

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°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 R_f 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]