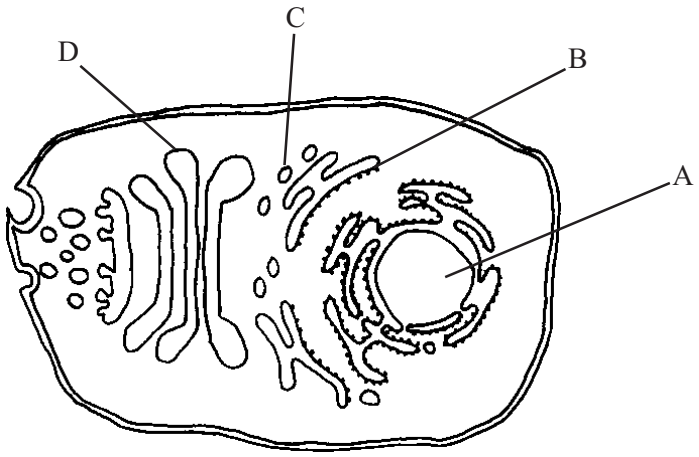
CELL BIOLOGY

QUESTIONSHEET 1

Do not write in margin

The diagram shows some of the cell structures involved in the secretion of an extracellular enzyme.



(a) Identify A, B, C, and D.

A: ..... B: ..... C: ..... D: .....

[4]

(b) Outline the role of each of the following in this process.

(i) A:

.....

.....

[2]

(ii) B:

.....

.....

[2]

(iii) C:

.....

.....

[2]

(iv) D:

.....

.....

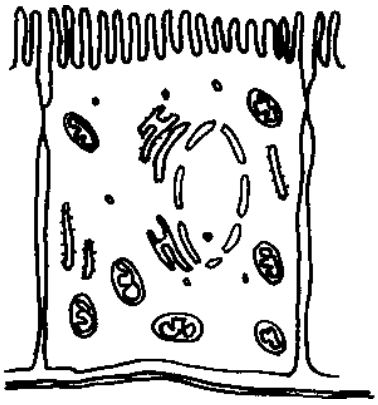
[2]

TOTAL / 12

CELL BIOLOGY

QUESTIONSHEET 2

The diagram shows a cell from the proximal (first) convoluted tubule in the nephron of the kidney.



(a) Label two features on the diagram that help the cell to take up glucose from the glomerular filtrate.

[2]

(b) Explain how the two features of the cell help in the uptake of glucose from the glomerular filtrate.

1. .....

.....

.....

[2]

2. .....

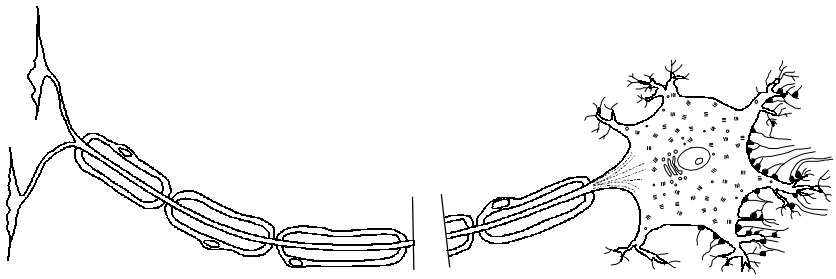
.....

.....

[2]

TOTAL / 6

The diagram shows a voluntary motor neuron.



(a) State one way in which (i) an autonomic motor neurone, and (ii) a sensory neurone differ in structure from the voluntary motor neurone.

(i) ..... [1]

(ii) ..... [1]

(b)Explain how each of the following features increase the efficiency of nerve impulse transmission.

(i) myelinated axon.

.....

.....

.....

[3]

(ii) Nissl granules

.....

.....

.....

