

B.E (FTBE) THIRD YEAR, SECOND SEMESTER EXAMINATION 2025

FOOD PACKAGING TECHNOLOGY

Time : Three hours

(50 Marks for each Part)

Full Marks : 100

Use separate answer scripts for each Part

PART- I (50 MARKS)

Answer Q1 and any Two from the rest

Q1. I. Describe the following (any 2):

2 × 2.5 = 5

- a) Retorting as an advancement of canning
- b) Outstanding properties of metallized BOPP film
- c) Uses of LDPE 'singly', 'as part of a laminate' and as 'composite'

II. Define the following:

5 × 1 = 5

- a) UHT processing
- b) WVTR
- c) MAP
- d) Complete aseptic packaged food
- e) *Sous vide* technology

Q2. Differentiate between (any 4):

4 × 5 = 20

- a) Static vs. Dynamic retorting
- b) Bottle of vegetable oil vs. Pouch pack of vegetable oil
- c) Packaging of Cured meat vs. Fresh meat
- d) Packaging of Regular milk vs. Long life milk
- e) Packaging of Grape juice vs. Apple juice

Q3. Diagrammatically illustrate the following (any 2):

2 × 10 = 20

- a) Tray packaging of dressed chicken for extended shelf life
- b) Retorting of PD prawns
- c) FFS machine to obtain a pouch pack of corn grits

Q4. 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 (any 4):

4 × 5 = 20

- a) Ice cream cups; b) Oil-top biscuits; c) Strawberries; d) Slice bread; e) Tomato ketchup

[Turn over

**B.E. FOOD TECHNOLOGY AND BIOCHEMICAL ENGINEERING
THIRD YEAR SECOND SEMESTER SUPPLEMENTARY EXAM 2025**

Food Packaging Technology

Time: 3 hrs.

Full Marks : 100

Part – II (50 marks)

Answer Q1 and any three from the rests.

1. Write the full form of 'HDPE'. What chemical sterilant may be used for sterilizing packaging material in aseptic processing? State why soda ash and lime stone are used as ingredients for glass manufacture? 2+1+2
2. Write the basic objectives of food packaging. Give examples of 'rigid' and 'flexible' packaging materials. Write the full form of PET and PVC. What should be the characteristics of ideal packaging material? What is 'tertiary packaging' ? Give example. 3+2+3+4+3
3. Write the advantages and disadvantages of using Aluminium as packaging material. Write the advantages of 'aseptic packaging technology' . Write short note on : Tetra Pak aseptic carton system. . Name two types of closures. How would you symbolize 'veg' and 'non-veg' food item ? What do you mean by 'OTR' and 'permeability' 3 + 2 + 3 + 2+1 + 4
4. Mention the advantages and disadvantages of using glass as packaging material. Name one colouring agent used for manufacturing of each of blue glass , green glass and red glass. What is 'cullet'? What is 'gob' ? What is 'annealing lehr' and what is its use in glass manufacturing? 4+ 3 + 2+2 +4
5. What are the significances of 'use by' and 'best before' date marks for food products. Give examples of use of polypropylene and polystyrene. Write the numerical symbol of PP and PS. What do you mean by (i) thermosets and (ii) elastomers . Give example of plastics products manufactured by (i) injection moulding and (ii) extrusion. Write short note on : thermoforming. 2+ 2+2+3+3+3
6. (a) Calculate the permeability coefficient of an amorphous polyethylene terephthalate (PET) film to O_2 at $23^\circ C$ given that the OTR through a 2.54×10^{-1} -cm-thick film with air on one side and inert gas on the other is 8.8×10^{-9} mL cm^{-2} s^{-1} .

(b) A food powder with a density of 1 is to be packaged in a plastic film that has a WVTR of 2.1 g m^{-2} day^{-1} at $25^\circ C$ and 75% RH. The initial moisture content of the powder is 3%, and the critical moisture content is 7%. Assuming that each pack will contain 450 g of powder and will be exposed to an external environment at $25^\circ C$ and 75% RH, calculate the shelf life if the shapes of the packs are the same as those of cubicals . For simplicity, assume that the driving force for water vapor transmission (WVT) remains constant and that there are no moisture gradients in the powder.

Assume that the cubical packs of volume 450 ml have surface area of 353 sq. cm.

6+9