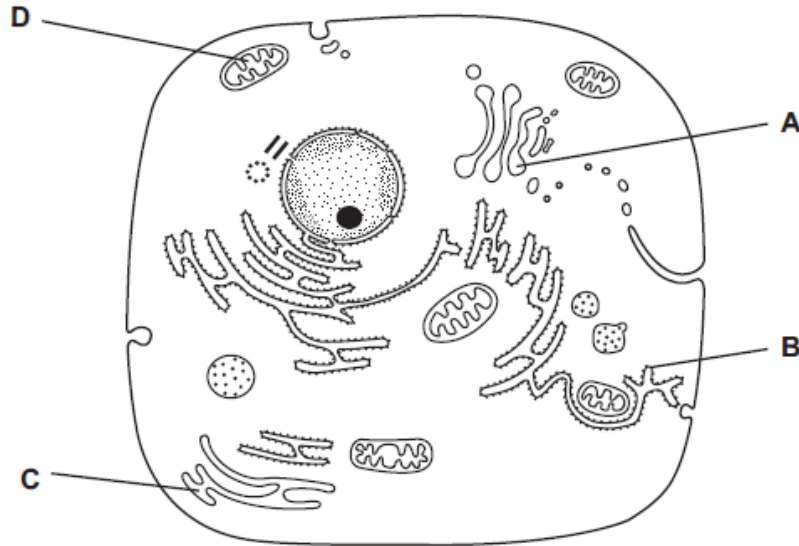


MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

MCQ

1. The diagram shows the ultrastructure of a typical animal cell. Which structure synthesises and transports lipids and steroids?



2. Which structures are found in plant cells but not in animal cells?

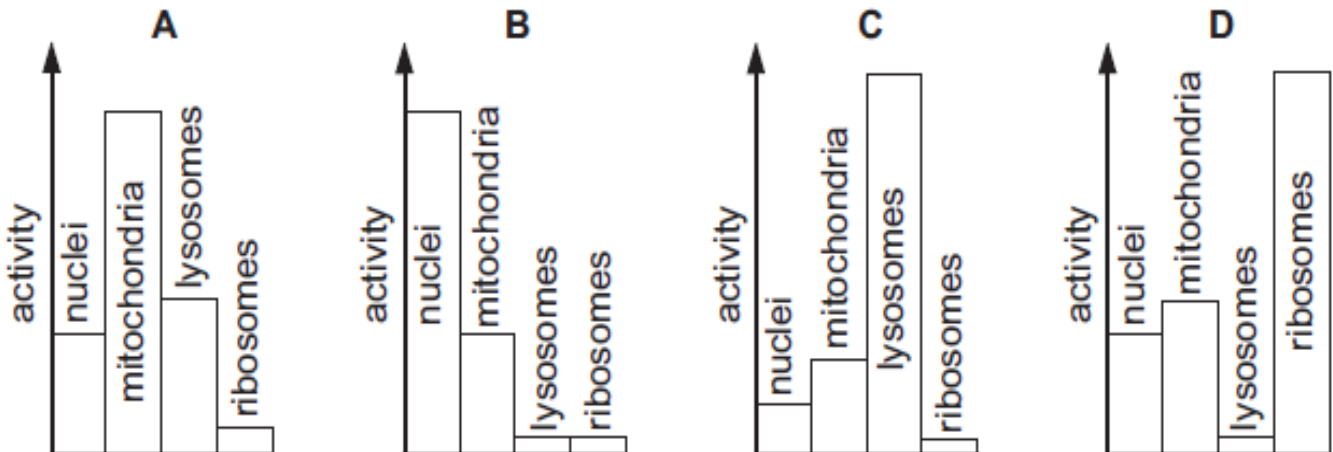
- A centrioles B mitochondria C nucleoli D plasmodesmata

3. What is the correct order of size of organelles?

	largest	→		smallest
A	mitochondrion	nucleus	lysosome	ribosome
B	mitochondrion	nucleus	ribosome	lysosome
C	nucleus	mitochondrion	lysosome	ribosome
D	nucleus	mitochondrion	ribosome	lysosome

4. A piece of mammalian tissue was homogenised and centrifuged. The biochemical activity of four subcellular fractions was investigated.

