

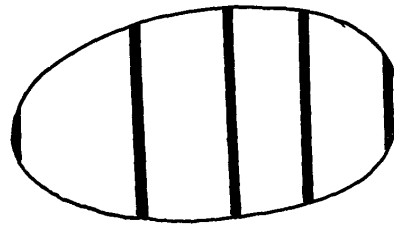
2. The cell – structure & functions of organelles

1. Name the organelles that perform each of the following functions:
 - a) Digestion and destruction of worn out organelles.
 - b) Osmoregulation
2. Explain why the following processes are important during the preparation of temporary

slides :- (a) Staining

(b) Use of a sharp cutting blade

3. In a class experiment to establish the size of an onion cell, a learner observed the following on the microscope field of view.



If the student counted 20 cells across the diameter of this field of view, calculate the size of one cell in micrometers.

4. State the functions of the following cell organelles: (a) Nucleolus. (b)

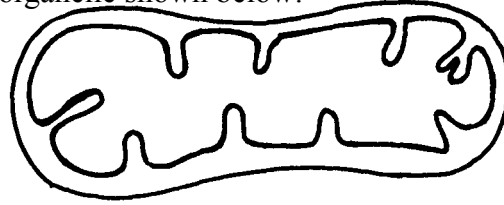
Plasma membrane

5. What is the of nucleus of a cell made up of?

6. (a) In a laboratory exercise a student observing a drop of pond water under a microscope saw and drew a spirogyra. If the magnification of the eye-piece was x5 and that of the objective lens was x100, what was the magnification of the spirogyra?

(b) If the spirogyra has a length of 5cm at the above magnification, calculate the actual length in micrometers

7. (a) Identify the organelle shown below:-



(b) How is the organelle you have identified in (a) above suited to its function

8. Identify the structures of the cells that perform the following functions:-

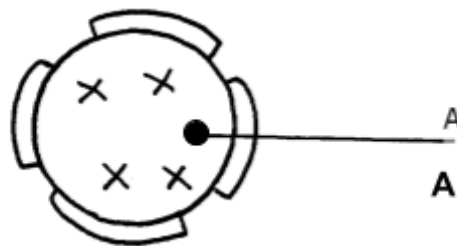
(a) Synthesize ribosomes

(c) Regulate exchange of substances in and out of the nucleus

9. (a) State the roles of enzyme catalase in living cells

(b) Which factor inactivates enzyme?

10. The figure below represents a certain cell organelle:-



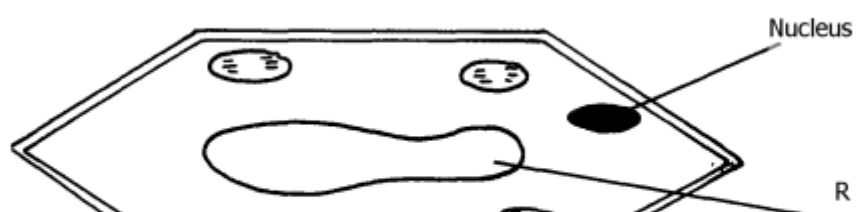
- (a) (i) Identify the cell organelle
(ii) What is the function of the part labelled A

(b) Name the organelles that perform each of the following functions;

(i) Osmoregulation in amoeba

(ii) Carries out digestion and destruction of worn out cell organelles

11. State **three** properties of the cell membrane



12. The diagram below represents a plant cell

(a) Name a carbohydrate which forms part of the structure labelled **S**

(b) State **two** functions of the part labelled **R**

(c) Name **two** structures present in the diagram but absent in the animal cell

13. What do you understand by the following terms

a) Anatomy

b) Biochemistry

14. State the function of the following parts of a cell

a) Ribosome

b) Chloroplasts

15. a) What is the formula for calculating linear magnification of a specimen when using a

hand lens

16. State the function of the following cell structures:- a) Ribosome ;

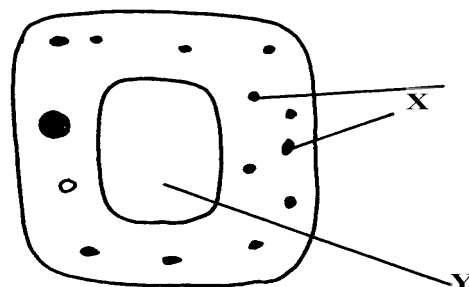
b) Centrioles ;

