

B.E (FTBE) THIRD YEAR, FIRST SEMESTER EXAMINATION 2019

FOOD PACKAGING TECHNOLOGY

TIME: 3 H

FULL MARKS = 100

PART- I (50 MARKS)

USE SEPARATE ANSWER SCRIPT FOR EACH PART

Q1. Answer either (a) or (b) in this block.

(a) Describe the following (any 1):

2 × 2.5 = 5

- I. Gas packaging is an extension of vacuum packaging (provide suitable examples).
- II. Retort packaging of peas (with the aid of graphs and schematic diagram).

(b) Define the following:

5 × 1 = 5

- I. *Sous-vide* processing
- II. O₂ scavenger
- III. Freshlock
- IV. Complete aseptic packaged food
- V. Green Pack

Q2. Differentiate between (any 2):

2 × 5 = 10

- a. LDPE vs. HDPE
- b. Freshilizer 'C' series vs. Freshilizer 'F' series
- c. Rotary retorts vs. Static retorts
- d. Lean fish packaging vs. Fatty fish packaging

[Turn over

Q3. Answer any two from (a), (b) and (c) in this block.

5 + 5 = 10

- (a) Explain the mechanism of action of 'Ageless'. Why is it essential to have films of correct O₂ permeability to ensure success of oxygen-scavenging films?
- (b) Enumerate the outstanding properties of a PET film as a food packaging material. Provide examples of food products where PET is used 'singly', 'as part of a laminate' and as 'coated films'.
- (c) Explain why retort packaging is an advancement over canning.

Q4. Answer any one from (a) and (b) in this block.

5

- (a) Diagrammatically illustrate an FFS machine to obtain a pouch pack of potato wafers.
- (b) Illustrate graphically Counter pressure method and Differential pressure method of retorting.

Q5. Answer any two from (a), (b) and (c) in this block.

10 + 10 = 20

- (a) Critically analyze the properties of the following packaging materials with reference to meat packaging. **3 × 3 = 9**

1. PS
2. Ionomer
3. EVA

Would you suggest any modification of PVC for use in meat packaging?

1

- (b). Choose appropriate packaging materials to form laminates and mention the relevant packaging technology including the machinery that would be employed in designing the packaged food product. Provide justification for your answers (any 3): **3 × 3 = 9**

1. Ground coffee
2. Corn grits
3. Oily top biscuits

4. Long life milk

What is the difference between laminate and composite?

1

(c). Design appropriate laminates for the products listed below. Also suggest active packaging for these with appropriate justifications (any 2). **5 × 2 = 10**

1. Bread
2. Grape juice
3. Cooking Vegetable oil

**B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING
THIRD YEAR FIRST SEMESTER EXAM 2019**

Food Packaging Technology

Time: 3 hrs.

Full Marks : 100

Part – II

[Answer any four questions, $12.5 \times 4 = 50$]

- Show the composition of the walls of both TFS and tin plate can . Why canning is called 'commercial sterilization process' ? Classify different food products in terms of pH and also give example of each class. Why blanching is an important step during canning of vegetables. What are 'two piece can' and 'three piece can'? (3+2+3+2+2.5)
- (a) A liquid food contains 3×10^5 spores of an organism A having a D value of 1.8 min at 121.1°C and 8×10^7 spores of organism B having a D value of 0.8min at 121.1°C . the food is heated at an uniform constant temperature of 121.1°C . Calculate the heating time for the food at 121.1°C needed to obtain a can with probability of spoilage 1 in 1000.
 - (b) The F_0 value of a sterilization process has been evaluated to be 2.88 min. If each can contains 10 spores of an organism having a D_0 value of 1.5 min, calculate probability of spoilage from this organism.
 - (c) The F value at 121.10C equivalent to 99.999% inactivation of a strain of an organism is 1.2 min. Calculate the D_0 value of this organism (5+4.5+3)
- What do you mean by 'gob' ? Name the unit operations followed during manufacturing of glass. Name two different types of moulds used as glass container forming machine. State the objective of passing glass containers through 'annealing Lehr' during the manufacturing process. What do you mean by 'hot end' and 'cold end' surface treatments for glass containers? (1+2+1+2.5+6)
- Mention the advantages and disadvantages of using glass as packaging material. With the help of neat sketch show the different sections of a glass container. Name one colouring agent used for manufacturing blue glass and one for amber glass. State why soda ash and lime stone are used as ingredients for glass manufacture? What is 'cullet' and what is its use? (3+3.5+2+2+2)
- Write the full forms of 'PET' and 'PVDC'. Name different methods of polypropylene container manufacturing process . What is a 'reclaim layer' in plastics packaging material ? What would be your choice between PVDC and EVOH as a barrier layer in plastics packaging and why ? Name two types of moulding techniques used for plastics packaging . What is 'TOR' process used during Lamipac containers packaging? Write merits of Lamicon bottles? (2 +2+2 +2+1+2+1.5)
- What do you mean by 'thermoformed' plastics packaging material ? Write short note on (any two) : (a) Collapsible tube (b) Tetra Pak aseptic carton system (c) Step can. With the help neat sketch, show different components of a double seam arrangement in a can. Write the basic objectives of using lacquers to can and give two examples of lacquering materials. (2+5+3+2.5)