[3]

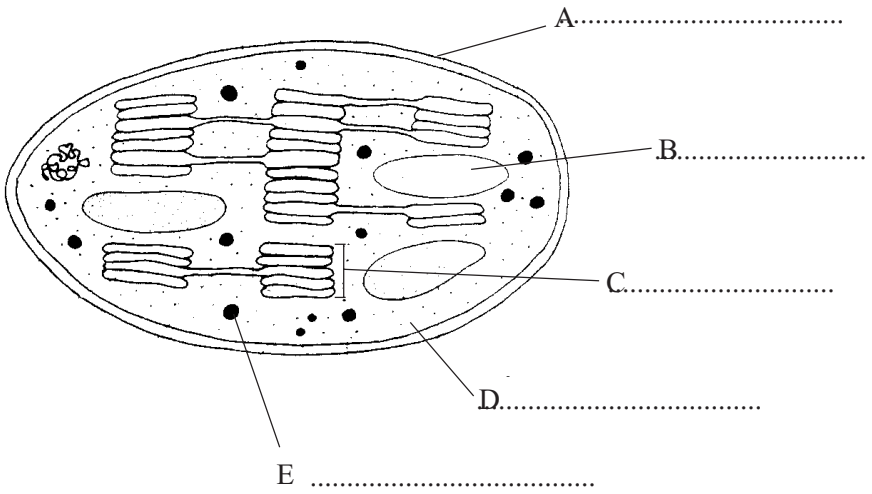
TOTAL / 8

CELL BIOLOGY

QUESTIONSHEET 4

Do not write in margin

The diagram shows the structure of a chloroplast.



(a) Name structures labelled A to E on the diagram.

[5]

(b) Describe where in the chloroplast:

(i) the light dependent reaction takes place.

.....

[1]

(ii) the light independent reaction takes place.

.....

[1]

(c) Describe three similarities in the structure of chloroplasts and mitochondria.

.....

.....

.....

[3]

(d) Suggest why each of the following are present in both chloroplasts and mitochondria.

(i) phosphorylase enzymes.

.....

.....

[2]

(ii) ribosomes.

.....

[1]

TOTAL / 13

CELL BIOLOGY

QUESTIONSHEET 5

The table below compares the process of diffusion, facilitated diffusion and active transport. Complete the table by filling in the blanks, using the words ‘yes’ or ‘no’.

	Process		
Description	Simple Diffusion	Facilitated Diffusion	Active Transport
Is ATP required?	No		
Are protein carrier molecules involved?	No		Yes
Direction of transport is always down concentration gradient		Yes	

[5]

TOTAL / 5

CELL BIOLOGY

QUESTIONSHEET 6

Do not write in margin

The table below describes the structure and function of organelles in eukaryotic cells. Complete the table by filling in the empty boxes A, B, C, D and E

Organelle	Structure/Feature	Function of feature
Nucleus	Nucleoli present	A
B	Inner membrane folded into cristae	C
D	Vesicles containing hydrolytic enzyme	Breakdown of old organelles. Cell lysis.
Smooth endoplasmic reticulum	Consists of flattened membrane- bound sacs called cisternae	E

TOTAL / 5

CELL BIOLOGY

QUESTIONSHEET 7

The table below refers to a bacterial cell, a liver cell and a palisade mesophyll cell and to the structures which may be found inside them.

If a feature is present in the cell, place a tick (✓) in the appropriate box and if a feature is absent from the cell, place a cross (×) in the appropriate box.

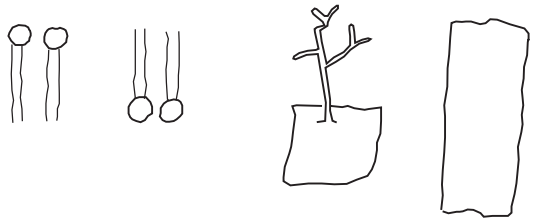
Feature	Bacterial cell	Liver cell	Palisade cell
Nuclear membrane			
Vacuole			
Cell wall			
Microvilli			
Chloroplasts			
Mesosomes			
Glycogen granules			

TOTAL / 7

CELL BIOLOGY

QUESTIONSHEET 8

The diagram below shows some of the components of the plasma membrane.



(a) (i) Using the information shown and your own knowledge, draw a diagram to show the structure of the plasma membrane.

[3]

(ii) On your diagram label the components drawn and indicate the outer surface of the membrane. [5]

(b) State two functions of the proteins in the plasma membrane.

.....

.....

[2]

(c) Explain how the following substances cross the plasma membrane.

(i) carbon dioxide.

.....

.....

[2]

(ii) glucose.

.....