17. What is the main structural component of:- a) Cell wall

b) Cell membrane

18. State **two** characteristics of the kingdom monera which are prokaryotes

19. The diagram below represents a cell



- (a) Name parts labelled **X** and **Y**
b) Suggest why the structures labelled **X** would be more on one side than the other
20. During a practical class, four students estimated the field of view to be 3.5mm. Using the low power objective, they observed spirogyra cells across the same field of view and counted 8 cells. Calculate the size of each cell and give your answer in micrometer
21. A student caught an animal which had the following characteristics:-
- Body divided into two parts
 - Simple eyes
 - Eight legs
- a) To what class does the animal belong?
- b) State **two** distinctive characteristics of members of the phylum from which the animals in this question (15) belongs
22. Distinguish between the following terms :-
- a) Magnification and resolution of a microscope
- b) Mounting and staining of a specimen
23. Name the organelle that performs **each** of the following functions in a cell.
- (a) Transport of packaged glycoproteins
- (b) Destruction of worn out cell organelles
- (c) Synthesis of proteins
24. Why are the following procedures done when preparing sections to be observed under a light

microscope?

- (a) Making of thin sections
- (b) Using a sharp blade to make the sections
- (c) Staining

25. What are the functions of the following parts of a light microscope?

- (a) Eye piece lens
- (b) Condenser
- (c) Diaphragm

26. Given that the diameter of the field of view of a light microscope is 2000 μ m.

Calculate the

size of a cell in mm if 10 cells occupy the diameter of the field of view

27. State the importance of the following processes in microscopy:

(a) staining

(b) sectioning

28. A cell was found to have the following under a light microscope; cell membrane, irregular

in shape, and small vacuoles. Identify the type of the cell above

29. State the functions of the following organelles;

(a) Lysosomes

(b) Golgi apparatus

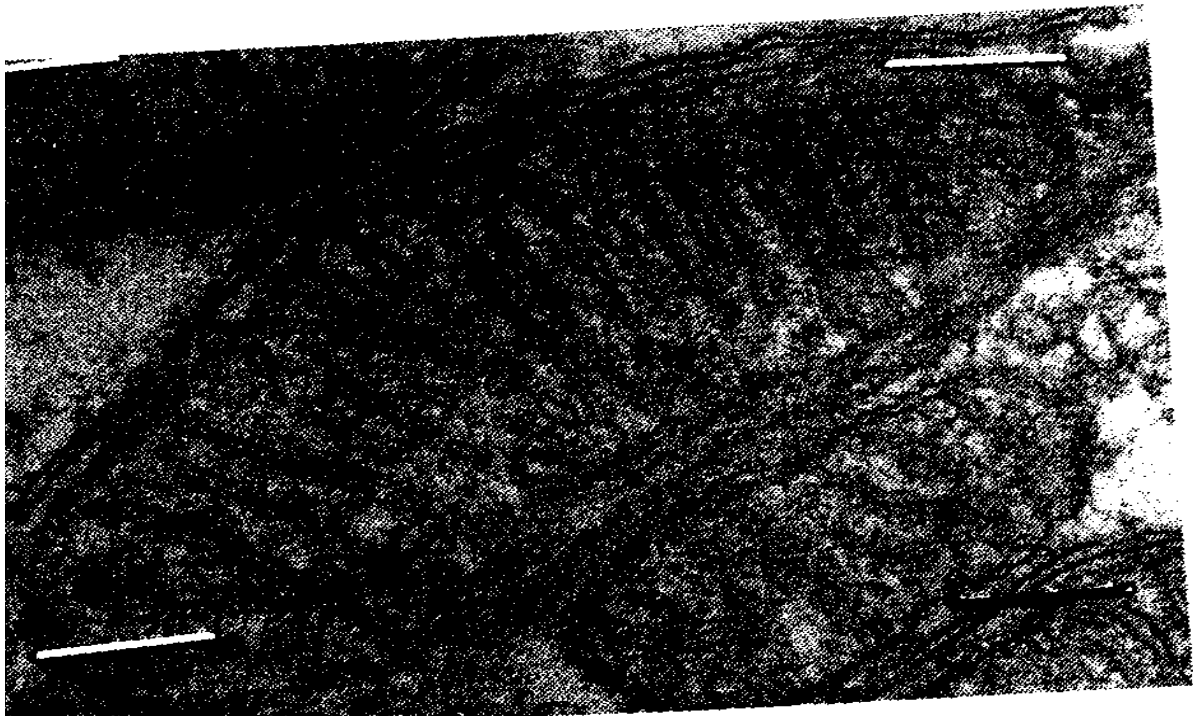
30. Name the class in phylum arthropoda which has the largest number of individuals

31. State the functions of each of the following parts in a microscope.

(a) The eye piece lens

(b) The objective lens

32. The figure below represents an electron micrograph of an organelle that is found in many cells;



(a) Identify the organelle

(b) State the function of the organelle

(c) What is the importance of infoldings in the inner membrane.

(d) Give **two** examples of tissues where you would expect many such organelles in animal body.

