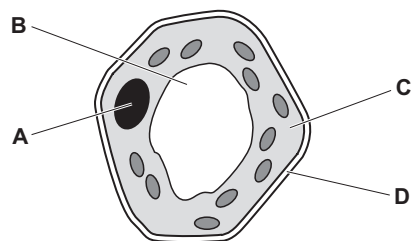


3 The diagram shows a plant cell.

A biologist wants to find out the number of chromosomes it contains.

Which labelled part should be examined more closely?



4 What is a leaf?

- A a cell
- B an organ
- C an organ system
- D a tissue

2 (a) Fig. 2.1 is a photograph of an acorn from a Caucasian oak, *Quercus macranthera*.

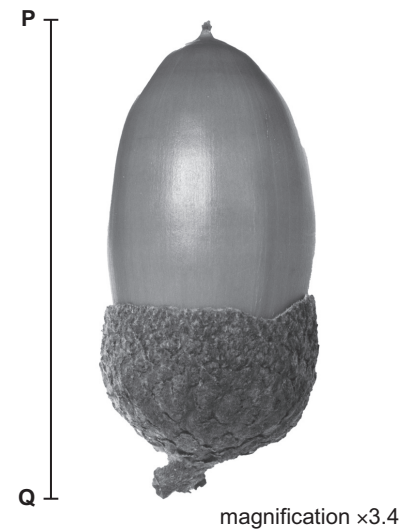


Fig. 2.1

(i) Make a large drawing of the acorn in Fig. 2.1.

(ii) Line **PQ** represents the length of the acorn in Fig. 2.1.

Measure the length of line **PQ** in Fig. 2.1.

length of line **PQ** mm

Calculate the actual length of the acorn using the formula and your measurement.

$$\text{magnification} = \frac{\text{length of line PQ in Fig. 2.1}}{\text{actual length of the acorn}}$$

Give your answer to **two** significant figures.

Space for working.

..... mm
[3]

(iii) Fig. 2.2 shows photographs of acorns from a Caucasian oak and from a Turkey oak, *Quercus cerris*.

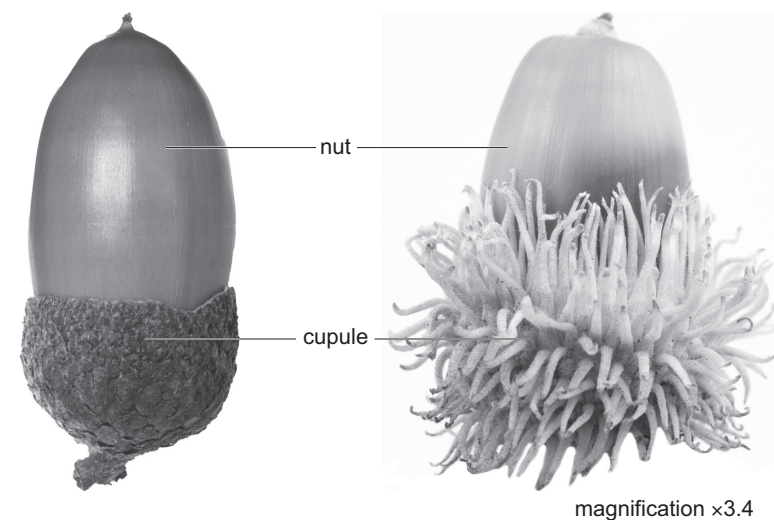


Fig. 2.2

Describe **two** visible differences between the acorns in Fig. 2.2.

- 1
 -
 - 2
 -
- [2]

(b) Different species of oak tree have acorns of different masses.

Scientists investigated if the mass of acorns affected the proportion of acorns that germinated in three different species of oak tree.

- The scientists took 100 acorns from each of three species of oak tree.
- The mass of each acorn was measured and recorded.
- Each acorn was then placed in a pot with the same type of soil in a dark room at 25 °C and watered every 48 hours.
- The scientists recorded the proportion of acorns that had germinated in 60 days.

(i) State **two** factors that were kept constant in the investigation described in **2(b)**.

