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 period.)

Answer all questions.

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

Question 1

(a) Prepare a 100 ml culture medium in 250 ml flask using the composition as given below:

Peptone	1 gm
Yeast extract	0.5 gm
NaCl	0.5 gm
Agar	1.5 gm

Take 50 ml of distilled water in a 250 ml beaker. Note the pH by using pH paper. Stir continuously; make the volume to 100 ml by adding distilled water. Note the pH by using pH paper. Adjust the pH of the mixture to 7 by adding drops of dil. NaOH or HCl. Transfer the content to the 250 ml flask and put a cotton plug at its mouth. Sterilize the medium in an autoclave. After sterilization allow the content to cool down. Pour 20 ml of the culture medium in a Petri plate and 4 ml in a test tube to make a slant. **Show the slant to the Visiting Examiner**.

Answer the following:

(i) Write the pH of culture medium when the volume is 50 ml and 100 ml respectively. **[1]**

(ii) Note the time taken to solidify in the Petri plate. What causes the solidification of the medium? **[1]**

(iii) What is the importance of the pH and slant in culture process? **[1]**

(b) A milk sample for the isolation of protein has been provided to you. Take 25 ml of sample in a beaker and proceed as follows:

First warm the sample in water bath set at 35^{o}C. Note the pH of milk sample using a pH meter or a pH meter. Next, add 0.4 N HCl into beaker drop wise until the protein starts coagulating. **Show the coagulated protein to the Visiting Examiner**. Note the pH at which maximum separation of protein takes place. Filter the solution through thin muslin cloth to separate out the protein.

(i) Report the: **[1]**

(1) Initial pH of the milk sample.

(2) Final pH of the milk sample when the protein is isolated.

(c) Name the protein isolated from milk. Also mention the principle involved in isolation of this protein. **[1]**

(d) Find out the wet weight of the isolated protein. **[1]**

Question 2

You are provided with two solutions **A** (0.2 M boric acid) and **B** (0.5 M sodium borate). Take two flasks (250 ml each) labelled **1** and **2**. Pour 50 ml of solution A into both the flasks. To flask 1 add 2 ml of solution B. Make up the volume to 200 ml by adding distilled water. Note the pH (by using pH paper). To flask 2 add 30 ml of solution B. Make up the volume to 200 ml by adding distilled water. Note the pH (by using pH paper). Add a small drop of diluted NaOH to the solution in flask 1 and 2. Note the pH change in each (by using pH paper). Answer the questions that follow:

(a) Tabulate your observations as follows: **[2]**

	pH
Flask 1	
Flask 2	
Flask 1 + diluted NaOH	
Flask 2 + diluted NaOH	

(b) Comment on the nature of solution in flasks 1 and 2. **[1]**

(c) Explain how a buffer solution resists small changes in pH. **[1]**

(d) Give two examples where the buffers solution is used in laboratory experiments. **[1]**

Question 3

You are provided with two pastes, one of adulterated turmeric marked "**I"** and pure turmeric marked "**P"**. Dilute these pastes by adding few drops of water to them. Take two strips of Whatman filter paper no.1 (8" x 2") provided to you and mark these as I and P. Load the paste I at one end of the strip I, and paste P at one end of strip P. Let these dry. Take 2 ml of the rising solution (methanol) in two test tubes. Keep the filter paper strips in each test tube in such a way that the load should not come in contact of the rising solution. Keep the test tubes in the vertical position. Observe the changes after 20 minutes. **Show the strips to the Visiting Examiner**. Answer the questions that follow:

(a) Write the aim of the experiment. **[1]**

(b) Name the technique used in the above experiment. Also write its principle. **[1]**

(c) Calculate the Rf value of pure turmeric and the adulterant. **[1]**

(d) Draw well labeled diagrams of the experimental set up. **[1]**

Show the following to the Visiting Examiner for assessment:

(a) Project **[10]**

(b) Biotechnology Practical file **[5]**