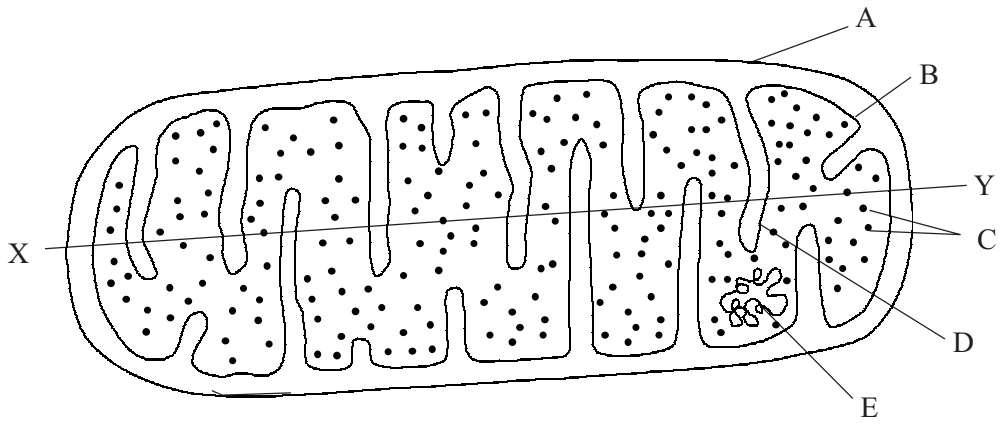
.....

[2]

TOTAL / 14

QUESTIONSHEET 9

The diagram below shows the structure of a mitochondrion.



(a) Name structures A to E.

A: ..... B: ..... C: ..... D: .....

E: ..... [5]

(b) State where the following are situated in the mitochondrion.

(i) The enzymes involved with oxidative phosphorylation and electron transport.

..... [1]

(ii) The enzymes involved with the Krebs cycle.

..... [1]

(iii) Why does the the mitochondrion contain RNA?

.....

..... [2]

(c) The magnification of the diagram is 130,000 times. Calculate the actual length of the mitochondrion. Express your answer in μm. Make your measurements along the axis XY.

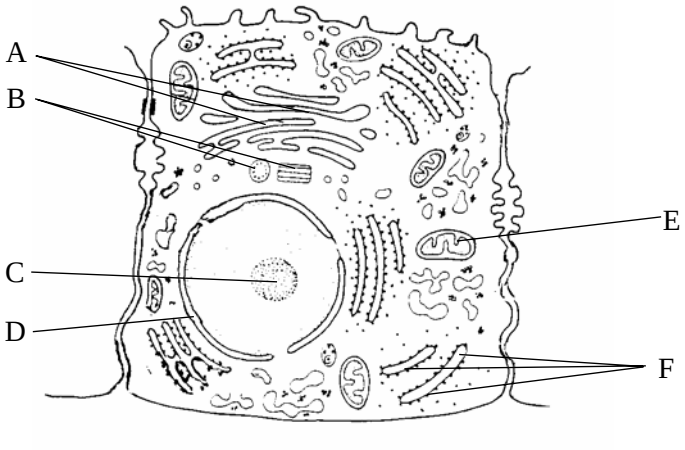
.....

..... [2]

TOTAL / 11

Do not write in margin

The diagram below shows an electron micrograph of a cell.



(a) Name the parts labelled A, B, C, D, E and F.

A: ..... D: .....

B: ..... E: .....

C: ..... F: .....

[6]

(b) What evidence can be seen in the diagram that suggests that the cell is:

(i) metabolically active and involved in secretion of enzymes.

.....

.....

.....

[3]

(ii) involved in production or modification of lipids?

.....

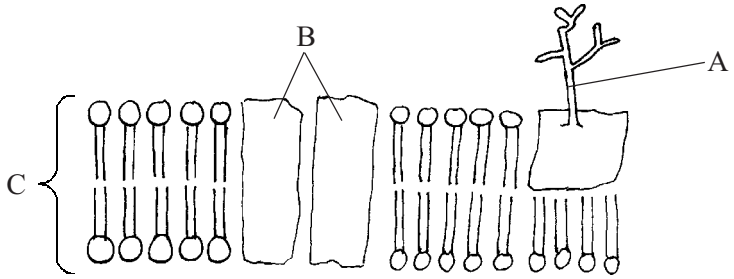
[1]

TOTAL / 10

CELL BIOLOGY

QUESTIONSHEET 11

The figure shows the fluid mosaic model of the plasma membrane.



