LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **FOOD CHEMISTRY AND FOOD PROCESSING**

FIRST SEMESTER – **NOVEMBER 2023**

PFP1MC02 – UNIT OPERATIONS AND FOOD PACKAGING

Date: 03-11-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A – K1 (CO1)

	Answer ALL the questions	**(5 x 1 = 5)**
1	**Multiple Choice Questions**	
a)	The transfer of heat between two surfaces as a result of electromagnetic waves is called as i. conduction ii. convection iii. radiation heat transfer iv. irradiation	
b)	Freeze drying is also called as i. appertization ii. lyophilization iii. cold sterilization iv. dehydrofreezing	
c)	An example of thermal technology i. UV ii. MRI iii. dielectric heating iv. cold plasma	
d)	Gas that is used as a replacement to oxygen as an alternative to vacuum packaging. i. Nitrogen ii. Carbon dioxide iii. Hydrogen iv. Helium	
e)	What is the specific number used to indicate the recycling symbol for low-density poly ethylene. i. 2 ii.3 iii. 4 iv.7	

SECTION A – K2 (CO1)

	Answer ALL the questions	**(5 x 1 = 5)**
2	**Definitions**	
a)	Ebullioscopic constant.	
b)	Fluidized bed drying.	
c)	Freezing time.	
d)	Gas flushing.	
e)	RFID.	

SECTION B – K3 (CO2)

	Answer any THREE of the following	**(3 x 10 = 30)**
3	Illustrate the phase change graph with a neat diagram.	
4	Explain the principles of thermal processing of liquid foods.	
5	Calculate the freezing point of a solution prepared by adding 140 g trichothecin ($C_{19}H_{24}O_5$) to 0.746 kg of benzene. The freezing point of pure benzene is 5.5 ºC. The freezing point constant for benzene is 5.12 ºC/m. (Molar mass of trichothecin = 332.39 g/mol).	
6	Classify the different types of papers that are used in food industry.	
7	Formulate a protocol for the sequential handling of packaging waste.	

SECTION C – K4 (CO3)

	Answer any TWO of the following	**(2 x 12.5 = 25)**
8	Illustrate the concept of boiling point elevation of liquid with a neat diagram.	

9	Diagrammatically represent the working protocol of a. Spray dryer b. Infrared heating
10	Outline the role of various gases and injection methods used in MAP.
11	Examine the role of active packaging systems in food industry.
	SECTION D – K5 (CO4)
	Answer any ONE of the following **(1 x 15 = 15)**
12	Explain in detail the concept and applications of electric double layer at solid-liquid interface.
13	Compare and contrast the principle, working protocol and applications of dielectric heating and pulsed electric field.
	SECTION E – K6 (CO5)
	Answer any ONE of the following **(1 x 20 = 20)**
14	Propose appropriate processing technique for the following foods and justify your answer a. Freezing of fresh strawberries. b. Preservation of meat products by using chemical preservatives and curing.
15	Summarize the recent advancements in the following smart packaging materials a. Retort Packaging. b. Intelligent Packaging.
