

Biological Molecules

Question Paper 4

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Biological Molecules
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Question Paper 4

Time Allowed: 56 minutes

Score: /46

Percentage: /100

1 Fig. 2.1 shows an insect-pollinated flower, cut in half longitudinally.



Fig. 2.1

(a) (i) Make a large drawing of the cut surface of the half-flower shown in Fig. 2.1.

[4]

(ii) On your drawing, label each of the following with a label line and the letter **X**, **Y** or **Z**:

X for the part of the flower in which the pollen grains are produced,

Y for the part of the flower to where the pollen grains are transferred during pollination,

Z for the part of the flower through which the pollen tube grows, shortly after pollination.

[3]

- (b) (i) Insects such as the honey bee, *Apis mellifera*, collect nectar to make into honey. Describe how you could test a sample of honey for the presence of each of the following:

reducing sugar;

.....

.....

starch.

..... [3]

- (ii) Honey contains reducing sugar.

State the colour change you would observe during the reducing sugar test in (b) (i).

..... [1]

- (c) Fig. 2.2 shows one pollen grain, as seen with the aid of an electron microscope. This pollen grain has been magnified 200 times.

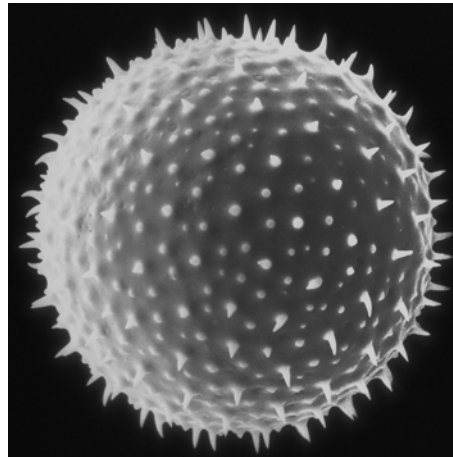


Fig. 2.2

- (i) Calculate the actual size of this grain. Show your working.

actual size [2]

- (ii) State **one** feature visible in Fig. 2.2, that suggests that this pollen grain is from an insect-pollinated flower.

..... [1]

(d) It has been suggested that petal colour is important to attract insects to collect nectar and to pollinate the flowers.

(i) Outline how you would carry out an investigation to find out which petal colour would attract most insects.

.....

.....

.....

.....

.....

.....

..... [4]

(ii) Some insect-pollinated flowers do **not** have brightly coloured petals to attract insects to collect nectar.

Suggest how insects might be attracted to these flowers.

.....

..... [1]

[Total 19]

2 Seeds from the plant family *Papilionaceae* form an important part of the human diet.

Fig. 1.1 shows three different types of seed that have been soaked in water for 24 hours.



lentils

chickpeas

soya beans

Fig. 1.1

(a) Describe the differences in shape **and** appearance of the seed coat (testa) between the three types of seed.

Write your answers in Table 1.1.

Table 1.1

feature	lentil	chickpea	soya bean
shape of seed			
appearance of seed coat			

[3]

- (b) A group of students were planning an investigation into the effect of temperature on the germination of seeds.

The teacher gave them a list of possible variables.

temperature	number of seeds germinated
intensity of light	time
length of seedling	volume of water

From this list, select the most suitable:

variable to change;

variable to measure.

[2]

Fig. 1.2 shows the same three seeds after they have been germinated in suitable conditions.



Fig. 1.2

(c) (i) Make a large, labelled drawing of the **lentil** seedling.

(ii) You are going to calculate the magnification of your drawing.

Measure the length of the line **ST** on Fig. 1.2.

length of line **ST** mm

Draw line **ST** on your drawing in the same position as in Fig. 1.2.

Measure the corresponding length of **ST** on your drawing.

length of **ST** in drawing mm

Calculate the magnification of your drawing.

Show your working.

magnification \times [4]

Lentils contain protein and a small quantity of fat.

(d) Describe the food tests you could carry out to show that lentil seeds contain:

(i) protein;

.....
.....
.....
..... [2]

(ii) fat.

