

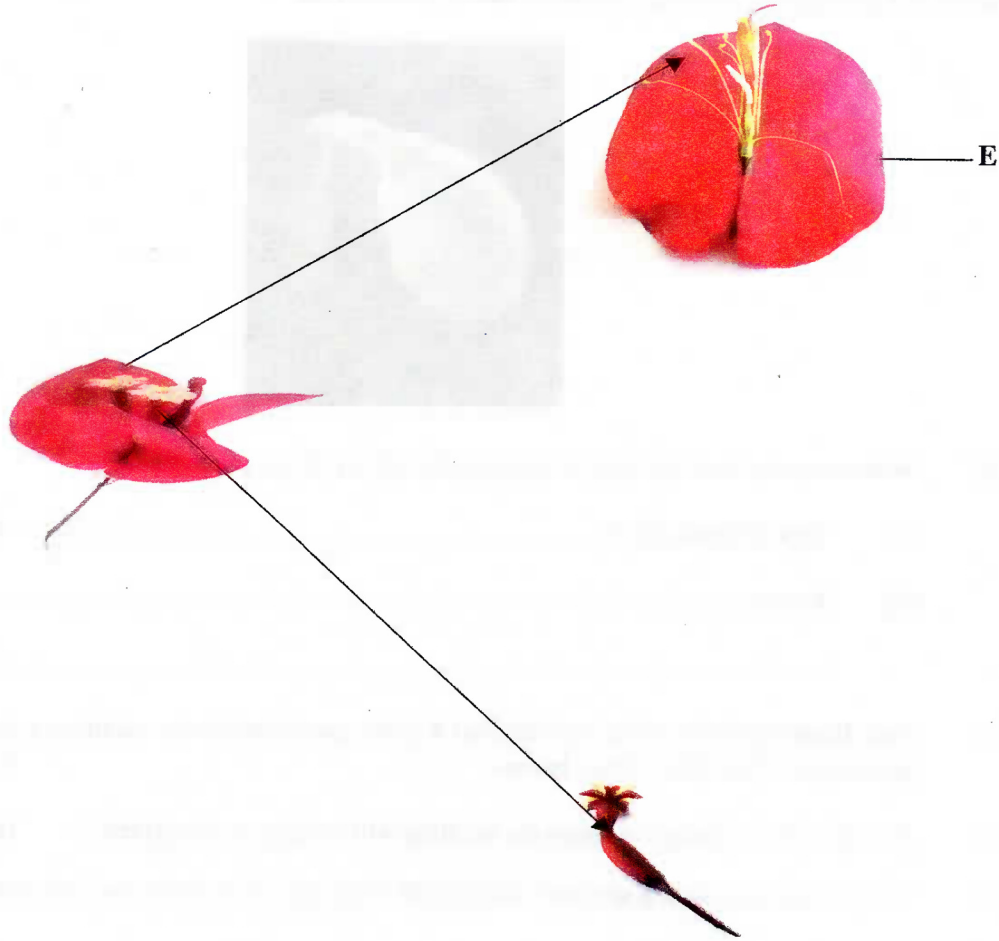
4.2.3 Biology Paper 3 (231/3)

1 Below is a photograph showing a seedling during germination.



- (a) With a reason, name the type of germination shown in the photograph.
 - (i) Type of germination (1 mark)
 - (ii) Reason
..... (2 marks)
 - (b) State **three** functions of the part labelled **A** in the germination of a seedling up to the appearance of the first foliage leaves. (3 marks)
 - (c) Account for the change in shape the seedling will undergo to straighten. (6 marks)
- 2 (a) You are provided with a specimen labelled **D** which has been grown on a substrate.
- (i) Name the specimen (1 mark)
 - (ii) What type of asexual reproduction occurs in the specimen? (1 mark)
 - (iii) Using a mounting pin, pick a few strands of specimen **D** and place them on the white tile. Using a hand lens, observe the strands and make a labelled drawing. (3 marks)

(b) The photograph below shows different parts of a flower.



- (i) Name the class of the plant from which the photograph was taken. (1 mark)
- (ii) Using observable features on the photograph, give **three** reasons for your answer in (b) (i) above. (3 marks)
- (iii) Name the agent of pollination for the flower in the photograph. (1 mark)
- (iv) State **three** observations on the photograph that support the answer in (b) (iii) above. (3 marks)
- (v) Name the part labelled **E** on the photograph. (1 mark)

3 You are provided with a potato, a 10 ml measuring cylinder, dilute hydrogen peroxide solution and substances F (pH 4), G (pH 7) and H (pH 9). Cut the potato and remove a piece measuring 1 cm³ from it.

Cut the 1 cm³ piece into tiny pieces and crush (macerate) them on a clean white tile using a glass rod.

Divide the macerated potato into **three** equal portions for use in the procedure that follows:

- I. Put 2 cm³ of substance F (pH 4) into the 10 ml measuring cylinder.
Add **one** portion of the macerated potato into the measuring cylinder.
Read and record the volume of the mixture in the table provided below.
Add one drop of washing-up solution.
Add 1 cm³ of dilute hydrogen peroxide solution to the mixture and immediately start a stop clock or watch. At the end of **two minutes**, read the mark to which the foam rises.
Record the reading in the table provided.
Clean and rinse the measuring cylinder with distilled water.
- II. Put 2 cm³ of substance G (pH 7) into the measuring cylinder.
Add the **second** portion of the macerated potato.
Read and record the volume of the mixture in the table.
Add one drop of washing-up solution.
Add 1 cm³ of dilute hydrogen peroxide solution to the mixture and immediately start a stop clock or watch. At the end of **two minutes**, read the mark to which the foam rises.
Record the reading in the table.
Clean and rinse the measuring cylinder with distilled water.
- III. Put 2 cm³ of substance H (pH 9) into the measuring cylinder.
Add the **third** portion of the macerated potato.
Read and record the volume of the mixture in the table.
Add one drop of washing-up solution.
Add 1 cm³ of dilute hydrogen peroxide solution to the mixture and immediately start a stop clock or watch. At the end of **two minutes**, read the mark to which the foam rises.
Record the reading in the table.

	F (pH 4)	G (pH 7)	H (pH 9)
Volume of solution + portion of potato			
Volume of solution + portion of potato + foam			
Volume of foam			

(9 marks)

- (a) Using the data obtained in the table, calculate the volume of the foam produced in each of the pH 4, pH 7, and pH 9 substances. Record the volumes in the table.

(b) Account for

- (i) the observation made when hydrogen peroxide was added to the potato mixture
(3 marks)
- (ii) the difference in the volume of foam produced in pH 4 and pH 9 substances.
(2 marks)