Which diagram indicates the fraction with maximum synthesis of messenger RNA?



MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

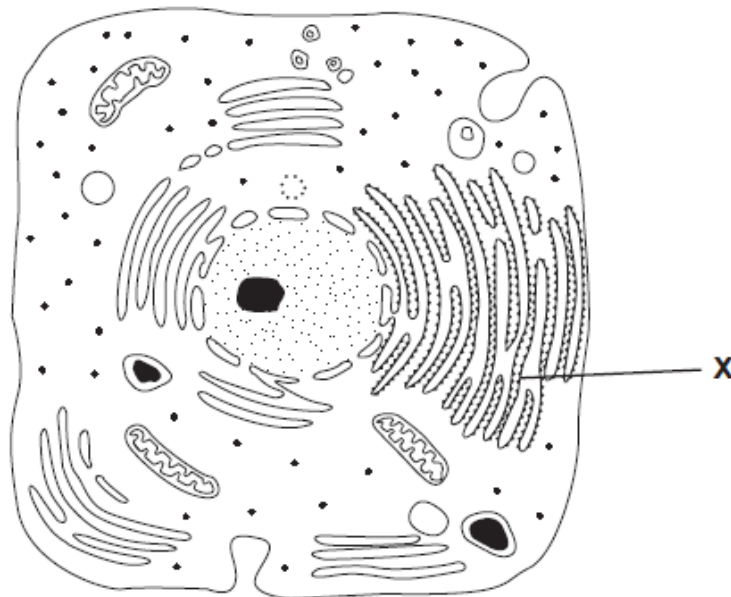
5. The action of which cell depends on large numbers of lysosomes?

- A ciliated epithelial cell B goblet cell C lymphocyte D phagocyte

6 An amino acid enters a cell and is used to synthesise an enzyme secreted by the cell. What is the sequence of cell components involved in this pathway?

	first	→		last
A	endoplasmic reticulum	Golgi apparatus	ribosome	exocytotic vesicle
B	endoplasmic reticulum	ribosome	Golgi apparatus	cell surface membrane
C	ribosome	Golgi apparatus	endoplasmic reticulum	cell surface membrane
D	ribosome	endoplasmic reticulum	Golgi apparatus	exocytotic vesicle

7. The diagram shows an electron micrograph of a typical animal cell.



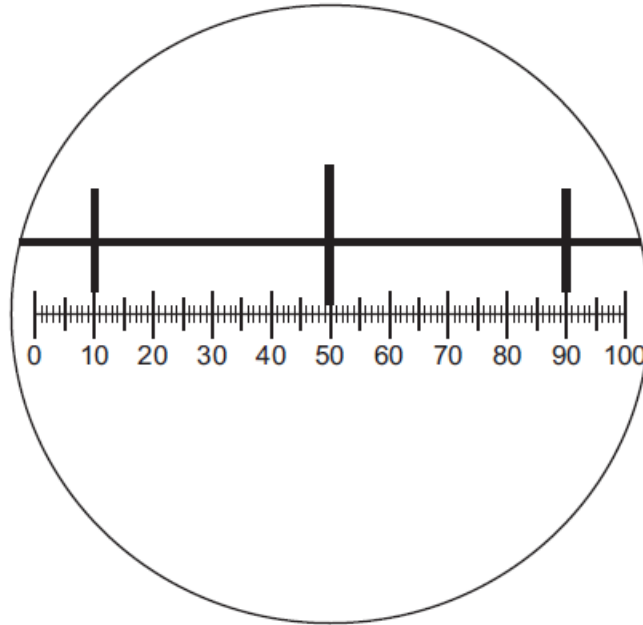
What is the function of the membrane system labelled X?

