SUBJECT: BIOLOGY.

CLASS: FORM 1

TOPIC 3: THE CELL.

1. What is a cell?

It is the basic unit of life.

2. State the functions of the following cell structures.

(a) Sap vacuole.

Sap vacuole - store sugars (in plants)

(b) Nucleolus.
Manufacture ribosomes.
3. Name **three** properties of the cell membrane.

Sensitive to change in temperature; pH;
Has electrical changes, positive and negative changes; Selectively permeable;

4. Name the organelles that perform each of the following functions in a cell.

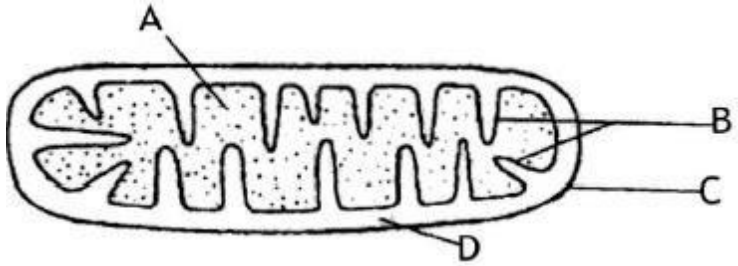
(i) Synthesis of proteins

Ribosomes;

(ii) Transport cell secretions
Rough endoplasmic reticulum
Smooth endoplasmic reticulum;
(iii) Destroy old and worn out organelles or even the entire cell. **Lysosomes;**
(iv) Package and transport glycoproteins.

Golgi apparatus/Golgi bodies;

5.The diagram below represents a cell organelle.



i).Identify the organelle.

Mitochondrion

(ii) Name the part labelled B.
Cristae;
(iii) State the function of the part labelled A. **Site where respiration occur;**

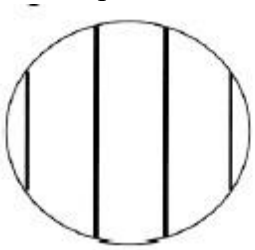
6. State the functions of the following organelles.

(i) Centriole

- Helps in formation of spindle fibres;
- Helps in formation of cilia and flagella; (ii) Nucleolus

Helps in formation of ribosomes.

7. Name **three** supportive tissues in plants.
- Collenchyma;
- Scherenchyma;
- Xylem;
- Tracheids;
8.A form one student trying to estimate the size of onion cells observed the following on the microscope's field of view.



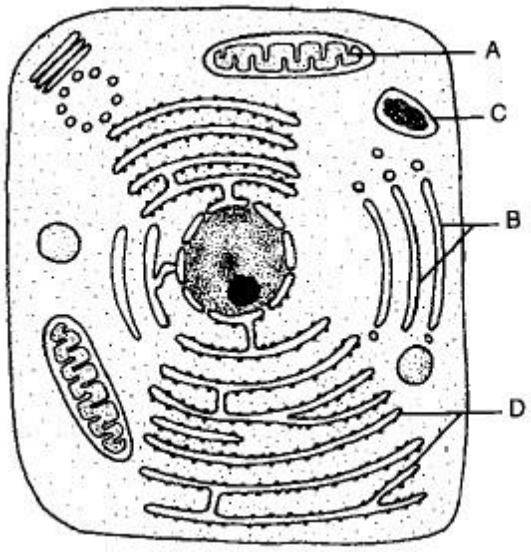
i).Define the term resolving power.

Resolving power is the ability to distinguish two close parts as separate entities;

(ii) If the student counted 20 cells across the field of view, calculate the size of one cell in micrometers.

Diameter field of view = 3mm
No. of cells – 20 cells
1mm = 1000µm
3mm = 3000µm
Size of 1 cell = $\frac{3000}{20}$ = 150µm
9. Name **two** tissues in plants which are thickened with lignin. **Xylem / (tracheid and vessels); sclerenchyma;**

10. The diagram below represents a cell as seen under an electron microscope.



a).Identify the parts labeled **A** and **D**.

A Mitochondrion;

D Rough endoplasmic reticular;

b) State the function of the structures found on the part labeled **D**. **Site for protein synthesis;**

11. Using a microscope, a student counted 55 cells across a field of view whose diameter was 6000μm. Calculate the average length of the cells. **Show your working**.

Length of a cell= diameter of field of view
Number of cells;
6000
55;
=109;

12. State the function of a Condenser of the light microscope. **Regulation of a mount of light.**

13. A student drew a 3cm long diagram of a plant flower. If the actual length of the flower was 6cm, calculate the magnification of drawing made by the student. Show your working.

