CLASS: IMSc.   SEMESTER : IX
BRANCH: FOOD TECH.   SESSION : MO/2024

SUBJECT: FT502 FOOD PROCESSING PLANT DESIGN AND LAYOUT

TIME: 3 Hours   FULL MARKS: 50

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Briefly describe the plant design procedures.	[5]	1	2
Q.1(b)	Explain the product layout, process layout, group layout and fixed position layout with applications in food industries.	[5]	1	3
Q.2(a)	Discuss ISO, FPO and MPO requirements for food plant layout and design.	[5]	1	2
Q.2(b)	Draw the flowchart of material balance and energy balance in a dairy plant.	[5]	3	3
Q.3(a)	Prepare the complete plant layout of an abattoir with flow direction.	[5]	5	5
Q.3(b)	Form a PERT network from the information in the following table and calculate float for each activity. Identify the critical path.	[5]	3	3

Activity	Predecessor Activity	Time (weeks)
A	-	4
B	-	6
C	B	4
D	A	12
E	A, C	7
F	B	9
G	E, F	5

Q.4(a)	Graphically represent and explain cumulative cash positions in an industrial project over the complete lifetime.	[5]	4	3
Q.4(b)	A continuous single-effect evaporator is fed at 303 K with 5000 kg/hr aqueous sugar solution of 1 wt% is to be concentrated at 2 wt%. The evaporation takes place at 38.58 kPa. Saturated steam is supplied for heating at 143.3 kPa. The heat transfer coefficient of the evaporator is 2833.13 W/m^2 K. Find out the flow rate of vapor and liquid products and the area of the evaporator. Given that, the saturation temperature of water at 143.3 kPa and 38.58 kPa are 383.2 K and 348.2 K, respectively. Enthalpy of feed is 125.79 kJ/kg, saturation vapour enthalpy is 2635.3 kJ/kg at 348.2 K, saturation liquid enthalpy is 313.93 kJ/kg at 348.2 kJ/kg. Saturation vapor enthalpy at 383.2 K is 2691.5 kJ/kg, and saturated liquid enthalpy at 383.2 K is 461.3 kJ/kg.	[5]	4	3
Q.5(a)	A confectionaries chain has decided to launch a pastry with aroma and flavors from different seasonal fruits. Suggest with proper justification what type of baking oven should be installed.	[5]	2	3
Q.5(b)	Explain in detail the transformation of a product undergoing deep frying regarding heat and mass transfer.	[5]	2	2