	Utech
Name:	
Roll No.:	The Samuely Samuely and Carlotte
Invigilator's Signature :	

FOOD PROCESS ENGINEERING

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following:

 $10 \times 1 = 10$

- i) Solar dryer is a type of
 - a) Conduction drying b) Convectional drying
 - c) Both of these d) None of these.
- ii) In Extruder, barrel temperature is
 - a) primary variable b) secondary variable
 - c) machine constant d) none of these.

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- iii) In plate type heat exchangers
 - a) only counter current flow is used
 - b) only con current flow is used
 - c) either type of flow may be used
 - d) none of these.
- iv) Shrimps may be dried most efficiently in
 - a) Tray dryer
- b) Freeze dryer

d)

- c) Fluidized bed dryer
- None of these.
- v) Heat damage may occur in
 - a) Drum drying
- b) Spray drying
- c) Both of these
- d) None of these.
- vi) When the inlet hot air temperatures are the same, high rate of evaporation are achieved at the "wet end" in the case of

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- a) Counter current system
- b) Concurrent system
- c) Both of these
- d) None of these.

CS/B.TECH(FT)/SEM-5/FT-503/20 vii) The ratio of the volume of voids to the total volume is called a) Void ratio b) Porosity Bulk density Specific gravity. c) d) viii) After freezing, frozen meat appears Darker in colour Lighter in colour a) b) Colourless d) None of these. c) ix) The cause of freeze burn is Condensation a) Rehydration b) Dehydration d) All of these. c) For a given material, the moisture content expressed as X) wet weight basis have greater value a) have lesser value b) c) have same value-compared to the moisture content expressed as dry weight basis

none of these.

d)



- xi) Homogenizer can be used
 - a) as a reactor in chemical reactions
 - b) to improve the sensory properties of food products
 - c) in the manufacture of enzymes or single cell proteins
 - d) all of these.
- xii) Which is the controlling factor for a drum dryer?
 - a) Diffusion
- b) Heat transfer
- c) Both (a) and (b)
- d) Neither (a) nor (b).

GROUP - B

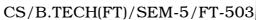
(Short Answer Type Questions)

Answer any three of the following.

- $3 \times 5 = 15$
- 2. Discuss with a neat sketch the operating principle, merits & demerits of hydrostatic sterilizer.
- 3. Explain with sketch the following visual seam defects :

$$1\frac{1}{2} + 1\frac{1}{2} + 2$$

- a) Droop
- b) False seam
- c) Sharp seam & Cutover.





- 4. Explain the following:
 - a) Texturized vegetable protein
 - b) Function of an extruder
 - c) Benefits of extrusion.
- 5. Explain the following:

$$1\frac{1}{2} + 2 + 1\frac{1}{2}$$

- a) Prefabricated cold storage
- b) Heating of milk before homogenization
- c) Basic units of HTST pasteurizer & advantages of plate heat exchanger.
- 6. Draw a schematic diagram of a falling film evaporator and state its working principle. $2\frac{1}{2} + 2\frac{1}{2}$

GROUP - C

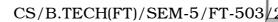
(Long Answer Type Questions)

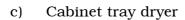
Answer any *three* of the following. $3 \times 15 = 45$

- 7. a) Determine the convective heat transfer co-efficient for a plate heat exchanger with a 6.35×10^{-3} m distance between plates. The product is non-Newtonian with n = 0.5 and thermal conductivity K = 0.52 W/mC.
 - b) Which types of food is dried in drum dryer and tray dryer? Give specific examples. 2 + 3
- 8. Describe high speed horizontal dough mixture. Give labelled diagram.

- 9. What do you understand by "Ton of Refrigeration" ? Discuss the factors to be considered for calculating the refrigeration load of a cold store. What is the ideal air distribution system in a cold store with unit coders? 4 + 6 + 5
- 10. a) Draw a labelled diagram of a commercial tray type freeze dryer and explain its principle of operation and advantages.
 - b) Differentiate between conventional drying and freeze drying processes.
 12 + 3
- 11. a) Why evaporation by boiling preserves the liquid food?

 Indicate the types of evaporator and their uses. What are the common features of an evaporator? How energy efficiency of an evaporation system can be increased?
 - b) Draw a labelled diagram of a fluidized bed dryer and state its advantages and disadvantages in food processing industries. (1+3+2+2)+(3+4)
- 12. Write short notes on any *three* of the following : 3×5
 - a) Cold chain
 - b) Cyclone separator





- d) Drying rate curve & microwave drying
- e) Continuous pressure sterilizer
- f) Liquid nitrogen tunnel freezer
- g) Individual Quick Freezing process.

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