Mg = Length of diagram = 3cm
Real length 6cm =X 0.5

14. State **two** functions of the plasma membrane?

Selective passage of substances in and out of the cell
Encloses cell contents

15. Give the synthesis role of smooth endoplasmic reticulum. **Synthesis of lipids.**

16. Name the organelles that are abundant in:

(a) Goblet cells

Golgi bodies / Golgi apparatus

(b) Liver cells

Mitochondria.

17. Name the cell organelles which would be abundant in;
(a) Sperm cell
Mitochondria
(b) Pancreas
Golgi bodies

18. How are the mitochondria adapted to their function?

Inner membrane is highly folded / have cristae to provide large surface area for attachment of enzyme; / respiratory reactions.

19. a).A student from Kegonga used a microscope with X40 objective lens and X5 eye piece lens which had 2mm radius and counted 5 cells. Calculate the area of the field of view in micrometers.

$$\text{Area} = \pi r^2$$
$$= \frac{22}{7} \text{ x } 2000\mu\text{m};$$
$$= 12{,}571{,}429\mu\text{m}$$

b) What is the average size of the cell in micrometers?

Diameter of field of view r x 2 = 2mm x 2 = 4mm

$$4\text{mm} = 4000\mu\text{m}$$
$$\therefore 1 \text{ cell} = \frac{4000\mu\text{m}}{5};$$
$$1 \text{ cell} = 80\mu\text{m}$$

20. Name the cell organelles that:-
a) Produce lysosomes

– Golgi body/apparatus;

b) Contain chromosomes
– Nucleus
c) Selectively control movement of substances in and out of the cell.

– Cell membrane;

21. What is the function of centriole in a cell?
Formation of spindle fibres / flagella / cilia;
22. Name a cell organelle that would be abundant in a skeletal muscle.

Mitochondria;

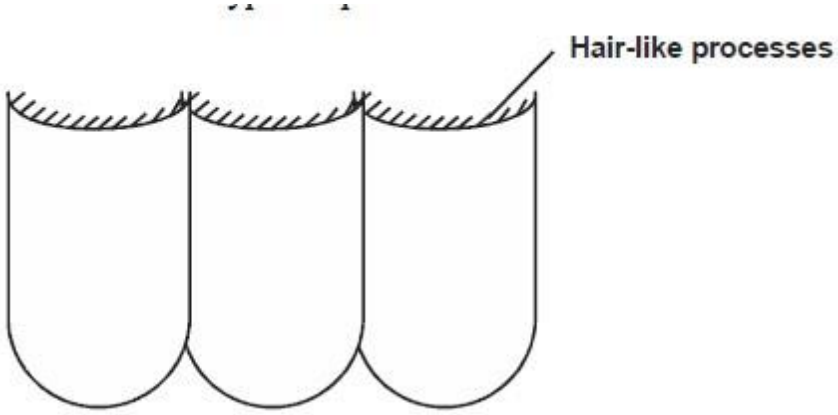
23. A student collected a bone from the school garden. The bone was measuring 45 cm. He drew the bone in his book and his diagram was 9 cm long. Calculate the magnification of his drawing.

Linear magnification = Length of drawing
Length of object;
= 9 cm ÷45cm = X 0.2;

24. Name the tissue responsible for secondary thickening in plants.

Cambium;

25. The diagram below shows a type of epithelial tissue.



a).State the possible functions of the hair-like processes on the tissue.
Move back and forth to help in the movement of materials;
b) Name two mammalian organs where this type of epithelium is found.
- Trachea;
- Oviduct;
- Nasal cavity;
26. Name the tissue that carry out the following functions in mammals.
a) Binds and supports various organs in the body.
Connective tissue;
b) Transport oxygen throughout the body.
Blood tissue;
c) Contract and relax to bring about movement.
- Skeletal muscle tissue;
27. The diameter of the field of view of a microscope was found to be 6mm. There were 8 cells across the diameter of the field of view. Calculate the size of one cell in micrometer.

$$\frac{\text{Diameter of the field of view}(\mu m)}{\text{No. of cells}}$$

$$\frac{6\times1000}{8}=\frac{6000}{8}=750\mu m;$$

28. State the difference between an electron microscope and a light microscope.

Electron microscope	Light microscope
-higher magnification	lower magnification;
-high resolving power	lower resolving power;
- uses a beam of electrons to illuminate the specimen	uses light to illuminate the specimen;
- uses electromagnetic lens	-uses glass lens;

