

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

Revision Lower Sub

Section A

1 What is the diameter of a typical plant cell?

- A $4.0 \times 10^1 \mu\text{m}$
- B $1.0 \times 10^0 \mu\text{m}$
- C $4.0 \times 10^2 \text{nm}$
- D $1.0 \times 10^2 \text{nm}$

2 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	remains the same
B	increased	increased
C	remains the same	decreased
D	remains the same	increased

3 What is the function of plasmodesmata in plant cells?

- A to act as a barrier to water soluble substances
- B to allow active transport of ions and sucrose between cells
- C to allow the symplastic movement of substances between cells
- D to enable cells to recognise each other

4 Which size of ribosome is found in both chloroplasts and mitochondria?

- A 60S B 70S C 80S D 90S

5 Which function is correct for the description of the cell structure?

	function	cell structure
A	organises microtubules to produce the spindle	membrane-bound sacs, arranged as a flattened sac
B	packages hydrolytic enzymes used in cell	non-membrane bound cylindrical structures
C	synthesises lipids	membranes which surround an enclosed inner cavity
D	synthesises polypeptides	membrane bound spherical structure

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

6 In order to estimate the quantity of glucose in a solution, equal volumes of a range of known concentrations were mixed with equal excess volumes of Benedict's solution and placed in a thermostatically controlled water-bath at 90 °C for the same length of time. The unknown solution was then treated in the same way and the colours of the known and unknown solutions compared.

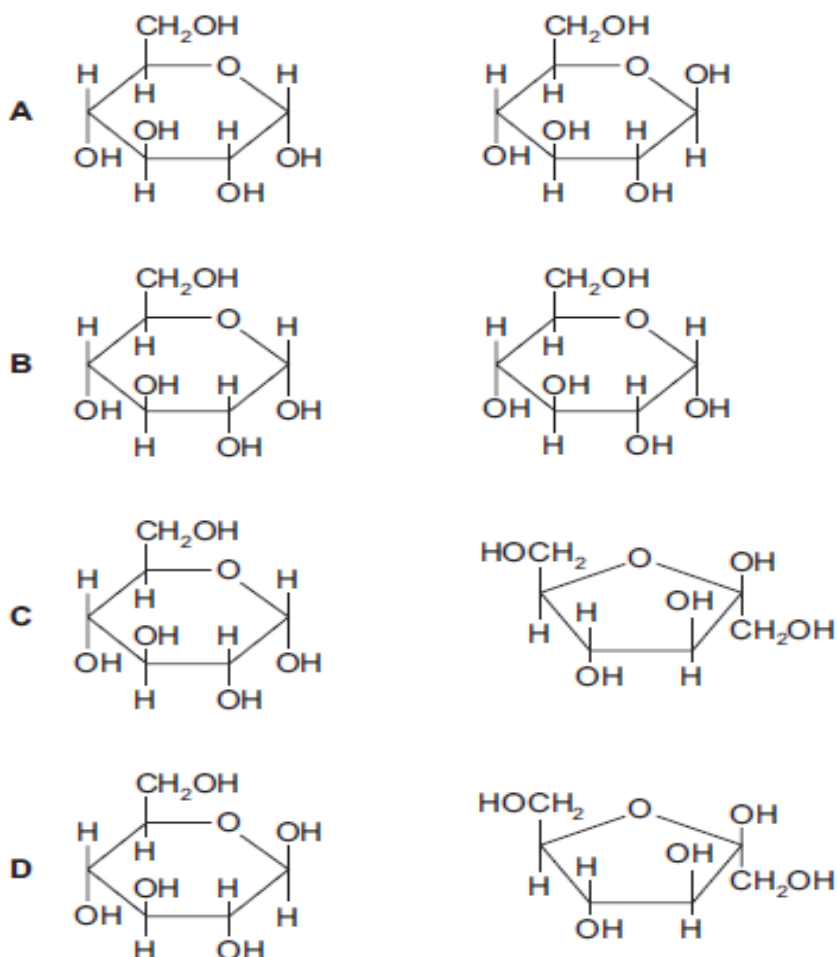
What is the independent variable in this procedure?