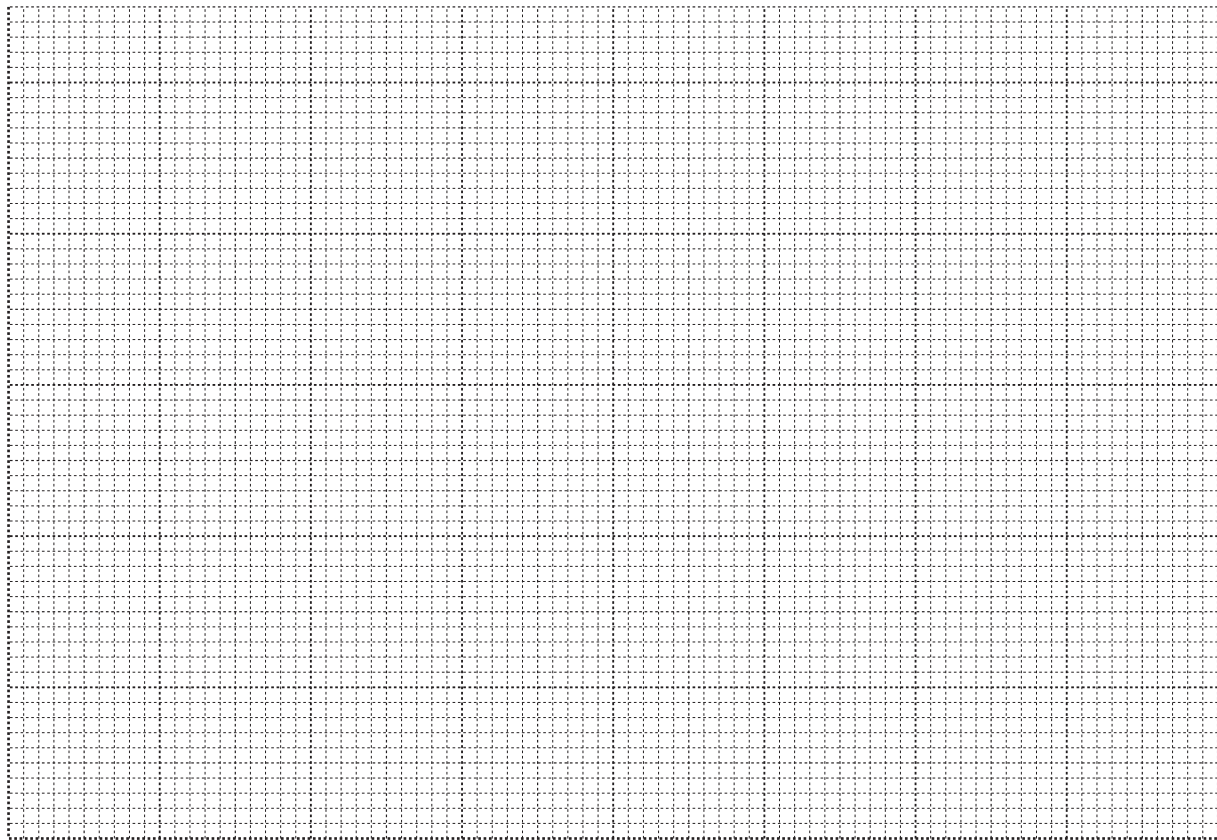
.....
.....
.....
.....
.....
..... [3]

(e) The percentage of protein and fat in five types of seed, are shown in Table 1.2.

Table 1.2

type of seed	percentage of protein / %	percentage of fat / %
chickpea	8.0	2.5
lentil	9.0	0.6
lima bean	8.0	0.4
mung bean	7.0	0.4
soya bean	16.0	8.0

(i) Construct a bar chart to show the percentages of protein and fat in the five types of seed. Use the same axes for the two sets of data.



[5]

(ii) Meat is a good source of protein.

Name the type of seed in Table 1.2 that would be a good alternative to meat in the human diet.

.....

[1]