2. The cell – structure & functions of organelles

1. a) Lysosomes;

 b) Contractile vacuoles;
2. (a) Make cells visible;
 (b) Prevent distortion of cells;
3. Diameter of field of view

 $= 4\text{mm} \times 1000\text{mm} = 4000\mu\text{m};$
 Size of each cell $= \frac{4000}{20}$
 $= 200\mu\text{m};$
4. a) Manufacture of ribosomes;

- b) encloses cell contents; regulate movement of materials in and out of the cell;
5. Protein:
- Nucleic acid (DNA – RNA);
6. (i) $Mg = O.L.M \times E.L.M;$
- $= 100 \times 5$
- $= 500;$
- (ii) $500 = 5 \times 10,000 = 50000m\mu$
- $\times 1 = ?$
- $= \frac{1 \times 50,000}{500};$
- $= 100micrometer;$
7. a) mitochondria;
- b) -has cristae/inner membrane highly folded to increase surface area; for respiration.
- Has matrix medium for respiratory activities; (reject (b) if (a) is wrong.)
- Has matrix medium for respiratory activities; (reject (b) if (a) is wrong.)
8. a) nucleolus;
- b) Centrioles;
- c) nuclear membrane/pore;
9. a) catalyses the breakdown of toxic hydrogen peroxide; to harmless water and oxygen in active tissues;
- b) Low temperature;
10. a) i) Nucleus.
- ii) Formation of RNA / ribonucleic acid;
- Formation of ribosomes;
- b) i) Contractile vacuole;
- ii) Lysosomes;
11. Sensitive to change in temp; sensitive to changes in PH; has both negative and positive charges;
12. a) Cellulose;
- b) Store sugars, salt and food; carry out osmoregulation by inducing osmotic gradient that

bring about water movement; maintain the shape of the cell;
c) Cell wall; and chloroplast;

13. Study of internal and external parts of the body of an organism; Study of the living organisms and their chemical composition;

14. a) Synthesis of proteins;

b) Site for photosynthesis;

15. a) Length of drawing :
Length of object

16. (a) Ribosomes:- Protein synthesis(1mk);

(b) Centrioles – Spindle formation during cell division ;
- Form cilia and flagella

17. (a) cellulose;

(b) Lipoproteins/lipids and proteins;

18. - No organized nucleus;

- Organelles not bound by membranes;

- Lack mitochondria;

19. (a) X : Chloplasts;

Y : Vacuole /sap vacuole;

(b) More on the upper side to obtain optimum light intensity/ in bright light, they move away to

avoid bleaching/ in dim light they move towards the source of light for maximum

absorption of light;

20. Cell diameter = field of view in menometer

Number of cells under the field of view

$$\frac{3.5 \times 1000}{8} ; \quad \frac{3500}{8}$$

$$= 437.6 \mu\text{m} = 438 \mu\text{m};$$

21. i) Arachnida

- ii) - Exoskeleton
- Jointed appendages
- Segmented body
- Moulting;

- 22 a) Magnification – Ability of a microscope to enlarge tiny objects

Resolution – Ability of a microscope to separate between two tiny structures under

magnification to appear distinct

- b) Mounting – The placing of prepared slide on stage of a microscope;
Staining – Use of chemical stain on specimen for clear observation

23. (a) Golgi bodies/Golgi apparatus;
(b) Lysosome(s):
(c) Ribosomes;

24. (a) Make the sections transparent:

(b) To produce thin sections/ Not to distort the cells:

(c) To distinguish between different parts/organelles of the cells:

25. - Magnify the object further;
- Concentrates light onto the object;
- Controls amount of light illuminating the object;

26. Size of one cell = $\frac{\text{diameter of field view}}{\text{No. of cells arranged across the diameter}}$
 $= \frac{2000\mu\text{m}}{10\text{cells}}$
 $200\mu\text{m} = 0.2\text{mm}$
 $\text{N/B} = 1\mu\text{m} = 0.001\text{mms};$

27. (a) To make the specimen /section more visible
(b) To allow light to pass through for easy viewing

28. Animal cell;

29. a) Stores hydrolytic enzymes for destruction of worn out organelles/ cells/ tissues/ digestion

of bacteria/ pathogens; Acc digestion of food/ accept autolysis

- b) Processing/ packaging synthesized and transporting of packaged cell materials; production
of lysosomes/ secretions of packaged material;

30. Insecta; Reject insects/ exopoda

31. a) magnifying the image of the specimen;
 b) Objective lens brings the image into focus and magnifies it;
32. a) Mitochondria
 b) early production/ respiration;
 c) Increases surface area; for attachment of respiratory enzymes;
 d) Nerve cells; skeletal muscles; cardiac muscles