- A concentration of glucose
- B final colour of solutions
- C temperature of water-bath
- D volumes of glucose solutions

7 What cannot occur as a result of a condensation reaction?

- A breaking of a glycosidic bond
- B formation of a disaccharide
- C joining together two amino acids
- D production of a molecule of water

8 Which pair of monosaccharides forms sucrose?



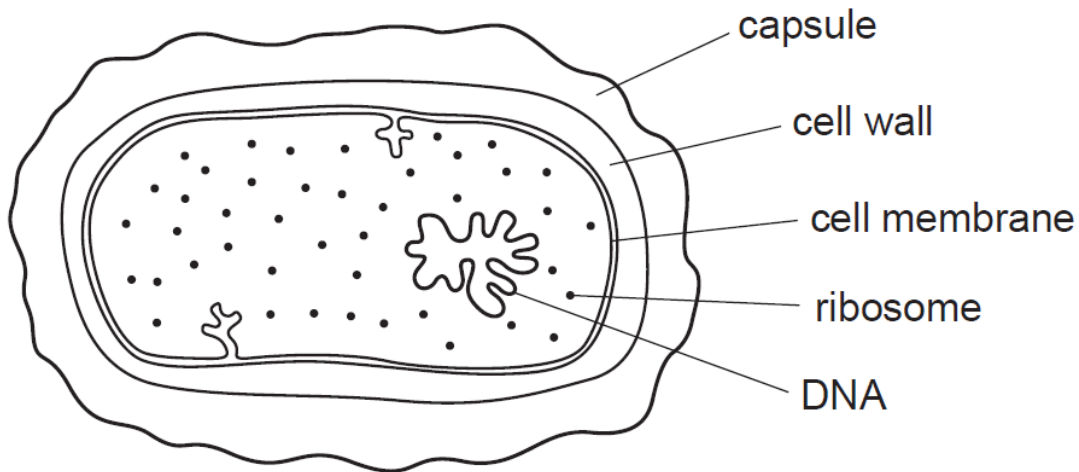
MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

9. What are the appropriate units for measuring diameters of alveoli, diameters of white blood cells and the width of cell walls?

	Diameters of alveoli	Diameters of white blood cell	Width of cell walls
A	mm	um	um
B	um	mm	um
C	Um	um	mm
D	Mm	mm	mm

10. The diagram shows a high-power drawing of a bacterium.



Which three components are found in **both** this bacterium and an animal cell?

- A capsule, cell membrane and cell wall
- B capsule, DNA and ribosome
- C cell membrane, cell wall and DNA
- D cell membrane, DNA and ribosome

11. Which structures are found in typical eukaryotic cells?

- 1 70S ribosomes
- 2 80S ribosomes
- 3 linear DNA (chromosomes)
- 4 circular DNA

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

12. What is the function of the nucleolus?

- A The formation and breakdown of the nuclear envelope.
- B The formation of rough endoplasmic reticulum.
- C The synthesis of ribosomal proteins.
- D The synthesis of rRNA.

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

13. A student carried out four tests for biological molecules on a solution. The observations are shown in the table.

Test for biological molecules	observations
Iodine solution	Orange
Biuret	Purple
Benedict's	Orange
Emulsion	Cloudy

Which molecules may be present in this solution?

- A glucose, starch, protein
- B lipid, protein, glucose
- C protein, starch, sucrose
- D starch, protein, lipid