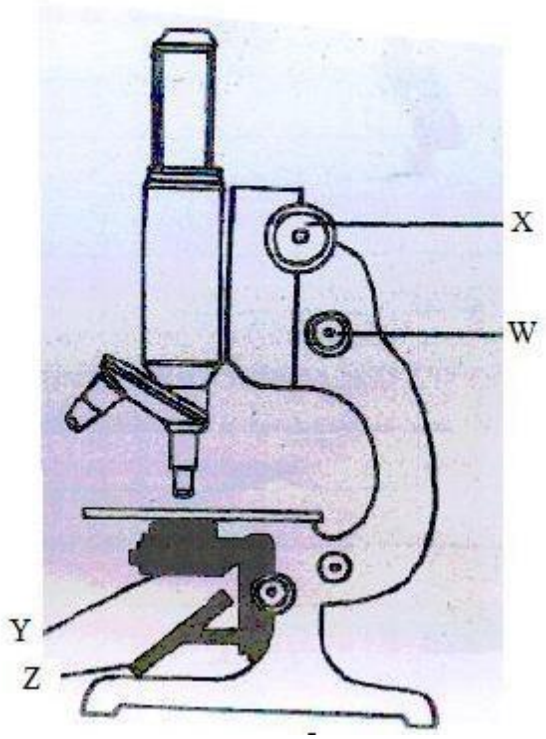
29. a)Name the cell organelle which forms spindle fibres during cell division.

Centriole;

(b) Other than the function given in (a) above, state one other function of the organelle.

Formation of cilia and flagella;

30. The diagram below represents a common laboratory equipment.



(i).Identify the equipment.

Light microscope

(ii) What is the function of part labelled W?

Raises or lowers the body tube for small distance to bring the image into sharp focus. 31. Define the following

i) Tissue

A group cells which are similar in structure and together perform a specific function.

ii) Organ

A group of different tissues that perform a similar function.

iii) Organ system

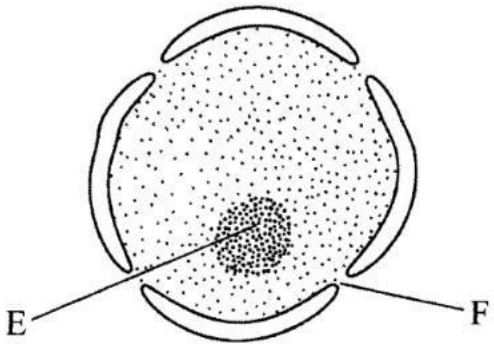
A group of different organ performing a similar function.

32. Name two structures found in plant cell but are absent in animals cell.

-Cell wall.

-Chloroplast.

33. The diagram below represents a nucleus.



(a) Name the structures labelled E and F.

(i) E **-Nucleolus**

(ii) F **- Nuclear pore/nucleopore**

(iii) State the function of F.

- Facilitates movement of materials in and out of the nucleus.

(b) With reference to the nucleus state one difference between an animal and a bacterial cell.

- Nuclear material in the bacterial cell is not enclosed Within a membrane /prokaryotic, While in animal cell it is enclosed/ eukaryotic.

34. Name the plant cell organelle:

(i) That stores chlorophyll.

- Chloroplast

(ii) Responsible for intracellular digestion.

- Lysosome.

35. State two main functions of the vacuole in the amoeba.

(i) - Feeding (food vacuole)

(ii)- Osmoregulation (contractile vacuole);

(iii)- Excretion/removal of wastes

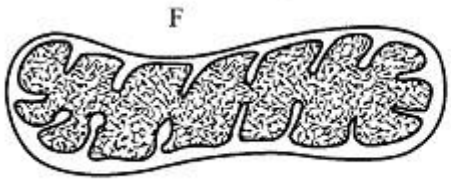
36. (a) Name the cell organelle found in abundance in the white blood cells.

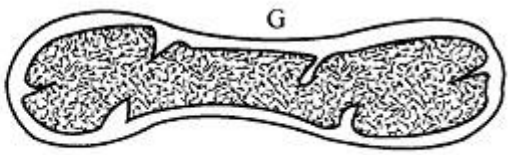
Lysosomes/golgi apparatus

(b) Give a reason for your answer in (a) above.

White blood cells fight pathogens to protect the body, the lysosomes contain lytic enzymes which destroy pathogens;/Golgi apparatus synthesize lysosomes which contain lytic enzymes that destroy pathogens.

37. Below are diagrams of a cell organelle obtained from different organs of an animal.





(a) (i) For each organelle state an organ in the urinary system where it is likely to be found.

F - Kidney;

G - Bladder/Ureter/Urethra;

(ii) Give a reason for your answers in (a) (i) above.
Kidney - active re-absorption of solutes requires more energy; organelle F has more cristae for attachment of more respiraton enzymes producing more energy;

Bladder/ureter/urethra - does not require as much energy/ organelle G has less number of cristae hence fewer respiration a enzymes attached/less energy produced;

38. State three functions of Golgi apparatus.

-Form vesicles that transport materials to other parts of the cell e.g. proteins.