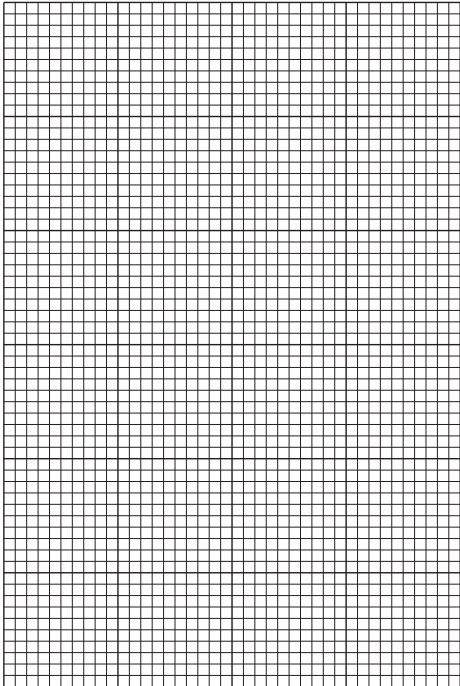
- 1
- 2

The results are shown in Table 2.1.

Table 2.1

species of oak tree	mean mass of acorns /g	proportion of acorns that germinated
A	0.52	0.44
B	1.92	0.56
C	2.30	0.64

- (ii) Plot a bar chart on the grid of **all** the data in Table 2.1.
- Include a key on your bar chart.



[4]

- (iii) The study measured 100 acorns for each species.
- Suggest why a large number of acorns was measured.

- (iv) Water is required for germination.

The scientists measured the mass of one acorn from each species. The acorns were then dried in an oven and the mass of each acorn was measured again. The scientists used these data to calculate the percentage water content of the acorns.

The results are shown in Table 2.2.

Table 2.2

species of oak tree	initial mass of the acorn /g	dried mass of the acorn /g	percentage water content of the acorn
A	0.49	0.36	26.5
B	1.96	0.74	
C	2.34	0.98	58.1

Calculate the percentage water content of the acorn from species **B**.

.....% [1]

- (c) State the name of the reagent used to test for protein.

..... [1]

[Total: 18]

3 (a) Fig. 3.1 shows the percentage of water in different structures of the human body.

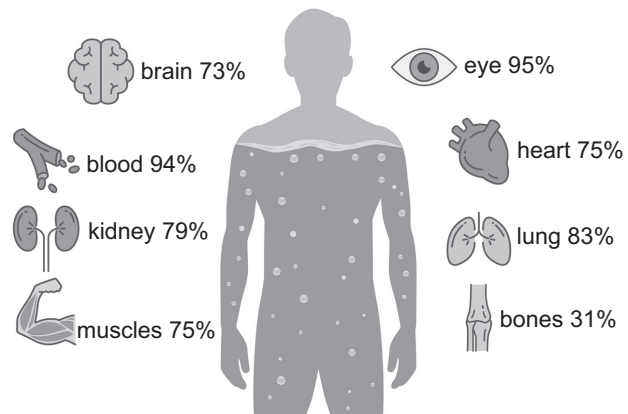


Fig. 3.1

(i) The mean mass of a human eye is 28g.

Using information from Fig. 3.1, calculate the mass of water in a human eye.

Give your answer to **two** significant figures.

..... g
[2]

(ii) Describe the importance of water in the human body.

.....

 [3]

(b) Cholera is a disease caused by a pathogen in contaminated water.

Fig. 3.2 is a diagram of the cholera pathogen.

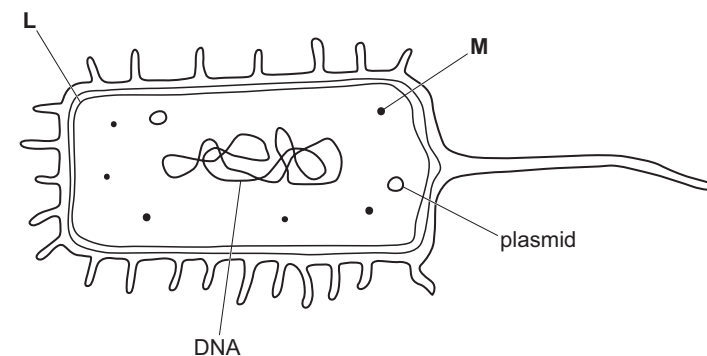


Fig. 3.2

(i) State the name of structures **L** and **M** shown in Fig. 3.2.

L

M

[2]

(ii) Identify **two** features shown in Fig. 3.2 that are typical of prokaryotes.

1

2

[2]

(iii) State the type of pathogen that causes cholera.

..... [1]

(iv) The scientific name for the pathogen that causes cholera is *Vibrio cholerae*.

State the genus name for this pathogen.

..... [1]

(v) Explain how the cholera pathogen causes dehydration of the human body.

.....

.....

.....

.....

.....

.....

.....

[3]

(vi) Complete the sentences about the use of plasmids in genetic modification.

During genetic modification, human DNA and plasmid DNA are cut with a restriction enzyme. This creates which are joined together using an enzyme called The modified plasmid containing the human gene is called a plasmid.

[3]

[Total: 17]