- A carbohydrate metabolism
- B lipid synthesis
- C protein synthesis
- D protein synthesis and transport

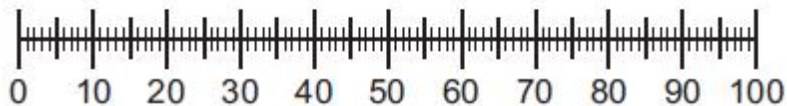
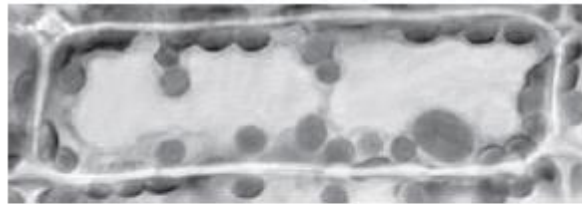
MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

8. The diagram shows a stage micrometer on which the small divisions are 0.1 mm. It is viewed through an eyepiece containing a graticule.



The stage micrometer is replaced by a slide of a plant cell.



What is the width of a chloroplast?

A 5 μm

B 10 μm

C 50 μm

D 100 μm

9. Which organelles are found in the cells of both eukaryotes and prokaryotes?

A chloroplasts

B Golgi apparatus

C mitochondria

D ribosomes

10. From which cell organelle are nucleic acids absent?

A chloroplast

B Golgi apparatus

C mitochondrion

D ribosome

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

11. Which eyepiece and objective lens combination enables you to see the greatest number of cells in the field of view?

	eyepiece	objective
A	×5	×10
B	×10	×10
C	×5	×40
D	×10	×40

12. Mitochondria are thought to have evolved from prokaryotic cells that were ingested by an ancestral cell.

Which feature have the prokaryotes lost during their evolution into mitochondria?

A cell wall B circular chromosome C endoplasmic reticulum D ribosomes

13. Which combination is found in a prokaryotic cell?

	endoplasmic reticulum	DNA	RNA	nucleus
A	✓	✓	✗	✗
B	✓	✗	✗	✓
C	✗	✓	✓	✗
D	✗	✗	✓	✓

key

✓ = present

✗ = absent

14. Which cell structure can be seen only with an electron microscope?

A cell surface membrane B chromosome C nucleolus D vacuole

15. A lymphocyte has a diameter of 1×10^{-2} millimetres (mm). What is the diameter in nanometres (nm)?

A 1×10^1 B 1×10^2 C 1×10^3 D 1×10^4

16. What is a function of the smooth endoplasmic reticulum?

- A protein synthesis
- B protein transport
- C steroid synthesis
- D steroid transport

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

17. Which is a feature of all prokaryotic cells?

- A absence of cell surface membrane
- B division by mitosis
- C presence of cellulose cell wall
- D presence of ribosomes

18. Which steps are needed to find the actual width of a xylem vessel viewed in transverse section using a $\times 40$ objective lens?

- 1 Convert from mm to μm by multiplying by 10^{-3} .
- 2 Calibrate the eyepiece graticule using a stage micrometer on $\times 10$ objective lens.
- 3 Measure the width of the xylem vessel using an eyepiece graticule.
- 4 Multiply the number of eyepiece graticule units by the calibration of the eyepiece graticule.

- A 1, 2, 3 and 4
- B 2, 3 and 4 only
- C 1 and 2 only
- D 3 and 4 only

19. A specimen is viewed under a microscope using green light with a wavelength of 510 nm. If the same specimen is viewed under the same conditions, but using red light with a wavelength of 650 nm instead, what effect will this have on the magnification and on the resolution of the microscope?

	magnification	resolution
A	decreased	decreased
B	increased	increased
C	remains the same	decreased
D	remains the same	increased

20. Which cell organelle does not contain nucleic acid?

- A chloroplast
- B Golgi apparatus
- C lysosome
- D ribosome

Paper 2

1 Fig. 1.1 is a drawing made from an electron micrograph of a goblet cell from the epithelium of the gas exchange system.