(a) State the approximate width of the membrane.

.....

[1]

(b) Identify,

(i) A.

.....

[1]

(ii) B.

.....

[1]

(iii) C.

.....

[1]

(c)(i) Explain why the membrane may be described as fluid.

.....

[1]

(ii) Distinguish each of the following pairs.

1. exocytosis and endocytosis.

.....

.....

[2]

2. phagocytosis and pinocytosis.

.....

.....

[2]

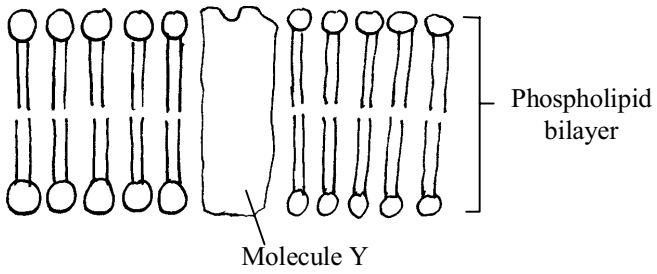
TOTAL / 9

CELL BIOLOGY

QUESTIONSHEET 12

Do not write in margin

The diagram shows part of the cell-surface membrane of a cell from the small intestine. Molecule Y acts as a cell-surface receptor for growth hormone.



(a) State the likely nature of molecule Y.

.....

[1]

(b) State the approximate length of molecule Y.

.....

[1]

(c) Explain why molecule Y is only able to recognise growth hormone.

.....

.....

[1]

(d) Suggest why pygmies are unable to achieve normal growth despite producing 'normal' amounts of growth hormone.

.....

.....

.....

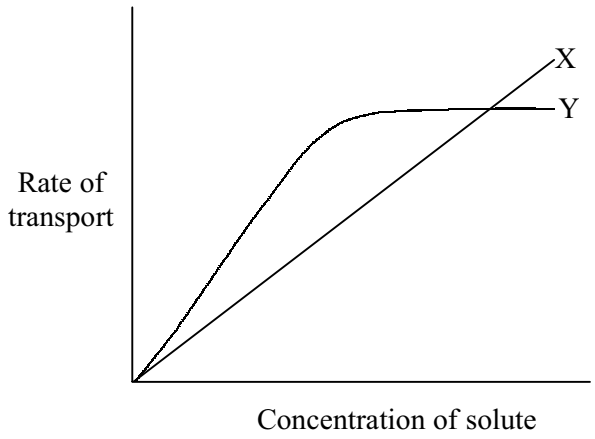
[2]

TOTAL / 5

QUESTIONSHEET 13

Do not write in margin

The graph below shows the rate of movement of solute molecules across a plasma membrane by simple diffusion and facilitated diffusion.



(a) Which type of uptake is shown by line Y. Explain your answer.

.....

.....

..... [3]

(b) State two factors which may limit the rate of simple diffusion.

1: .....

2: ..... [2]

(c) Explain how the concentration of ions such as sodium and chloride are kept at high levels outside cells but low levels within.

.....

.....

.....

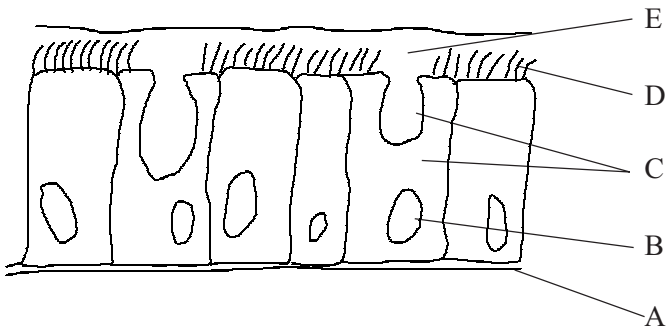
[3]

TOTAL / 8

CELL BIOLOGY

QUESTIONSHEET 14

The diagram below shows a vertical section through a simple columnar epithelium.



(a) (i) Name structures A to E.

A: ..... B: ..... C: .....

D: ..... E: ..... [5]

(ii) State two sites in the body where this type of epithelium can be found.

