1. A student set up an experiment on water uptake in plants as shown in Figure 1. The results of this experiment after 24 hours are described below each drawing.

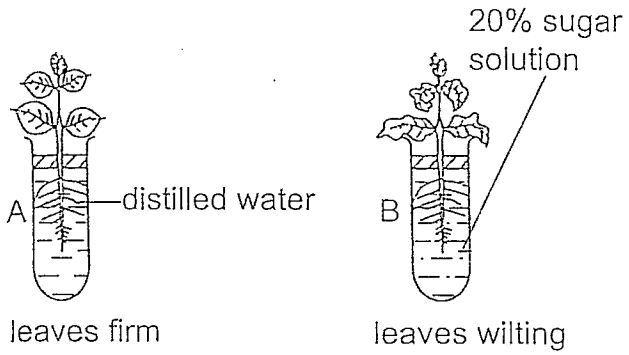


Figure 1

(a) Explain how the results came about in plants A and B.

(b) Figure 2 is a sketch of a leaf cell from plant A at the end of the experiment.

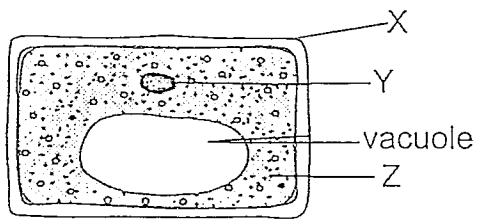


Figure 2

i. Label X, Y, and Z.
ii. Make a sketch of a leaf cell from Plant B at the end of the experiment.

2. (a) State *three* differences between aerobic and anaerobic respiration.

(b) Why does anaerobic respiration occur in muscles of mammals during vigorous exercise?

3. (a) In what way is Euglena like plants and in what way is it like animals?

(b) If all bacteria were destroyed, explain how the following could be reduced.

Plant food production

Milk production in cows

Decomposition of organic matter

Disease of human beings

4. (a) State *one* function of each of the following in the human.

i. Pepsin:
ii. Bile:
iii. Colon:

(b) What is the meaning of the following statement: the optimum pH of ptyalin is 7?

(c) State *three* ways in which the ileum is adapted to the process of absorption.

(d) i. What is constipation?
ii. State *three* ways of preventing constipation.

5. Figure 3 is a diagram showing two different defects of the eye. Use it to answer the questions that follow.

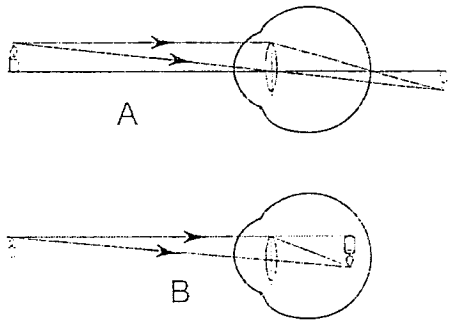
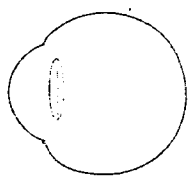


Figure 3

(a) Name the defects:
i. A
ii. B

(b) Complete the diagram below to show how defect B could be corrected.



6. A student did the following experiment on soil. All petri dishes were incubated for 3 days.

Petri Dish	Soil	Treatment
A	Top soil	Mixed with sugar and water into a paste.
B	Top soil	Heated to red hot, cooled, mixed with sugar and water into paste.
C	Sub soil	Mixed with sugar and water into a paste.
D	Sub soil	Heated to red hot, cooled, mixed with sugar and water into paste.

(a) State *one* of the aims of the experiment.

(b) What would be the expected results of this experiment? Give reasons for your answers.

7. **Figure 4** is a diagram showing a longitudinal section through a root tip. Use it to answer the questions that follow.

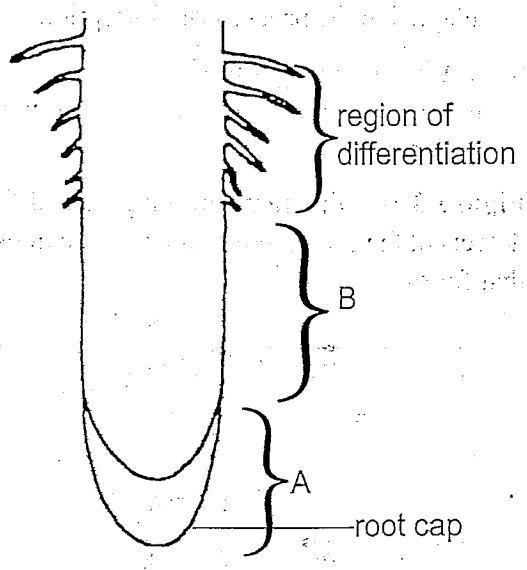


Figure 4

(a) Name regions marked A and B.

(b) Name *two* special cells formed in the region of differentiation.

(c) **Figure 5** is a diagram showing one of the stages of a cell undergoing mitosis.

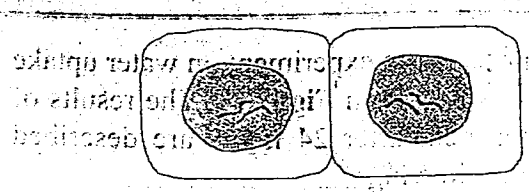


Figure 5

i. Name the stage shown.
ii. Draw a similar cell at metaphase stage.