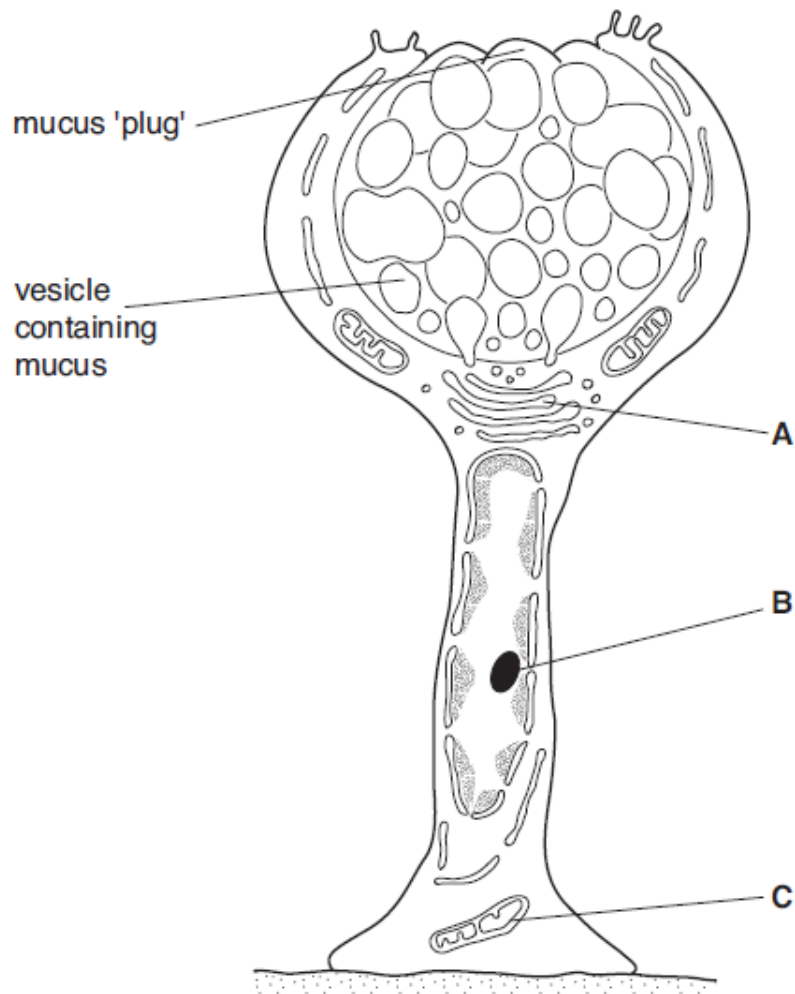


Fig. 1.1

(a) Name A to C and state their function.

[6]

(b) State two places in the gas exchange system where goblet cells are found.

[2]

(c) Describe the role of mucus in the gas exchange system.

[2]

[Total: 10]

2 Fig. 2.1 shows a transverse section of a root nodule of a legume. Fig. 2.2 is a drawing of a cell from the centre of the nodule made from an electron micrograph.