1: ..... 2: .....

[2]

(iii) What are the functions of D and E?

D: ..... [2]

E: ..... [1]

(b) (i) How does a compound epithelium differ from a simple epithelium?

.....

.....

[2]

(ii) Name two types of compound epithelium and state one site in the body where each is found.

1. Name: ..... Site: .....

2. Name ..... Site: .....

[4]

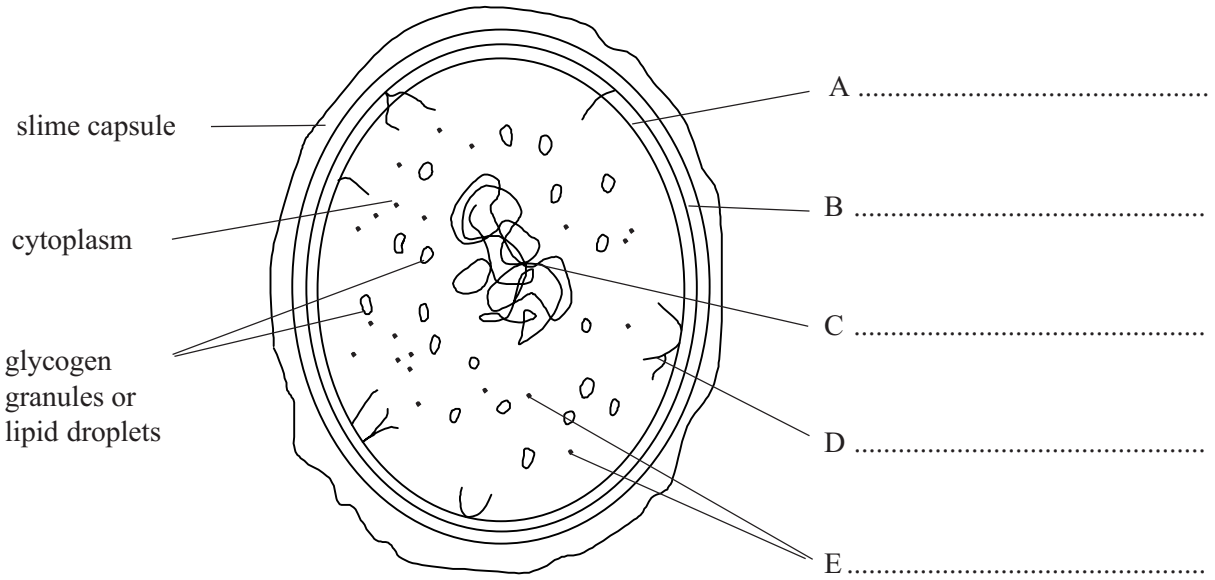
TOTAL / 16

CELL BIOLOGY

QUESTIONSHEET 15

Do not write in margin

The drawing below shows the ultrastructure of E. coli.



(a) (i) Label structures A to E on the drawing.

[5]

(ii) State a function of part D.

.....

[1]

(iii) What term is given to this bacterial shape?

.....

[1]

(b) List three ways in which prokaryotic cells differ from eukaryotic cells.

1 .....

2 .....

3 .....

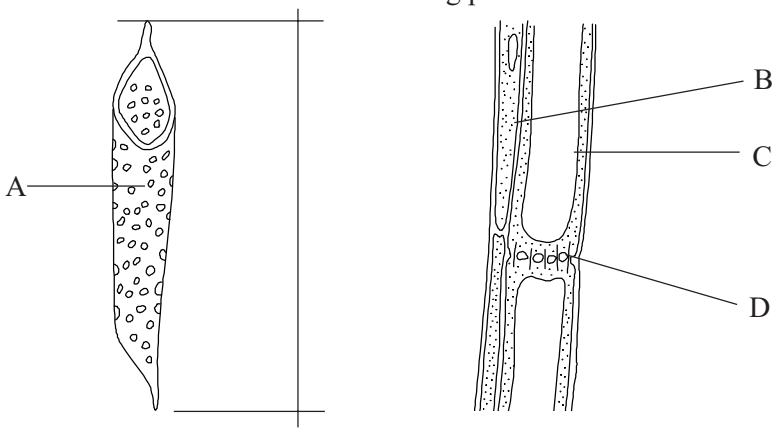
[3]

TOTAL / 10

CELL BIOLOGY

QUESTIONSHEET 16

The cells drawn below are from the vascular bundle of a flowering plant.