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

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

SECTION B – Structured Questions

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

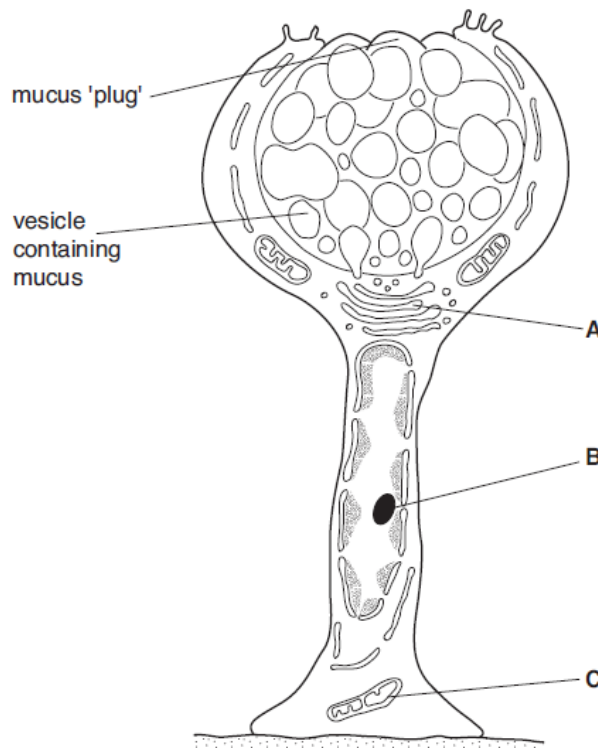


Fig. 1.1

(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. *Candida albicans* is a yeast-like fungus that lives in human lungs. It is the causative agent of one of the opportunistic infections that may develop during AIDS.

C. albicans is eukaryotic. Fig. 2.1 shows its structure.

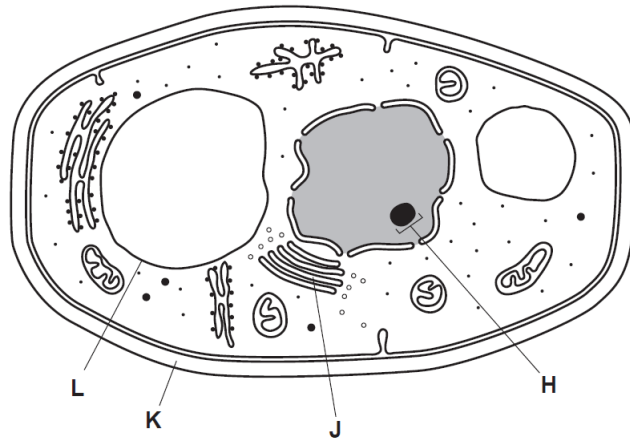


Fig 2.1

(a) (i) Name **H** to **L**. [4]

(ii) State two ways in which the **structure** of a prokaryotic cell differs from that shown in Fig. 2.1. [2]

[Total: 6]

3. Fig. 3.1 is a drawing made from an electron micrograph of a mammalian liver cell.

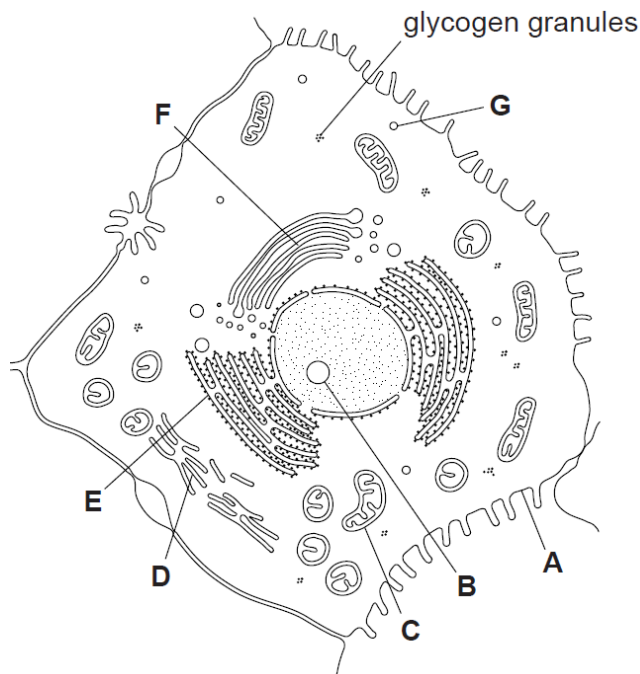


Fig 3.1

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

(a) Copy and complete the table by naming the structures **B** to **G** and stating **one** function of each. The first one (**A**) has been completed for you.