-Transportation secretions to the cell surface for secretion e.g. enzymes and mucus. Packaging of materials such as glycoproteins.

-They form lysosomes

39. State the functions of the following pans of a microscope.

(a) Objective Lens

-Magnification of the object/ image

(b) Diaphragm

-Regulates amount of light (falling on the object on microscope)/ Adjust control amount of light.

40. A student drew a 6cm long diagram of a plant flower. If the actual length of the flower was 12 cm. calculate the magnification of the drawing made by the student. Show your working.

Object length = 12 cm Drawing

length = 6 cm

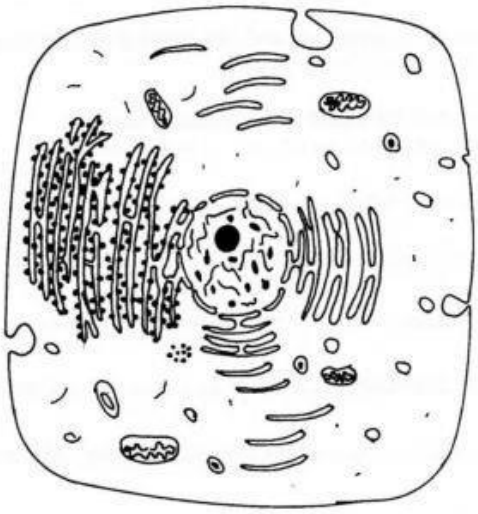
M =Drawing length

Object length

= 6 ÷ 12 =

X 0.5;

41. The diagram below represents a cell as seen under an electron microscope.



a).Based on the diagram, state whether it represents an animal cell or a plant cell.

Animal cell;

(b) Give **two** reasons for your answer in (a) above.

-Has cell membrane only/has no cell wall;

- Has numerous small vacuoles;

-Has central nucleus;

42. Why is the palisade layer a tissue?

Consists of many similar cells performing the same function;

43. State the functions of the Stage of a light microscope.

Platform where specimen (on slide) is placed;

44. Give reasons for carrying out the following procedures when preparing temporary wet mounts of plant tissues.

(a) Making thin plant sections.

To reduce layers of cells to allow light to pass through;

(b) Adding water on the plant section.

To make the cells turgid/prevent drying up;

45. What is the function of a cover slip in a microscope?

To protect the lens on the objective;

46. State **two** ways in which chloroplasts are adapted to their functions.

- **They contain chlorophyll which traps/absorb light (energy)**
- **They have grana which increase surface area for accommodation of a large number of chlorophyll molecules for photosynthesis - The stoma has enzymes for photosynthesis**

47. The diagram below represents a cell organelle.

a).Name the part labelled B. **Outer membrane*;***

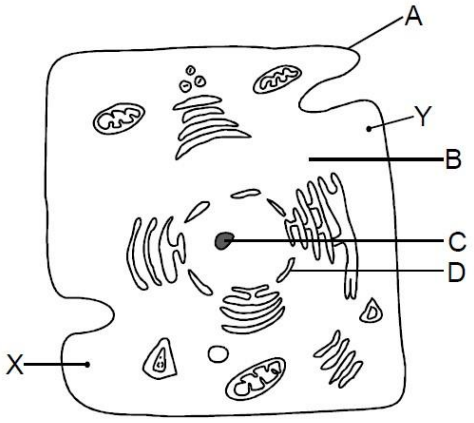
b) State the function of the part labelled A.

Attachment of respiratory enzymes*;* / have respiratory enzymes*;*

48. Give a reason why red blood cells have no nucleus.

To give / provide more room for the package of haemoglobin *;*

49. The diagram below shows a certain cell. Use it to answer questions that follow.



Identify the structures labelled A, B, C and D

A cell membrane; /plasma membrane;
B Cytoplasm;
C Nucleolus*;*
D Nuclear membrane;
50. Name the cell organelles that are responsible for the formation of the following organelles. i) Lysosomes
Golgi bodies / Golgi apparatus; ii)

Ribosomes

Nucleolus;

51.Akol observed and drew an amoeba using a light microscope. If the total magnification of the amoeba was X450 and that of the objective lens was X30. What was the magnification of the eyepiece lens ? Show your working.

450 ÷ 30 = X 15;

52. Where does glycolysis take place in a cell ?

cytoplasm;

53. Name **two** membranes that materials from outside the cell will have to pass through before they enter into a sap vacuole.
Cell membrane/ plasma membrane; Tonoplast;

54. State the function of goblet cells.

They secrete mucus to lubricate food and form a protective layer for the gut wall to prevent it from being digested;