(a) (i) Name the tissues from which these cells are taken.

Cell A: ..... Cells B and C: .....
[2]

(ii) Name cell types A, B and C.

A: ..... B: ..... C: .....
[3]

(iii) What is structure D?

..... [1]

(b) (i) Suggest three ways in which the cell A is suited to perform its functions.

1 ..... [1]

2 ..... [1]

3 ..... [1]

(ii) State two structural differences between cells B and C.

1 .....

..... [1]

2 .....

..... [1]

(c) Cell A is magnified 750 times. By measuring between the lines indicating the ends of the cell, calculate the actual length of the cell. Show your working.

Answer ..... [3]

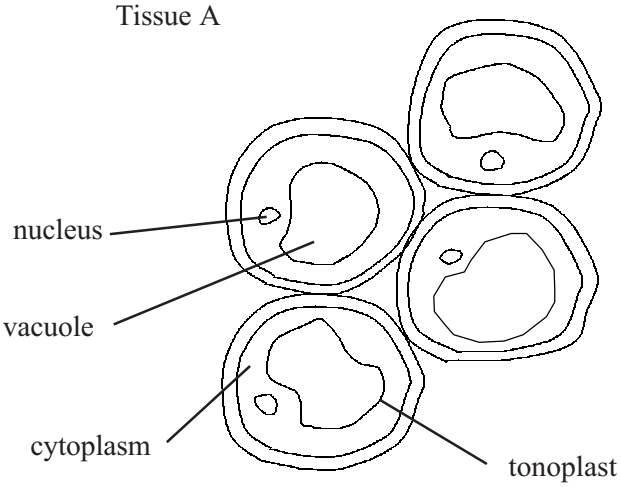
TOTAL / 14

CELL BIOLOGY

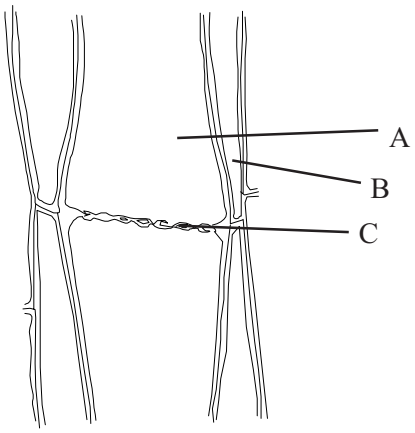
QUESTIONSHEET 17

The diagrams below show two types of plant tissue which perform different functions in the plant.

Tissue A



Tissue B



(a) (i) Identify tissue A:

.....

[1]

(ii) State the main function of this type of tissue.

..... [1]

(iii) How is the structure of the tissue suited to its functions?

.....

..... [3]

(b) (i) Identify tissue B:

..... [1]

(ii) Name parts A, B and C.

A: ..... B: ..... C: .....

[3]

(iii) What is the main function of this tissue?

.....

[1]

(iv) How is the structure of this tissue suited to its function?

.....

.....

[3]

TOTAL / 13

Do not write in margin

The diagram below illustrates cellular secretion. Secretion may be continuous or it may be intermittent, only occuring to coincide with some other activity outside the cell.

(a) (i) Name A, B, C and D.

A: ..... B: .....

C: ..... D: ..... [4]

(ii) State the function of structures B.

..... [1]

(iii) Describe the role of structure C in secretion.

.....

.....

..... [3]

(b) (i) Name a cell that secretes continuously throughout its life and name the secretion.

cell: ..... [1]

secretion: ..... [1]

(ii) Name a secretion only released intermittently and name the cell that secretes it.

secretion: ..... [1]

cell: ..... [1]

(iii) Suggest why an intermittent secretion must be packaged up in a secretory granule;

.....

..... [2]

(iv) How may a cell be triggered to release an intermittent secretion?