8. (a) Where in a plant cell does photosynthesis take place?

(b) Give *one* way in which each of the following is adapted for process of photosynthesis.
i. Spongy mesophyll
ii. Palisade mesophyll
iii. Leaf veins

9. **Figure 6** is a graph showing the distribution of AIDS cases in country M in 1990. Use it to answer the questions that follow.

(a) i. In which age group was the largest number of male AIDS patients?
ii. In which age group was the largest number of female AIDS patients?

(b) Suggest *two* reasons why AIDS cases are lowest between the range 5 - 14 years.

(c) Give *two* ways in which children between the ages of 0 - 4 years could become HIV positive.

(d) Besides using condoms as a preventive measure, name *three* other ways of preventing HIV infection.

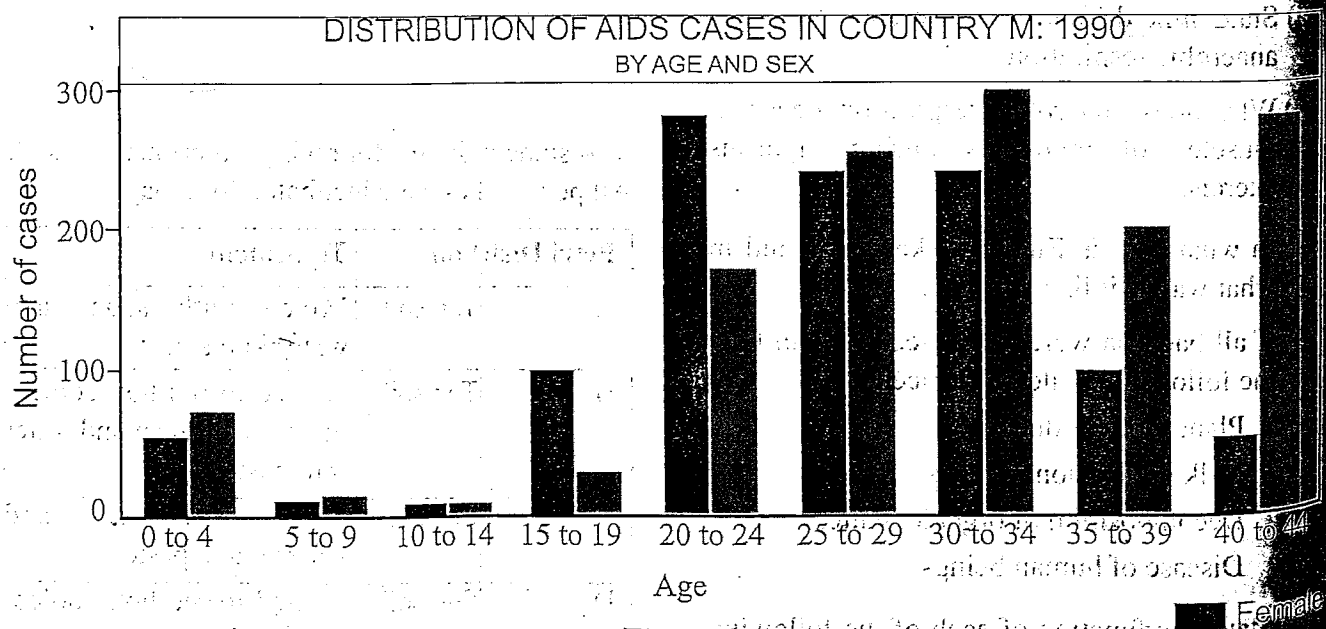


Figure 6

10. Table 2 shows changes in population size of three groups of birds living in a certain area between 1982 and 1988. Use it to answer the questions that follow.

Table 2

YEAR	POPULATION OF		
	FRUIT EATERS	INSECT EATERS	FRUIT AND INSECT EATERS
1982	110	240	450
1984	80	225	430
1986	30	190	410
1988	10	180	405

(a) i. Plot a graph of number of fruit eaters against time.

ii. Describe what has happened to the population of fruit eaters.

iii. Suggest *two* possible reasons for the trend in the population of the fruit eaters.

(b) Calculate the percentage decrease in population of insect eaters, and fruit and insect eaters by using the following formula:

$$\frac{\text{Population in 1982 - Population in 1988}}{\text{Population in 1982}} \times 100\%$$

i. Insect eaters

ii. Fruit and insect eaters

(c) i. Which group of the birds decreased the least?

ii. Suggest *one* possible reason that could have led to this group having the least decrease.

iii. How does the data in Table 2 suggest that the environment was changing?

11. (a) Explain how lymph is formed.

(b) State *one* structural difference and *one* structural similarity between lymph vessels and blood veins.

(c) Give *two* differences in the composition of blood plasma and lymph.

12. In an experiment a scientist crossed pure line pea plants with green seeds and pure line pea plants with yellow seeds. All the F_1 plants had green seeds. When F_1 plants were crossed, the F_2 plants had green and yellow seeds in ratio 3:1.

(a) What can be deduced about the dominance of the genes for yellow and green seed colour?

i. Yellow seed colour

ii. Green seed colour

(b) Using the symbols: **G** for dominant gene and **g** for recessive gene, write down the genotypes of the parents and F_1 generation.

i. Yellow:

ii. Green:

iii. F_1:

(c) What would be obtained from a cross of F_1 plants and plants with yellow seed colour? Show your working.