Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016**

**Subject Code:2131408** **Date:31/12/2016**

**Subject Name:Basics of Food Engineering**

**Time:10:30 AM to 01:00 PM** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

**Q.1** State the following sentences are TRUE or False **14**

1. Density is a physical property.
2. Material in = Material out is theory of mass balance.
3. Psychometric chart is designed at 1atm.
4. Relative humidity is represented in percentage.
5. Superheated steam is generated when vapors are fully dried.
6. Adhesiveness is a textural property.
7. Bond's law is related to size reduction.
8. Carbohydrate is the major energy source in the body.
9. Drying is used to increase the shelf life of product.
10. Full form of BIS is Bureau of Indian States
11. If any two thermodynamic properties are known then other properties can be found from Psychometric chart.
12. Blanching is used to inactivate the enzyme.
13. Terminal velocity is used to design the conveying equipment.
14. Canning is a method of food preservation.

**Q.2** **(a)** How much dry sugar must be added in 100 kg of aqueous sugar solution in order to increase its concentration from 20% to 50%? **03**

**(b)** How drying is different from dehydration? Justify its advantages in relation to food processing. **04**

**(c)** Write the full form of NIFTEM, CFTRI, PFA, FPO, ISI, BIS, ISO and APEDA **07**

**OR**

**(c)** List out the advantages of process control in food industry. Give the list of temperature and pressure measuring instruments. **07**

**Q.3** **(a)** What is the role of enzymes in food metabolism? **03**

**(b)** 5000 kg/h of milk with a specific heat of 3.849 kJ/kg$^0$C is entering into the heat exchanger at 15$^0$C, calculate the total amount of energy. **04**

**(c)** Explain the role of pulping, peeling and blanching in food industry. List out different methods of peeling and discuss any two in detail. **07**

**OR**

| | | | |
|---|---|---|---|
| **Q.3** | **(a)** | How much water would be evaporated from 100kg of milk of 15% solid to from 40% concentrated milk. | **03** |
| | **(b)** | Discuss the formation of steam to superheated steam. List out the use of steam tables in calculations. | **04** |
| | **(c)** | Discuss the role of material handling in food processing. Discuss the different equipments involved in handling of food products. | **07** |
| **Q.4** | **(a)** | Answer the following in short:<br>a. What is the present status of food industry in India?<br>c. Give measures to prevent food loss.<br>d. Scope of entrepreneurship in food industry? | **03** |
| | **(b)** | Explain with the help of diagram about the different phases of steam formation starting from ice to superheated steam. | **04** |
| | **(c)** | Draw the labelled psychometric chart and list out its properties. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Differentiate between dry bulb and wet bulb temperature. | **03** |
| | **(b)** | Explain the material balance and energy balance with example. | **04** |
| | **(c)** | What do you mean by deterioration of food quality? Discuss the causes of spoilage in detail. | **07** |
| **Q.5** | **(a)** | Define<br>Relative humidity, Filtration and Diffusion | **03** |
| | **(b)** | What is the need of size reduction in food industries? State Kick's and Rittinger's law. | **04** |
| | **(c)** | Discuss the followings in brief<br>Specific volume, Specific heat, Latent heat, Benefits of Industrial training | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain recommended daily allowance for nutrients. | **03** |
| | **(b)** | Discuss the followings<br>1. Role of Condiments and spices in food industry.<br>2. Give uses of nuts and oil seeds in food industry. | **04** |
| | **(c)** | Differentiate between cleaning, grading and scalping. Discuss any one cleaning equipment with diagram. | **07** |