

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- IVth SEMESTER-EXAMINATION – MAY/JUNE- 2012****Subject code: 141405****Date: 31/05/2012****Subject Name: Principles of Food Engineering****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)	What is unit operation? Discuss drying and sieve separation process.	07
	(b)	Give importance of engineering properties. Describe physical properties.	07
Q.2	(a)	Explain the mode of operation of ionizing radiations in food irradiation.	07
	(b)	Explain material and energy balance principles. Fresh lemon juice containing 8 % solid is concentrated in an evaporator to 50 % solids. If the juice entering rate is 600 kg/hr. Calculate the concentrated juice produced using mass balance system.	07
		OR	
	(b)	Explain heat conduction system. Also explain heat energy involved in steam formation and ice melting.	07
Q.3	(a)	Explain heat convection and heat radiation system.	06
	(b)	Discuss types of heat exchanger and its effectiveness.	04
	(c)	Give importance of thermal process time. Also give effect of temperature on reaction rate.	04
		OR	
Q.3	(a)	Define packaging. Enlist different packaging materials and explain any one.	07
	(b)	Define water activity and discuss the different types of water present in the food.	07
Q.4	(a)	Answer the following (Any three) 1. Explain non steady system. 2. What is freezing process? 3. What is distillation? 4. What is crystallization?	06
	(b)	Define following terms. a. Centrifugation b. Cleaning c. Separation d. Forming	04
	(c)	Explain mechanical properties of food.	04
		OR	
Q.4	(a)	Define food and discuss the microbial spoilage of foods.	07
	(b)	State the objectives of packaging and explain the product package compatibility.	07
Q.5	(a)	Discuss processing by heat. Explain heat transfer characteristics of food.	05
	(b)	Write short notes (Any two) 1. Gravity separator 2. Aseptic processing 3. Dryers	06

	(c)	Calculate quantity of ice required to cool 1000 kg of water from 40°C to 20°C using material balance.	03
		OR	
Q.5	(a)	Explain the methodology to decide the radiation dose for the food.	07
	(b)	Enlist the temporary methods of food preservation and explain any one in detail.	07