	Name of organelle	function
A	Cell surface membrane	Controls movement of substances into and out of the cell
B		
C		
D		
E		
F		
G		

[Total: 12]

4. (a) Enzymes are globular proteins that catalyse metabolic reactions. Describe the features of globular proteins.

[3]

(b) A student carried out an investigation into osmosis using red blood cells. Red blood cells were placed in sodium chloride (salt) solutions at five different concentrations. For each concentration, a sample was added immediately to a microscope slide and the cells were viewed using a light microscope for a period of time.

The observations recorded are shown in Table 4.1.

concentration of salt solution / %	observation of red blood cells
0.0	swell and burst, numbers decrease
0.4	increase in size
0.9	remain the same size
1.5	decrease in size
3.0	smaller and shrivelled

Explain, in terms of **water potential** and osmosis, the results that the student obtained.

[4]

(d) The student also carried out a similar investigation using plant cells with cell walls removed. These cells were suspended in a 12% mannitol solution so that the water potential inside and outside of the cells was equal.

Fig. 4.2 is a photomicrograph of these cells.

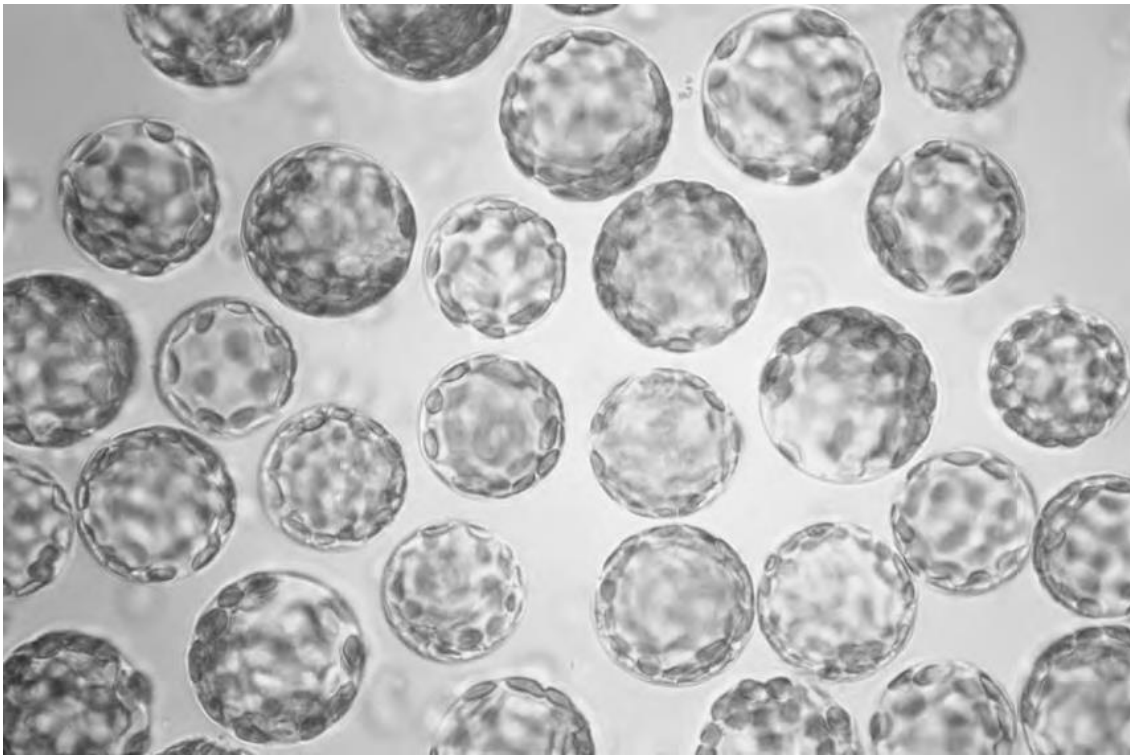


Fig 4.2

The student removed a sample of these cells. The sample was placed into distilled water and was viewed using a light microscope.