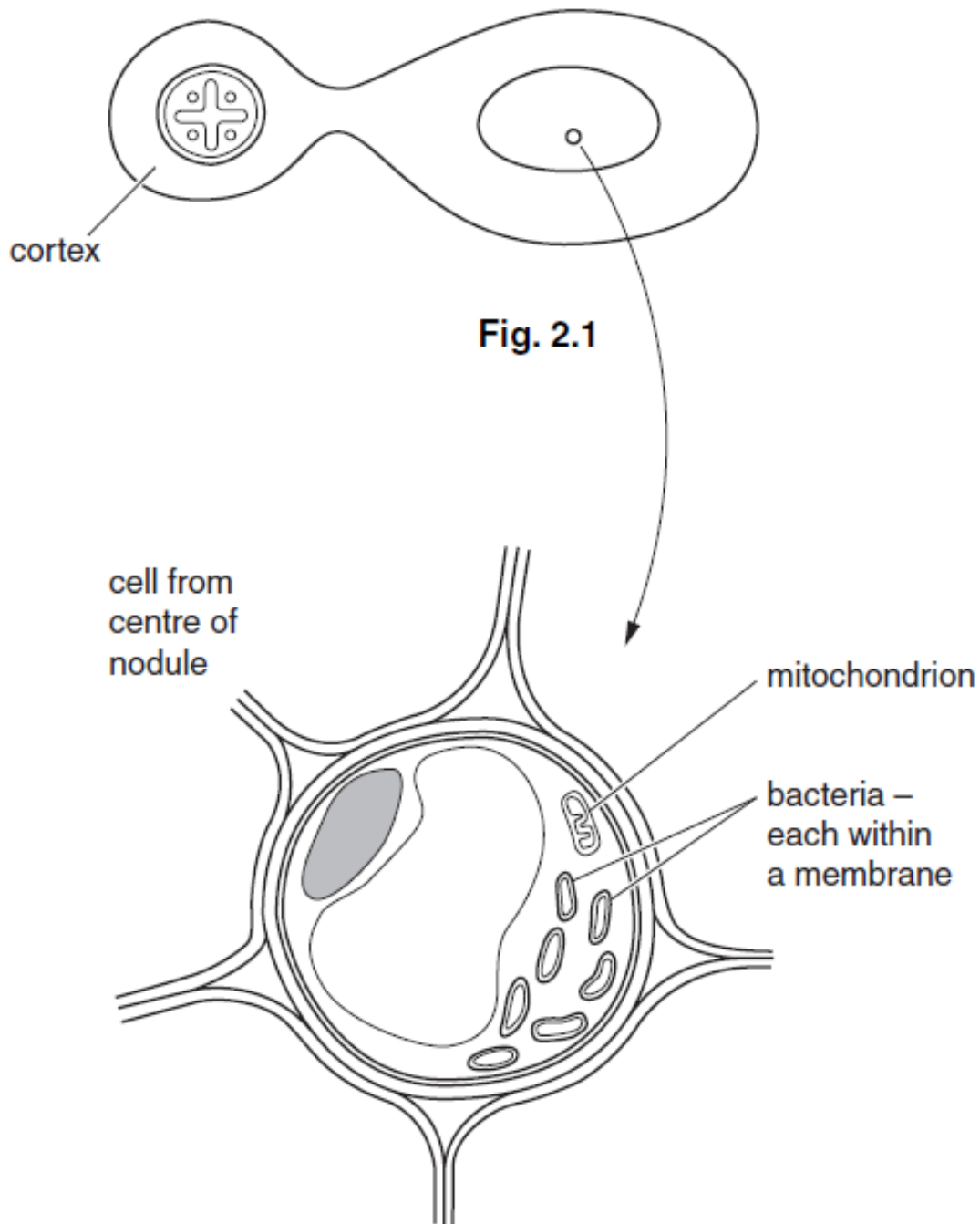


Fig. 2.2

(a) Name three structures that are present in cells in the cortex of the root that are not present in bacterial cells.

[3]

(b) Explain the advantages of studying cell structure with an electron microscope rather than with a light microscope.

[2]

Fig. 2.3 shows a bacterial cell dividing by binary fission.

