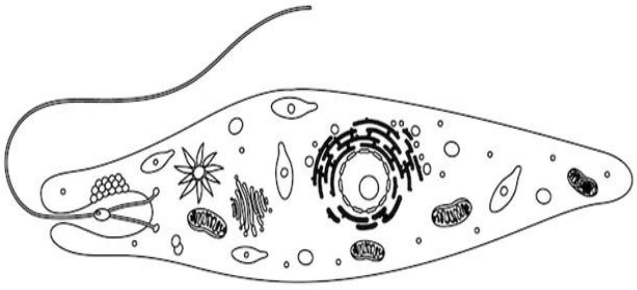
   Parasitology;

2. Which biological tool would a scientist require to collect rats to be used for study? (1mark)

   Bait trap;

3. When are two organisms considered to belong to the same species. (2marks)
   When they are capable of interbreeding; to produce a fertile offspring;

4. The diagram below represents an organism



   a) Name the kingdom to which the organism belongs. (1mark)
      Protoctista;
   b) Suggest the habitat in which the organism lives. (1mark)
      Water;
   c) Give two reasons for your answer. (2marks)
      Presence of flagella;
      Presence of contractile vacuole;

5. State two unique characteristics of Chordate not found in another phylum. (2marks)

   Dorsal nerve cord;

   Endoskeleton;

6. Shieko sec school biology student used a microscope with X40 objective lens and X5 eye piece lens which had 2mm radius. Calculate the area of the field of view in micrometers. (2marks)

1mm = 1000um

Areas = πr^2 = 22/ 7 x $(2000)^2$

= (22 / 7 x 2000 x 2000);

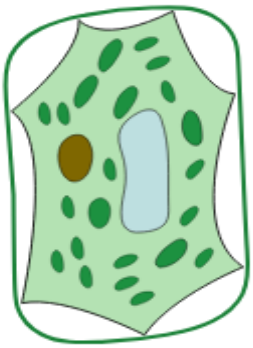
= 125714.29μm^2;

b) What is the average size of the cell in micrometers if there were 5 cells on the field of view (2marks)

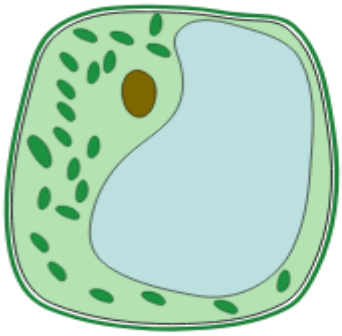
$$\frac{125714.29}{5}$$

= 25142.858μm^2

7. The cells shown below were obtained from two different plant cells which were immersed in 2% and 25% salt solutions



A



B

8. (a)Which of the two cells **A** and **B** was immersed in 2% salt solution? (1mark)

B;

(b) Comment on the nature of 25% salt solution in relation to the cell sap. (1mark)

Hypertonic;

(c)What biological phenomenon leads to the observation made in **A**. (1mark)

Plasmolysis;

9. a) If pepsinogen and trypsinogen were produced in their active forms, what would be their effects on the alimentary canal. (1mark)

Digest the membrane of cells that produce them and those of alimentary canal;

b) How else is the alimentary canal protected from the effects stated in a) above. (1mark)

Covered with mucus lining;

10. In an investigation, the pancreatic duct of a mice was blocked by tying it with a string. Explain how this affected the digestion of food. (2marks)

Digestion of food was impaired; this is because the blockage of prevented pancreatic juice containing digestive enzymes from reaching duodenum;

11. Examination of the alimentary canal of a mammal showed that the food in the small intestine was more fluid than in the colon. Give an explanation for this observation. (1mark)

Much water is absorbed in the colon; making the food in colon less fluid;

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

Sclerenchyma;

Xylem tissue; ACC Xylem vessel; tracheid;

13. (a) What is the importance of the following substances in blood clotting process in man?

