

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III • EXAMINATION – WINTER 2013****Subject Code: 131405****Date: 26-11-2013****Subject Name: Introduction to Food Processing Technology****Time: 02:30 pm – 05:00 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)** Explain the concept of mass balance in steady and non-steady state unit operations with the help of a suitable example. A single strength (fresh) mango juice with 10 % soluble solids is concentrated to 55% soluble solids in an evaporator. To improve the flavor of the final product, a certain amount of single strength juice is added to the concentrated juice so that the concentration of the final mixture becomes 40%. If the inlet juice flow rate is 1200 kg/h fresh juice, calculate **07**
- (i) Water evaporation rate.
(ii) How much fresh juice per hour is being added back?
(iii) Rate of production of final product.
- (b)** Classify food materials and list major components of foods. State primary composition of the following products: Milk, Fruits, Cereals, Legumes, Vegetables and Spices and condiments. **07**
- Q.2 (a)** Explain the law of conservation of energy in process unit operations with the help of a suitable example. The Cheese processing section of a plant requires water to be heated from 20 °C to 80 °C @ 50 kg/s. To achieve this, saturated steam at 152 °C taken from a boiler is injected into a coil in direct contact with the water. The steam condenses in the coil and becomes liquid water at 90 °C. Draw a neat flow diagram depicting the process and calculate the amount of steam required to heat the water as stated above. **07**
- Take specific heat of water = 4.2 kJ/kg and latent heat of condensation of steam = 2267 kJ/kg.
- (b)** State the functions of foods and define nutrients. Describe functions of various food nutrients in brief. Explain recommended daily allowances (RDA) of nutrients and state its significance. **07**
- OR**
- (b)** Discuss food as a source of nutrients. What is meant by Recommended nutrients and food refining? **07**
- Q.3 (a)** Discuss the status of food industry in India with relevant data and scope. Explain its need and importance. Describe future growth prospects in terms of revenue and employment generation. **07**
- (b)** State the need and importance of industrial training and exposure in the field of food processing. Discuss the steps needed to start a small scale food processing industry in a rural area. Enumerate the major operations involved in food industry. **07**

OR

- Q.3 (a)** Write short note on the following: **07**
1. PFA
2. Obesity
3. Heating as a method of food preservation.

- (b)** What are unit operations? Name and explain in detail various unit operations employed in food industries along with equipments and machinery used. **07**

- Q.4 (a)** State the use of steam tables in food engineering calculations. With the help of a neat diagram explain different phases of steam formation starting from ice to superheated steam. Define the following terms: **07**
(i) Enthalpy (ii) Latent heat
(iii) Sensible heat (iv) Specific heat

- (b)** Write meaningful notes on the following with examples: **07**
(i) Drying (ii) Distillation (iii) Packaging
(iv) Size reduction (v) Blanching

OR

- Q.4 (a)** Give the importance of blanching in the processing of fruits and vegetables. Briefly discuss the working of steam blancher and hot-water blancher. **07**

- (b)** Write meaningful notes on the following: **07**
(i) Pasteurization (ii) Wet bulb Temperature (iii) Relative Humidity
(iv) RTE Food (v) Centrifugation

- Q.5 (a)** What is psychometric chart? State its uses in food processing. Draw a neat labeled diagram of psychometric chart indicating various variables and processes and explain what is dry bulb temperature and dew point temperature. **07**

- (b)** Discuss the need and applications of instrumentation and control in food industry? Enumerate the instruments to measure the following: **07**
(i) Temperature (ii) Humidity (iii) Pressure (iv) °Brix (v) Colour
(vi) Power (vii) Fluid flow

OR

- Q.5 (a)** Explain the functions and importance of food minerals and vitamins. Explain in detail the causes of food spoilage and various methods of preservation. **07**

- (b)** Explain the following: **07**
(i) Food Quality (ii) Food Laws (iii) Cleaning and Grading
(iv) Moisture content (dry basis) (v) Heat exchangers