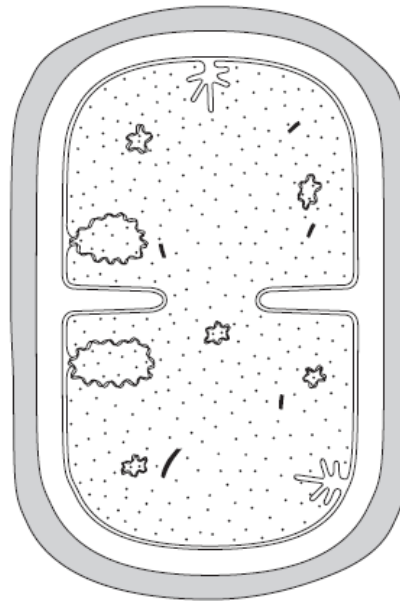


Fig 2.3

(c) With reference to Fig. 2.2, state three structural features of prokaryotic cells that are **not** shown by eukaryotic cells

[3]

Plant cell walls consist of cellulose that is embedded in a matrix of compounds, such as pectins and proteins.

Cell wall material is synthesised inside the cell and transported to the cell surface membrane as shown in the drawing made from an electron micrograph in Fig. 2.4

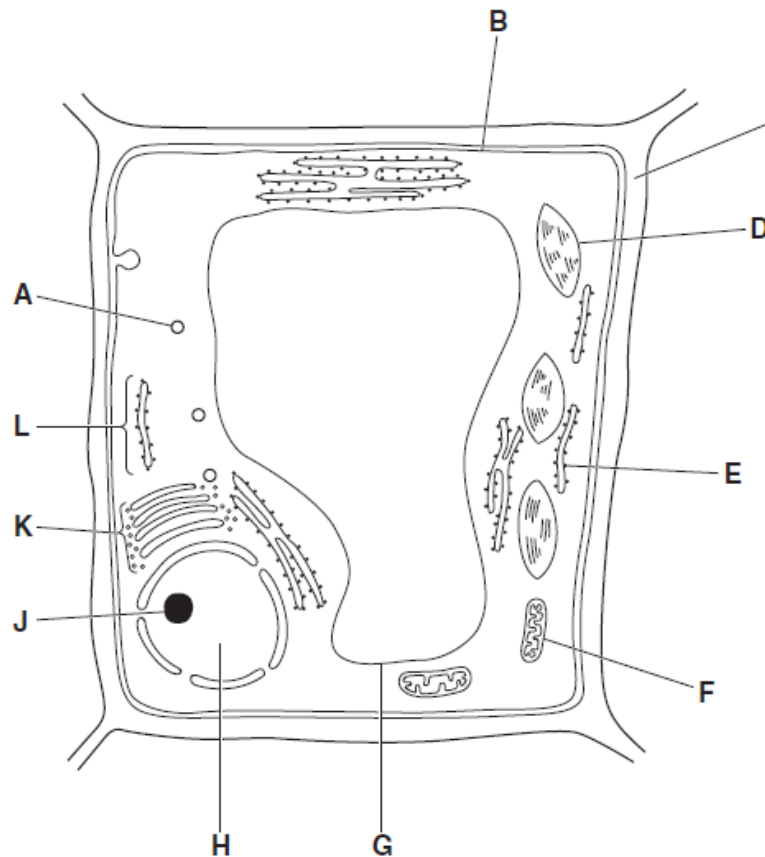


Fig 2.4

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

(c) Locate the parts of the cell labelled in Fig. 2.4 which apply to each of the following statements. You must only give one letter in each case. You may use each letter once, more than once or not at all. The first answer has been completed for you.

Copy and complete the table

statement	letter from Fig. 5.2
organelle that contains DNA	H
transports cell wall material to the cell surface membrane	
site of transcription	
site of ribosome synthesis	
site of photosynthesis	

[4]

(d) Enzymes known as expansins are found in the matrix of cell walls to help the growth of cells. Use the information in Fig. 5.2 to describe how proteins made by the ribosomes reach the matrix of the cell wall.