(i) Vitamin K. (1mark)

Production of prothrombin;

(ii)Thrombin. (1mark)

It activates conversion of fibrinogen to fibrin; (which forms a meshwork of fibres on the

cut surface (to trap red blood cells forming a clot)

(b) what is the disadvantage of having blood group O. (1mark)

One can receive blood only from blood group O individual;

14. Name the part of the seed whose growth brings about epigeal germination. (1mark)

Hypocotyl;

15. a) Differentiate between gaseous exchange and ventilation (1mark)

Gaseous exchange is passage of respiratory gases across respiratory surface while ventilation is the process of bringing in air rich in oxygen and removing out air rich in carbon (IV) oxide;

b) State the respiratory site of the following. (2marks)

i) Fish - gill filaments; reject gills

ii) Insect - tracheoles;

16. In an investigation, a bird was found to use 10 litres of oxygen to give a respiratory quotient of 0.7 during period of flight.

a) Name the type of food that was being respired by the bird.

Type of food- Lipid / fat or oil; (1mark)

b) Determine the volume of carbon (IV) oxide produced during the same flight. (2 marks)

$$R.Q = \frac{\text{Volume of } CO_2 \text{ produced;}}{\text{Volume of } O_2 \text{ used}}$$

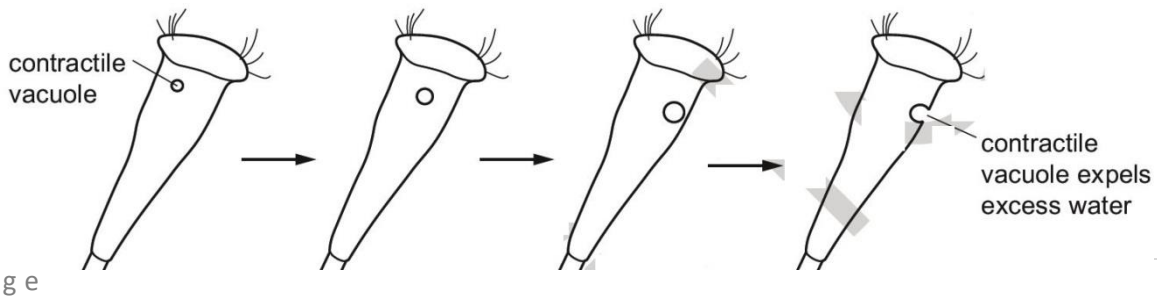
$0.7 \times 10 = 7$ litres;

$CO_2 = 7$ litres;

17. a) Single-celled Organisms with cell walls do not have contractile vacuoles. Suggest why. (2marks)

Cell walls; inelastic/do not stretch/rigid/inflexible keep shape of cell; cells are turgid/ have high turgor pressure; resist any increase in volume/ pressure;
These cells do not absorb excess water; the cells will not burst (any two)

b) *Rhabdostyla* lives in freshwater habitats, such as pond, lakes and rivers where solute concentration is low. *Rhabdostyla* has a contractile vacuole that fills with water and empties at intervals as shown in. The contractile vacuole removes excess water.



Explain, why *Rhabdostyla* needs to remove excess water. (3marks)

Water enters into the *Rhabdostyla* by osmosis; due to higher osmotic pressure in the *Rhabdostyla* than the surrounding; to remove the excess water to prevent bursting;

18. Name three plant excretory products deposited in the leaf. (3marks)

Caffein;

Quinine;

Coccain;

Cannabis;

Nicotine; First three

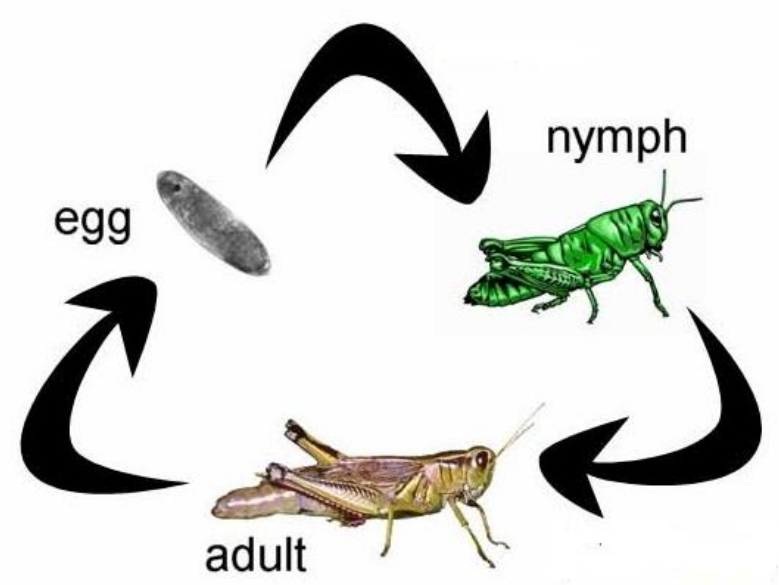
19. State one economic importance of each of the following plant excretory products.

