

**B B.E (FTBE) THIRD YEAR FIRST SEMESTER EXAM 2018**

**FOOD PACKAGING TECHNOLOGY**

**Time : Three hours**

**Full Marks : 100**

**(50 marks for each Part)**

**Use separate answer script for each part.**

**PART- I (50 MARKS)**

**Answer Q1 and any Two from the rest**

**Q1. Fill in the blanks:**

**10 × 1 =10**

1. Indirect heat sterilization in aseptic packaging is achieved by .....sterilizer.
2. The most used sterilizing agent for packaging materials is .....
3. The time required to reach the retort sterilization temperature is known as .....
4. ....is the most common antimicrobial agent incorporated into plastics.
5. For rotary type retort, products with .....heat transfer co-efficients are preferred.
6. Food grade alcohol adsorbed into SiO<sub>2</sub> is commercially sold as.....
7. 'Gas packaging is an extension of .....packaging technology.
8. 'Ethysorb' is composed of.....
9. ....is a promising O<sub>2</sub>-scavenging enzyme
10. O<sub>2</sub> permeability of packaging films are expressed in .....units.

**Q2. 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 4):**

**4 × 5 = 20**

- a. Ground coffee
- b. Corn grits
- c. Fresh meat
- d. Sugar coated biscuits
- e. Vitamin C enriched orange juice

**Q3. Comparatively evaluate the following (any 5):**

**5 × 4 = 20**

- a. Absorption type and Generation type of sachets
- b. Counter pressure method and Differential pressure method of retorting

- c. Al foil pouch and Al foil trays
- d. Retort technology and *Sous vide* technology for vegetable curry
- e. Complete aseptic packaged food and Commercial aseptic packaged food
- f. Packaging of cocoa Beans and cocoa Powder

**Q4. Write short notes on (any 5):**

**5 × 4 = 20**

- a. Long life milk
- b. Ageless
- c. Grape juice package
- d. O<sub>2</sub>-scavenging films
- e. F and C series of Freshlizers
- f. Packaging for absorption of odors

## BACHELOR OF ENGINEERING ( F.T.B.E) EXAMINATION, 2018

(3<sup>rd</sup> Year -1<sup>st</sup> Semester )

## Food Packaging Technology

Time: 3 hrs.

Full Marks : 100

## Part-II

[Answer any five questions, Marks 50]

1. What are DRD and DWI cans ? 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. State the mode of heat transfer during sterilization of can refer different types of canned material. (2+3+2+3)
2. Write the steps during canning. Why blanching is an important step during canning of vegetables. Give example of a depolarizer. Show the composition of can wall. Write the steps involved in the fabrication of a three piece can. Mention one can defect. (2+2+1+2+2+1)
3. What do you mean by 'D' value ? State '12D' concept. What is the relation between process time and sterilizing value ? A liquid food contains  $4 \times 10^6$  spores of an organism A having a D value of 1.5min at  $121.1^\circ\text{C}$  and  $7 \times 10^7$  spores of organism B having a D value of 0.8min at  $121.1^\circ\text{C}$ . The food is heated at an uniform constant temperature of  $121.1^\circ\text{C}$ . Calculate the heating time for the food at  $121.1^\circ\text{C}$  needed to obtain a can with probability of spoilage 1 in 1000. (1 + 2+ 2+ 5)
4. 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 amber glass. State why soda ash and lime stone are used as ingredients for glass manufacture? What is the use of 'cullet'? (3+3+1+2+1)
5. What do you mean by 'gob'? Name the 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. Explain different modes of surface treatment of a glass container. (2+2+1+2+3)
6. Name different methods of polypropylene container manufacturing process . Mention the types of plastics containers generally used for heat processed foods and write short note on any of those types of containers. Write short note on (a) Collapsible tube or (b) Tetra Pak aseptic carton system. (2 + 4 + 4)
7. A food powder with density of 1 is to be packaged in a plastic film that has a WVTR of  $2.1 \text{ g m}^{-2}\text{day}^{-1}$  at  $25^\circ\text{C}$  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 gms of powder and will be exposed to an external environment at  $25^\circ\text{C}$  and 75% RH, calculate the shelf life if the shape of the packs are cylindrical . For simplicity , assume that the driving force for WVT remains constant and that there are no moisture gradient in the powder. Surface area of cylindrical package shape, with a volume of 450 mL, is  $33 \text{ l cm}^2$ .