[3]

[Total: 15]

3. Fig 3.1 is a label diagram of a palisade mesophyll cell seen with high quality light microscope

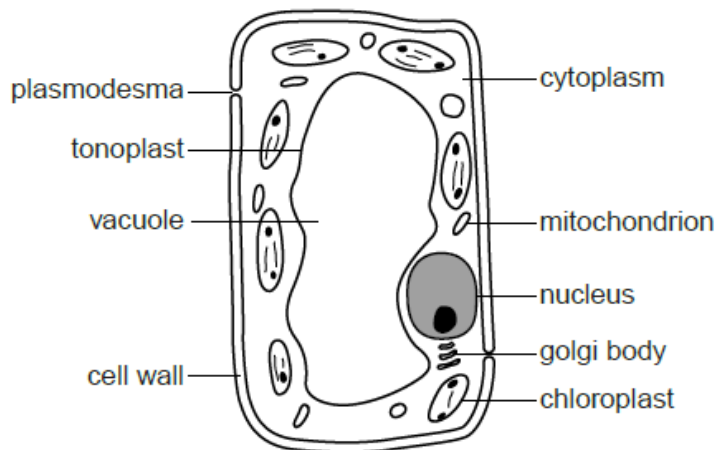


Fig 3.1

An electron micrograph of the same leaf mesophyll at same magnification would show more detail than is shown in Fig 3.1

(a) Explain why at the same magnification an electron micrograph is able to provide more detail than a light micrograph

[2]

(b) List three additional features that could be seen on an electron micrograph of leaf mesophyll cell that are not seen in Fig 3.1

[3]

[Total: 5]

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

4. When tobacco leaf fragments in cigarettes are burnt, substances that are hazardous to health are released.

(a) Name **two** of these hazardous substances and for each describe **one** effect on the body.

[4]

(b) Describe how the student would test for the presence of starch.

[2]

(c) Explain what is meant by the term transpiration.

[2]

(d) Name one factor that affect the rate of transpiration

[1]

[Total: 10]

5. (a) State three ways in which HIV is transmitted.

[3]

(b) Explain why the mammalian circulatory system is described as a closed double circulation.

[2]

Fig. 5.1 shows three stages in the cardiac cycle.

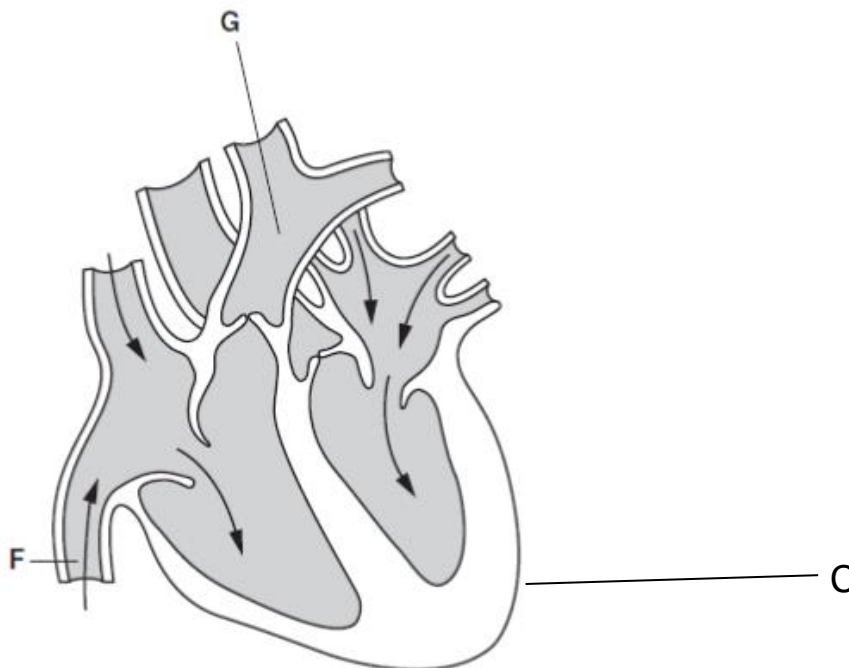


Fig 5.1

(c) (i) Name the blood vessels labelled **F** and **G**. and chamber **C**

[3]

(iii) Explain why the walls of the atria have thinner muscle than the walls of the ventricles.

[2]

[Total: 10]