..... [1]

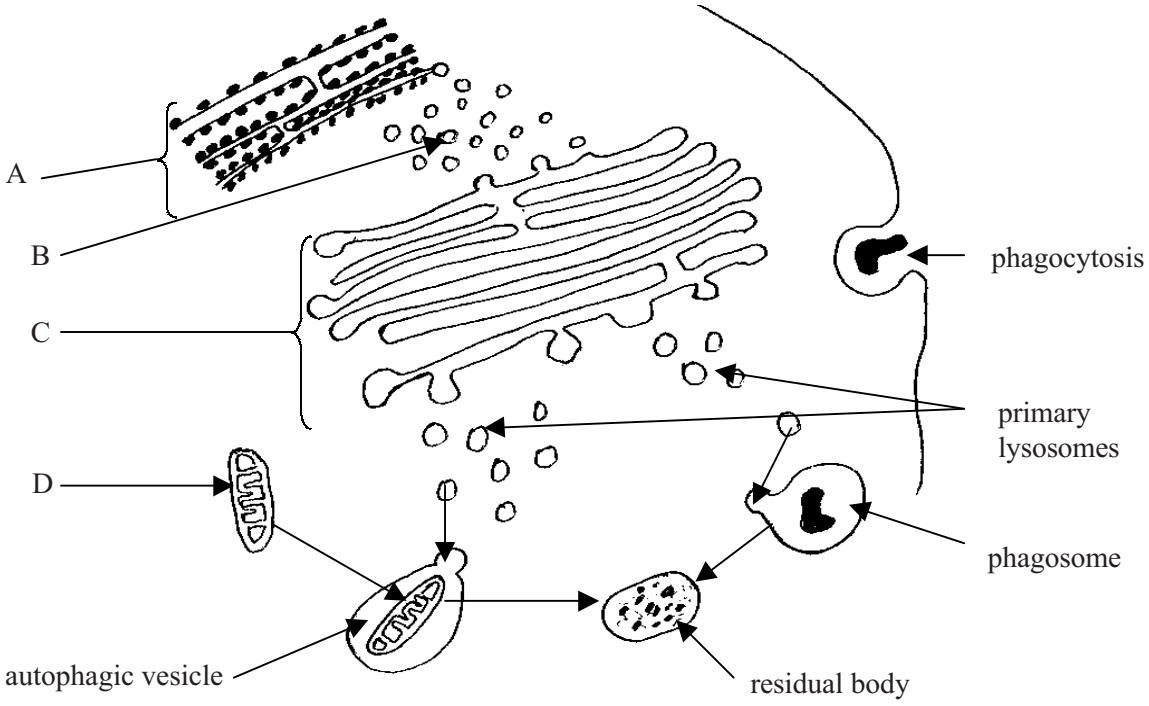
TOTAL / 15

CELL BIOLOGY

QUESTIONSHEET 19

Do not write in margin

The diagram below illustrates the synthesis and fate of lysosomes. The autophagic vesicle, phagosome and residual body are all secondary lysosomes.



(a) (i) Identify A, B, C and D.

A: ..... B: .....

C: ..... D: .....

[4]

(ii) What are the main functions of lysosomes?

.....

.....

.....

.....

[3]

(iii) Describe the role of the Golgi body in forming lysosomes.

.....

.....

.....

.....

[3]

(*Continued...*)

(b)(i) Distinguish between primary and secondary lysosomes.

.....

.....

.....

[2]

(ii) Suggest functions for the autophagic vesicles, the phagosomes and the residual bodies.

autophagic vesicles: .....

.....

[2]

phagosomes: .....

.....

[2]

residual bodies: .....

.....

[2]

The equation below represents Ficks' first law of diffusion.

$$J = DA\frac{\Delta C}{\Delta x}$$

where: J = net rate of diffusion
D= diffusion coefficient of the dissolving solute in the membrane (constant)
A= area of the membrane
ΔC = concentration difference across the membrane
Δ*x* = thickness of the membrane

(a) Use Fick's law to explain why some cells which are concerned with absorption by diffusion:

(i) possess a brush border of microvilli.

.....

.....

.....

[3]

(ii) make a very thin membrane.

.....

.....

.....

[3]

(b) In some membranes absorption involves active transport. Explain why cells in these membranes:

(i) contain many mitochondria.

.....

.....

.....

[3]

(ii) possess large quantities of cholesterol and other lipids in their cell membranes.

.....

.....

.....

[2]

TOTAL / 11