Describe what you would expect the student to observe and explain why this would not occur with normal plant cells. [2]

[Total: 9]

6. Fig. 6.1 is a labelled diagram of a leaf palisade mesophyll cell, as seen with a high quality light microscope.

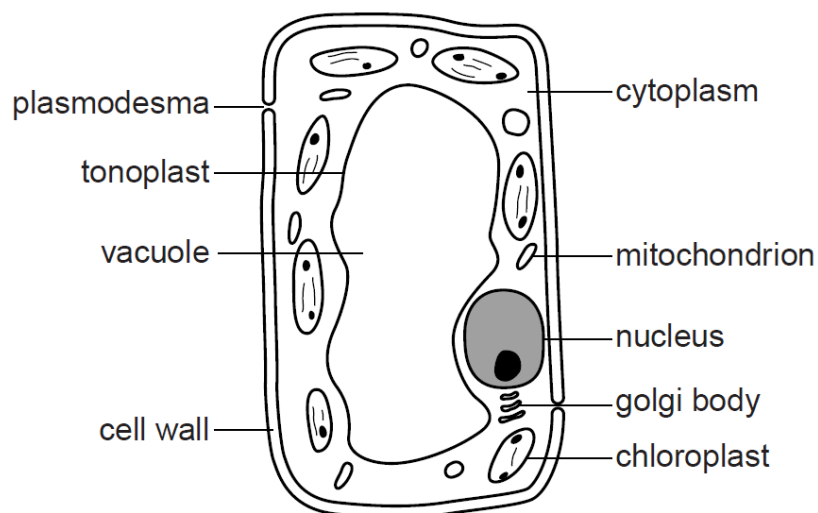


Fig 6.1

MODERN COLLEGE

SUCCESS DEPENDS ON THE PROPER USE OF TIME

An electron micrograph of the same leaf mesophyll cell at the **same magnification** would show more detail than is shown in Fig. 6.1.

(a) Explain why, at the **same magnification**, an electron micrograph is able to provide more detail than a light micrograph. [2]

(b) **Describe** three additional features that could be seen on an electron micrograph of the leaf mesophyll cell that are not seen in Fig. 6.1. [3]

(c) The length of the labelled chloroplast in Fig. 6.1 is $5.0\ \mu\text{m}$. Calculate the magnification of the cell shown in Fig. 6.1.

Show your working. [2]

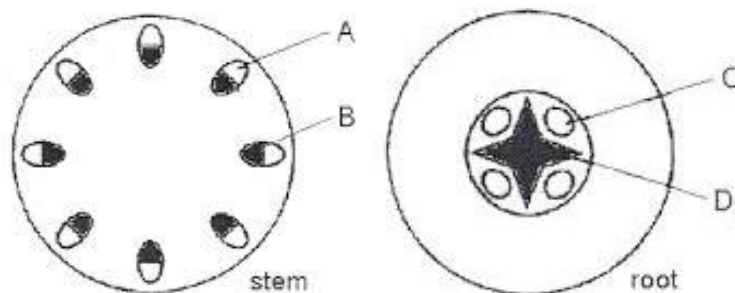
(d) In Fig. 6.1, starch granules are visible within the chloroplasts. Starch is the most common storage compound of plants. It is composed of amylopectin and amylose.

(i) Describe the structural differences between amylopectin and amylose. [2]

(ii) State **one** role of magnesium ions within chloroplasts. [1]

[Total: 10]

7 Fig. 7.1 shows transverse sections of a root and a stem.



(a) (i) State the label part A-D [4]

(ii) Give the function of the A and C [4]

(iii) Shade in an area in the transverse section of the stem where there are cells specialised for the transport of sucrose. [1]

(b) Suggest why the vascular bundles in the stem are situated towards the outside. [1]

(c) Describe the process by which water passes from the soil into the root hairs. [2]

(d) Describe the process by which minerals ions pass into the root cells. [2]

(e) Explain how water passes from the stem to the air surrounding a leaf. [4]

[Total : 18]