

# B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

## September / October 2023 Supplementary Examinations

**Programme: B.E.**

**Branch: Biotechnology**

**Course Code: 19BT6DE4FBT**

**Course: Food biotechnology**

**Semester: VI**

**Duration: 3 hrs.**

**Max Marks: 100**

**Date: 20.09.2023**

**Instructions:** 1. Answer any FIVE full questions, choosing one full question from each unit.  
2. Missing data, if any, may be suitably assumed.

### UNIT - I

- 1 a) Following are three instances where a suspension of starch (10 mg/mL of water) extract from potato was treated. **10**
- Starch suspension was heated at a temperature of 35 °C for one hour and has been cooled sufficiently to room temperature.
  - Starch suspension was heated at around 52-65 °C for a duration of around 30-50 min and then cooled sufficiently to room temperature.
  - Starch suspension was heated at boiling temperature of water for 30-50 min and then cooled sufficiently to room temperature.
- Discuss the physical and chemical processes that take place at above three instances. Which of these treatments is ideal for preparing starch-based food stuff with desired viscosity? Justify your decision.
- b) Explain the three major types of foods classified based on their physical status. Provide suitable examples. **05**
- c) Consider the two scenarios A & B as given below **05**
- A. A food company resorts to food evaluation of a new recipe developed by the company. The number of samples provided are two and the panellists asked to decide the directional difference. Identify the type of food evaluation and discuss the procedure.
- B. For the above scenario, following responses were collected from the panelists. Out of 10 panelists, 4 of them mentioned sample 1 to be sweeter than sample 2, 4 of them mentioned sample 2 to be sweeter than sample 1 and the remaining 2 of them could not find the difference. What could be the reason for such varied response and infer on the same.

### UNIT - II

- 2 a) You are provided with pure carbohydrate extract (present in abundant amount) from cereal grains namely corn, rice and maize. Further the carbohydrate is suspended in water and you are asked to prepare different syrups out of it. **10**
- What type of enzymes is supposed to be used for such food suspension?
  - Describe the relevant protocols with enzyme actions leading to particular syrup.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

- b) Describe the mechanism of action of cloned gene on the insect pests in Bt Brinjal. **05**
- c) Distinguish probiotics from prebiotics with respect to their composition and functions. Provide suitable examples. **05**

### OR

- 3 a) A food consisting fruit pulp (with even skin of fruit) was blended which resulted in coarse particles uniformly suspended. This undesirable property resulted in difficulty of swallowing. To overcome this, in a reactor the suitable enzymes in free form were added and incubated to clarify the juice to reduce the coarse particles. **10**
  - i. What types of enzymes are supposed to be used for such food suspension?
  - ii. Interpret with reasoning the problems associated with free enzymes used in a reactor for longer duration.
  - iii. Design the suitable strategy to overcome the problems associated with use of such free enzymes.
- b) Discuss the role of flavonoids in human health with suitable examples and their sources. **05**
- c) Though biotechnology has a potential to bring about beneficial food products and processes, it is been criticized by the society based on the societal issues. Justify. **05**

### UNIT - III

- 4 a) Distinguish Passive monitoring from Active monitoring of air contamination. With a neat diagrammatic representation of Anderson air sampler, discuss its added benefits over other active air samplers. **10**
- b) A processed animal meat and poultry flesh were suspected to consist of *Staphylococcus aureus* comparatively lesser (5 fold) than those of meat tenderizing ones. Early detection of such organisms is the key factor in preservation and extension of shelf life of food stuff. What suitable culturing method can be employed in detection of such pathogenic species over others? Justify your answer with the method. **05**
- c) Discuss the principle of Petrifilm Technique and mention its advantages over other culturing techniques. **05**

### UNIT - IV

- 5 a) Fresh vegetables and fruits were selected for preservation by freezing. The vegetables were freezed at rate of 0.1 °C/min for 15 h to reach the final freezing temperature of -40 °C. On the other hand the fruits were freezed at a rate of 1 °C/min for 2 h to reach the final freezing temperature of -40 °C. After freezing, both the food stuffs showed differences in their morphological features. **10**
  - i. Which of the food do you expect to be morphologically intact?
  - ii. Highlight the undesirable morphological changes in one of the food stuff
  - iii. Discuss with mechanism the two freezing methods employed in the above scenario

- b) The gamma irradiation of food not only targets microorganisms but the food constituents as well. Justify with suitable examples. **05**
- c) 'Different ranges of low temperature have varied effect on preservation of food stuff'. Justify suitably. **05**

**OR**

- 6 a) Differentiate different types of freeze dryers with diagrammatic representations and comment on their merits and demerits. **10**
- b) 'Water is an important determining factor in the extent of radiation treatment of different food stuffs. Justify the statement with respect to different food materials. **05**
- c) Graphically represent constant rate period vs falling rate period in dehydration of foods. Which of them is efficient in drying the foods and why? **05**

**UNIT - V**

- 7 a) Discuss the role of microorganisms and their products in enhancing the organoleptic quality of cheese. **10**
- b) Define alcoholic beverages. With a neat flow chart discuss the various steps involved in wine production in a fermentation industry. **10**

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