BIOLOGY

PAPER - 2

(PRACTICAL)

(*Three hours*)

(*Candidates are allowed additional 15 minutes for **only** reading the paper.*
They must NOT start writing during this time.)

Answer **all** *questions.*

All working including rough work should be done on the same sheet as the rest of the answer.

The intended marks for questions or parts of questions are given in brackets [ ]

Note: Q4 (Spotting) is to be attempted on a separate continuation sheet. The continuation sheet is to be handed over to the Supervising Examiner after the last observation. This continuation sheet should be attached to the main answer booklet of the candidate after the examination.

Question 1 **[5]**

(a) Examine carefully the flower specimens **D41** and **D42** provided. Describe their floral characters in semi-technical terms. (Details of individual whorls are not required).

(b) Cut a longitudinal section of the flower specimen **D41** with a sharp razor blade**.** Arrange one of the cut surfaces on a moist filter paper. Draw a neat and labelled diagram of the cut surface. **Show the L.S. to the Visiting examiner**.

(c) With the help of a sharp blade cut a longitudinal section of specimen **D42**. Arrange one of the cut surfaces on a moist filter paper. Draw a neat and labelled diagram of this cut surface, highlighting the essential whorls.

(d) Observe with a hand lens the cut surfaces of **D-41** and **D-42**. Record your observations in the table below:

Androecium		**D41**	**D42**
(i)	Relation of stamens to each other	--	--
(ii)	Method of attachment of anther to filament	--	--
Gynoecium			
(i)	Nature of stigma	--	--
(ii)	Type of placenta	--	--

(e) Name the families to which each flower specimen belongs.

(f) Point out *any two* features, which are distinctive characteristics of each family.

(g) Take a fresh specimen of **D41.** With the help of a forceps, remove the whorls one by one, till you reach the gynoecium. With the help of a sharp razor blade, cut a transverse section of the ovary. Draw a neat and labelled diagram of the transverse section. **Show the T.S. to the Visiting examiner.**

(h) State the floral formulae of specimens **D41 and D42**.

(i) Draw the floral diagram of specimen **D42**.

(j) Mention *one* economically important plant belonging to each family mentioned in (f) above (Write the **botanical name** only).

Question 2 **[5]**

Procedure:

1. Take a 250ml beaker which has about 2cm of solvent at the bottom. Cover the beaker with aluminium foil to prevent the vapours from spreading.
2. Cut a piece of filter/ chromatography paper which is long enough to reach the solvent. Draw a pencil line about 1.0 cm from the bottom of the paper.
3. Use a coin (quarter) to extract the pigments from the cells of the given leaf. Place a small section of leaf on the top of the pencil line drawn on the paper. Use the ribbed edge of the coin to crush the leaf cells. **Be sure the pigment line is on top of the pencil line.** Use a back and forth movement exerting firm pressure throughout.
4. Place the filter paper/chromatography paper in the beaker such that the tip of the paper touches the solvent. **Do not allow the pigment to touch the solvent.**
5. Cover the beaker. When the solvent is about 1 cm from the top of the paper, remove the paper and **immediately** mark the location of the solvent front before it evaporates.
6. Mark at the bottom of each pigment band. Measure the distance each pigment migrated from the bottom of the pigment origin to the bottom of the separated pigment band. Record the distance moved by each front, including the solvent front, in the table below. Depending on the species of the plant used, you may be able to observe 4 or 5 pigment bands.

Distance moved by Pigment Band (millimetres)

Band Number	Distance moved (mm)	Band Colour
1		
2		
3		
4		
5		

Distance Moved by the Solvent Front _____ (mm)

Analysis of Results

The relationship between the distance moved by a pigment and the distance moved by the solvent is a constant called **R_f**. It can be calculated for each of the pigments using the formula:

$$\mathbf{R_f} = \frac{\text{Distance pigment migrated (mm)}}{\text{Distance solvent front migrated (mm)}}$$

Record your **R_f** values in the table below:

	= **R_f** for carotene (yellow to yellow-orange)
	= **R_f** for xanthophyll (yellow)
	= **R_f** for chlorophyll a (bright green to blue green)
	= **R_f** for chlorophyll b (yellow green to olive green)

Answer the following questions:

(a) What are the factors involved in the separation of pigments?

(b) Would you expect the R_f value of a pigment to be the same if a different solvent was used? Explain.

(c) What type of chlorophyll does the reaction centre contain? What are the roles of the other pigments?

Question 3 **[5]**

(a) With the help of a sharp razor/blade, cut thin sections of **D43**. Select a good transverse section and stain it with safranin. Mount the section in glycerine. **Show your slide to the Visiting Examiner under a low power microscope.**

(b) Draw a neat labelled outline of the mount as observed under the microscope.

(c) Identify the specimen and mention at least three important characteristics.

Question 4 **[5]**

Identify the given specimens A to E. **For specimen E identify the type of inflorescence**. Give *two* identifying characteristics to support your answer in each case. Draw a neat labelled diagram of each specimen. You are not allowed to spend more than three minutes for each spot.

Note: *Hand over your continuation booklets to the Supervising Examiner after you finish answering this question.*

Question 5

Show the following to the Visiting Examiner for assessment:

(a) Project **[7]**

(b) Biology Practical File. **[3]**

PAPER – 2

(PRACTICAL)

List of Items for Spotting

Spotting:

1. T.S. of monocot root - slide
2. T.S. of testis of mammal - slide
3. Plasmodium - slide
4. Capitulum inflorescence
5. Experiment to show transpiration in a plotted plant covered by a polythene bag.