(2marks)

(a) Tannin
treatment of hides or skin into leather;
manufacture of ink/printing fabrics/dyeing of clothes/printing of patterns in pots. (1st one)

(b) Quinine
Treatment of Malaria;

20. Study the life cycle shown below and answer the questions that follow.



a) i) Identify the life cycle shown above. (1mk)

Incomplete metamorphosis;

ii) Give a reason for your answer in ai) above. (1mk)

Lack larva; 3 stages; Nymph resembles the adult;

b) Explain how the prothoracic gland is important in the life cycle above. (2mks)

Secretes ecdysone/Molting hormone; that promotes molting/Changes in the developmental stages/change in the developmental forms;

c) Name one stage found in the cycle of butterfly but is missing in the above cycle. (1mk)

Pupa/larva;

21. Name the structures in the human body that detect: (2marks)

(i) External temperature changes.

Thermo-receptor cells in the skin; rej skin alone.

(ii) Internal temperature changes.

Thermo – receptors in the hypothalamus; rej hypothalamus alone.

22. (a) Name the hormone whose deficiency may lead to the excretion of glucose in urine. (1mark)

Insulin

(b) Name the hormone that controls the reabsorption of sodium ions in the kidney tubules. (1mark)

- Aldosterone;

23. Oil can be applied on stagnant water to control the spread of Malaria;

a) How does this practice control the spread of Malaria (1mark)

The mosquito larvae are suffocated to death/ pupa are killed / break life cycle of mosquito;

b) Give a reason why this practice should be discouraged (2marks)

It prevents entry of air in water; hence other organisms in the water die out of suffocation;/ causes water pollution

24. a) State two importance of predation in an ecosystem. (2marks)

Control prey- predator population; acc if given population of prey/predator;

Can improve genetic qualities of population by removing the weaker members;

b) Apart from predation state two other biotic factors that will influence the distribution of organisms in an ecosystem. (2marks)

Competition;

Parasitism;

Symbiosis;

Saprophytism; acc diseases (any two.)

25. Mention two causes of genetic variation. (2marks)

Mutation;

Recombination during crossing over

Fertilization;

Environmental factors; (any 2)

26. State two importances of polyploidy. (2marks)

Increased yields;

Resistance to drought;

Early maturity;

Resistance to pests and diseases;

27. a) Pure lines of black and white mice were crossed. All the F1 generation were grey. Explain the absence of white and black mice in the F1 generation. (1mark)

The gene for black and white shows incomplete dominance/codominance; and contribute equally to the phenotype of the offspring.

b) Define multiple alleles (1mark)

This is where more than two genes control a particular characteristic; by occupying the same locus but the individual possess only a pair.

28. a). State two theories that explains origin of life (2marks)

Special creation;

Chemical evolution;

b) State three evidences of organic evolution (3marks)

Fossils records;

Comparative anatomy;

Comparative embryology;

Comparative serology;

Geographical distribution of organisms;

Cell biology any three correct;

29. a) Explain two limitations of fossil records as evidence of organic evolution. (2marks)

Only partial preservation of the organisms occurs because softer parts decay hence incomplete records;

Distortion during sedimentation;

Destruction due to geological activities; eg erosion, earthquakes, faulting and uplifting; (mark any 2)

b) Name the evidence of organic evolution exhibited by occurrence of similar amino acid molecules in a range of organism. (1mark)

Cell biology;

30. State the function of the following parts of the eye. (2marks)

Ciliary body –

It has ciliary muscles - which contract and relax to change the shape of lens during accommodation.

Sclerotic layer –

It protects the eye and gives its shape.

31. State three ways through which herbaceous stem obtain support. (3marks)

- Turgidity of cell;
- Twinning around other plants;
- Use of tendrils; e.g pumpkins.;