(a) Discuss the major challenges existing in the Food Processing Industries in India. 6

(b) What are carbohydrates ? With examples and structural formulas give the classification of carbohydrates. 7

(c) Define Emulsification and Homogenization. With a neat sketch explain the working of a pressure homogeniser. 7

(a) Explain various steps involved in the raw material preparation of food. 10

(b) Define D-values and Z-values in the food processing. Discuss the important factors which determine the heat resistance of micro-organisms. 10

(a) Explain the terms freezing, freeze drying and freeze concentration stating the exact differences between them. 8

(b) Ten-centimeter potato cubes are individually frozen in a freezer operating at —10°C and with a surface heat transfer coefficient of 30 w / (m^2) (k). If the freezing point of the potato is measured as —1·0°C and the density is 1180 kg / m^3, Calculate the expected freezing time for each cube. If the cubes are then packed into a cardboard carton measuring 40cm x 20cm x 20cm, Calculate the freezing time. Also, calculate the freezing time for freezing of 5 cm cubes. 12

Data : Thickness of card = 2·0 mm
Thermal conductivity of potato = 2·5 w /(m)(k)
The thermal conductivity of the card = 0·07 w /(m)(k)
Latent heat of crystallization = 2·74 x 10^5 J /(kg)

(a) Explain ultra high-temperature process in detail. 10

(b) Peas which have an average diameter of 6mm and a density of 880 kg/m^3 are dried in a fluidised bed drier. The minimum voidage in 0·4 and the cross-sectional area of the bed is 0·5m^2. Calculate the minimum air velocity needed to fluidise the bed if the air density is 0·94 kg/m^3 and the air viscosity is 2·05 x 10^{-5} Ns/m^2. 10

(a) Explain the manufacturing process of Bread in detail. 10

(b) An 8 kW oven has a hearth area of 4m^2 and operates at 220°C. It is loaded with two batches of bread dough in baking time; 300 loaves on the first batch and 250 loaves on the second batch. The surface of each loaf measures 15 cm x 25 cm. The emissivity of dough is 0·85. If the dough bakes at 100°C, and that 95% of the heat in transmitted in the form of radiant energy. Calculate the efficiency of energy use for each batch. 10

(a) Discuss chocolate coating and compound coating. Explain pan coating. 10

(b) Explain filling and sealing of containers in food processing. 10

Write short notes on any **two** :—

(a) Lipids 10

(b) Dielectric heating 10

(c) Various frying methods and their effect on food materials. 10