

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Regular / Remedial Examination December 2010****Subject code: 131405****Subject Name: Introduction to Food Processing Technology****Date: 18 /12 /2010****Time: 10.30 am – 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** (a) State the principle of mass balance with the help of suitable flow diagram. Fresh orange juice with 12% soluble solids content is concentrated to 60% in a multiple effect evaporator. To improve the quality of the final product the concentrated juice is mixed with an amount of fresh juice so that the concentration of the mixture is 42%. Calculate how much water per hour must be evaporated in the evaporators, how much fresh juice per hour must be added back and how much final product will be produced if the inlet feed flow rate is 10000kg/h fresh juice. **07**
- (b) Explain in detail about Wet bulb temperature, Dry bulb temperature, Dew point temperature, Relative humidity and Absolute humidity. **04**
- (c) Calculate the rate of thermal energy required in food dryer, to heat 10m³/s of outside air at 30⁰C dry bulb temperature and 80% relative humidity to dry bulb temperature of 80⁰C. Assume no gain of moisture. **03**
- Q.2** (a) What are the benefits of size reduction in food processing? Explain the stress-strain diagram for various foods. Explain different laws to calculate the energy required during the size reduction of solids in detail. **07**
- (b) Steam is used for peeling of potatoes in a semi continuous operation. Steam is supplied @ 4kg/100kg of unpeeled potatoes. The unpeeled potatoes enter the system with a temperature of 17⁰C and the peeled potatoes leave at 35⁰C. A waste stream from the system leaves at 60⁰C. The specific heat of unpeeled potatoes, waste stream and peeled potatoes are 3.7, 4.2 and 3.5kJ/kg K. If the heat content of the steam is 2750 kJ/kg, determine the quantity of waste stream and the peeled potatoes from the process. Assume 0⁰C as reference temperature. **07**
- OR**
- (b) List the various kinds of food materials. Also give major composition of Cereals and Millets, Legumes, Vegetables, Oil seeds and Spices with their major uses. **07**
- Q.3** (a) Explain the role of vitamins in body. Discuss classification of foods. Define Food processing, Recommended nutrients and refining. **07**
- (b) Derive the expression $MC_{wb} = \frac{MC_{db}}{MC_{db} + 1}$ **07**
- 10kg of food at a moisture content of 320% dry basis is dried to 50% wet basis. Calculate the amount of water removed.
- OR**
- Q.3** (a) Explain in brief Stimulatory effect, Food calories, Extra body weight, Quality testing lab, Types of beverage and Food analysis **07**
- (b) What are the objectives of National Food Control System? List the salient features of the PFA Act. What is an adulterated food under PFA Act? **07**

- Q.4 (a)** The temperature of three different food products A, B and C of equal mass are 12, 19 and 28⁰C respectively. The temperature when A and B are mixed is 16⁰C and when B and C are mixed is 23⁰C, what would be the temperature when A and C are mixed. **04**
- (b)** What is peeling? List out advantages of peeling. Explain different methods of peeling in details. **03**
- (c)** Write the full form of PFA, FPO, ISI, BIS, ISO, APEDA and EIC **07**
- OR**
- Q.4 (a)** Describe milk and milk products and also discuss meat, egg and sea foods. **07**
- (b)** Discuss Indian diet. Give importance of semi processed and ready to eat food with examples. **07**
- Q.5 (a)** Explain the working principle of hand operated double screen grain cleaner and seed grader with diagram. **07**
- (b)** Classify foods according to their spoilage. Write in detail about different causes of spoilage. **07**
- OR**
- Q.5 (a)** Explain the importance of material handling in food processing. Discuss the different equipments involved in handling of food products. **07**
- (b)** Write in short about Drying, Dehydration, Evaporation, Distillation, Crystallization, Extraction, Filtration, and Centrifugation. **04**
- (c)** Write down advantages of glass packaging and flexible film. **03**
