

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.

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Turn over

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 / gram seeds labelled P.

Take a 100 ml beaker and label it as B. Into this beaker, pour 1% CuSO₄ 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. HNO₃ and 1 ml of conc. NH₄OH. 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]