

ISC SPECIMEN QUESTION PAPER FOR 2012 EXAMINATION

BIOTECHNOLOGY

Paper 2 (Practical)

(Three hours)

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

This paper comprises two sections – Section A and Section B.

*Attempt Question 1 (compulsory) and any **two other** questions from **Section A**.
Section B is compulsory.*

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

SECTION A

Question 1 (Compulsory)

- (a) You are provided with two stock solutions – 1% coconut milk; 1% Sucrose solution and 1 gm of agarose powder. Prepare 100 ml of tissue culture media in a 250 ml flask using the given composition:

[10 ml coconut milk + 10 ml sucrose solution + 1% agarose powder and raise the volume to 100 ml using distilled water].

Adjust the media at a pH 6.8 using a pH meter or a pH paper. Sterilize the media using an autoclave.

Pour about 4ml of the media in two test tubes to prepare a slant.

Answer the questions that follow:

- (i) What is the role of sucrose and agarose in the given media? [1]
- (ii) Name the kind of media prepared above. [1]
- (iii) Explain the principle on which an autoclave works. [1]
- (iv) What is the purpose of preparing a slant? [1]

- (b) Perform the experiment described below and answer the questions that follow:

Take a ripe mashed banana (about 2'' piece) into a beaker and add 30 ml of extraction fluid (E.F) provided to you. Incubate the beaker at 60 degrees C for 15 minutes. Stir gently with a glass rod. Filter 5 ml of the cooled content into a test tube and add 5 ml of cold 90 % alcohol to it. Allow the test tube to stand for 10 minutes.

- (i) What do you observe in the test tube after 10 minutes? [1]
- (ii) Give two uses of genomic DNA in molecular biology experiments. [1]
- (iii) Name a major contaminant found in the above sample. [1]
- (iv) Name two equipments used for quantitative estimation of DNA. [1]

Question 2

You are provided with a culture of bacteria isolated from curd. Proceed as follows:

Pick up a bacterial colony with a toothpick or an inoculation loop and spread it to a glass slide. Add two drops of crystal violet solution (1%) and gently warm it on a hot plate at 40 degrees C until it becomes dry. Wash the smear with water to remove excess stain. Next, stain the slide with about 2ml of iodine solution for 1 minute. Wash the smear with acetone. Now counterstain the smear with saffranin solution (0.5%) for 1 minute. Again wash the smear with water and observe the slide under the microscope.

Answer the questions that follow:

- (i) Write your observation when the slide is placed under the microscope. [1]
- (ii) Identify the technique used above and mention its use in the laboratory. [2]
- (iii) Explain the principle on which this technique is based. [2]
- (iv) Name the bacteria present in the curd. [1]

Question 3

A milk sample for the isolation of proteins has been provided to you. Take 25 ml of the sample in a 50 ml flask and proceed as follows: First warm the sample in a water-bath set at 35° C. Note the pH of the milk sample using a pH meter or a pH paper.

Next add 0.4 N HCl using a drop-wise until the protein starts coagulating. Note the pH at which at which maximum separation of protein takes place. Filter the solution through a thin muslin cloth to separate out the protein.

Show the protein isolated by you to the visiting examiner.

- (a) (i) Report the initial pH of the milk sample. [1]
(ii) Report the pH at which the protein gets coagulated. [1]
- (b) Name the protein and carbohydrate present in the above sample. [1]
- (c) Explain the basic principle involved in the above isolation. [2]
- (d) How can you calculate the net amount of protein that you have isolated? [1]

Question 4

Identify the instruments/ photographs of the instruments (1 – 4) commonly used in a biotechnology laboratory. Write:

- (a) The names of the instruments. [2]
- (b) One important structural feature of the instrument [2]
- (c) Specific uses of the instrument [2]

SECTION B**Question 5**

- (a) Show your Project Work / Assignment to the Visiting Examiner for assessment. [7]
- (b) Submit your Practical File to the Visiting Examiner for assessment. [3]