BIOTECHNOLOGY

PAPER 2

(PRACTICAL)

(Maximum Marks: 30)

(Time allowed: Three hours)

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

Answer all questions.

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

Question 1

(a) You are provided with an explant (a small piece of leaf) labelled E, a Petri plate labelled G and metallic forceps labelled M. Using appropriate method(s), sterilise each of these samples. You may use autoclave / hot air oven / chemicals provided to you, as required.

Answer the following questions:

(i) Which sample / samples can be sterilised by applying dry heat as well as wet heat sterilisation method? [1]

(ii) Which sample / samples cannot be sterilised by applying dry heat or wet heat sterilisation method? Give a reason. [1]

(iii) Name the method by which, the sample / samples mentioned by you in (ii) above, can be sterilised. [1]

(b) You are provided with a Petri plate labelled L, containing bacterial colonies isolated from curd. Using this sample, perform the following experiment:

Pick up a bacterial colony with the help of a needle / inoculation loop and spread it on a clean glass slide and make a thin smear.

Next, add a few drops of crystal violet stain to the smear and spread it evenly on the slide. Wait for 30 seconds.

Add a few drops of iodine solution to the smear and keep it for 2 minutes.

Rinse the smear with distilled water to remove extra stain.

Now, wash the smear with ethanol.

This paper consists of 3 printed pages and 1 blank page.

Counterstain the smear with saffranin. Again, rinse off the excess stain with distilled water.

Leave the slide to dry for 2 minutes.

Examine the slide under the microscope.

Based on your observations, answer the following:

(i) Name the technique used in this experiment. [1]

(ii) Name the bacteria present in the culture labelled **L**. [1]

(iii) Based on the technique used in this experiment, categorise the bacteria observed under the microscope. [1]

Question 2

You are given an extract of germinating pea grams seeds labelled **P**.

Take a 100 ml beaker and label it as **B**. Into this beaker, pour 1% $CuSO_4$ solution, 2% NaOH and 4% sodium potassium tartrate solution in the ratio of 1:3:3 and mix it thoroughly to make it a 70 ml solution.

Take 3 test tubes and label them as **X**, **Y** and **Z**.

(a) Take 5 ml of extract **P** in the test tube labelled **X**. Add 5 ml of mixture labelled **B** into it. Observe the colour change.

(b) Take test tube labelled **Y**. Pour 2 ml of extract **P** in the test tube. To it, add 2 ml of Millon's reagent. Observe the change carefully. Heat the test tube over the flame for a few minutes. Observe the colour change.

(c) Take test tube labelled **Z**. Pour 2 ml of extract **P** in the test tube. To it, add 5 drops of conc. HNO_3 and 1 ml of conc. NH_4OH. Observe the change. Heat the test tube over the flame for a few minutes. Observe the colour change.

Show the colour changes in the test tubes X, Y and Z, to the Visiting Examiner.

Answer the following questions:

(i) Write your observations in test tubes X, Y and Z in a tabular form, as shown below: [1½]

Test tube	Observation
X	
Y	
Z	

(ii) Name the tests performed in each of the test tubes, **X**, **Y** and **Z**. [1½]

(iii) What is the name given to the mixture prepared in beaker B? [1]

(iv) Based on the tests performed above, identify the biomolecule present in extract P. [1]

Question 3

Identify the displayed instruments / photographs of the instruments labelled 1 to 4.
For each instrument write:

(a) The name of the instrument [2]

(b) One specific use of the instrument. [2]

Question 4

Show the following to the Visiting Examiner for assessment:

(a) Project [10]

(b) Biotechnology Practical File [5]