मोतीलाल नेहरू राष्ट्रीय प्रौद्योगिकी संस्थान इलाहाबाद

प्रयागराज -211004 [भारत]

Motilal Nehru National Institute of Technology Allahabad

Prayagraj-211004 [India]

Name of the Department: Chemical Engineering

Mid Semester (Odd) Examination 2024-25

Programme Name: B.Tech. **Semester:5th**

Course Code: CHN15250 **Course Name: Food Technology and Engineering**

Branch: Chemical Engineering **Student Reg. No.:** 2 0 2 2 2 0 6 8

Max. Marks:25/20

Duration: 90 Minutes

Instructions: (Related to Questions)

1. ***Draw diagrams only if asked in the question.***
2. ***Read questions carefully and write to the point.***
3. ***Give proper arguments and justifications for your choice of response.***

		Marks	Mapped to CO number **(Optional)**
Q 1.	What are the roles of food engineer in food industry. Write the importance of water activity. The jam usually has high water activity and high sugar content. You are not to add sugar into jam from outside and keep its water activity in control. How will you do it (at least three methods). How does water activity change with temperature?	8 4	1
Q2.	Derive the Planck Equation for calculation of the freezing time of a food. You are to write the assumptions and significance of each and every parameter.	6 4	2
Q3.	Name at least three useful microbes for the food industry and the applications. Write a detailed note on pasteurization of various food products.	8 5	2
Q4.	State the difference between food borne infection and intoxication. You are also to mention at least three names of microbes causing food poisoning.	3 2	2
	or		
Q4.	A solid fuel analyzes 74.0wt% C and 12.0% ash(inert). Air is added to burn the fuel, producing a flue gas of 12.4% CO_2, 1.2% CO, 5.7% O_2, and 80.7% N_2. Calculate the kg of fuel used for 100 kg mol of outlet flue gas and kg mol of air used.	3	1

Paper Setter: Harinder Singh

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Name of the Department: Chemical Engineering

End Semester (Odd) Examination 2024-25

Programme Name: B.Tech. **Semester:5th**

Course Code: CHN15250 **Course Name: Food Technology and Engineering**

Branch: Chemical Engineering **Student Reg. No.:** 2 0 2 2 2 0 6 8

Duration: 2.5 hrs (NEP) **Max. Marks:50**

Instructions: (Related to Questions)

1. ***Draw diagrams only if asked in the question.***
2. ***Read questions carefully and write to the point.***
3. ***Give proper examples arguments and justifications for your choice of response.***

		Marks	Mapped to CO number **(Optional)**
Q 1	a) What is the need of food fortification and how it is carried out. Name the iron salts used for preparation of fortified rice.	5	4
	b) Name some food additives which are used as binder, natural colors and preservatives. How is classification done for food additives?	5	4
Q2	a) What are various mass transfer steps for gases or vapors to diffuse to materials inside a food package?	5	2
	b) Give examples of food products preserved by immersion freezing and the temperatures of refrigerants used in immersion freezing. Why do we observe different zones in freezing of food products?	5	2
	Or		
	b) Define storage and loss modulus. What is the response of viscoelastic material to creep. Name at least three viscoelastic materials in food science other than gluten.		

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Q3	b) Derive the relation for mean velocity of Newtonian fluid in an extruder. What is power number and its use?	5	3
	b) How are single screw extruder different from twin screw extruders? (no need of making any diagram in this question). Make a table for stating the differences	5	3
Q 4	a) You are given a problem of detecting oxygen and carbon dioxide content in a packaging. How will you do it. Give names of at least three companies and their smart packaging products which manufacture smart packaging.	5	3
	b) State the difference between thixotropic and shear thinning liquids. What makes gluten a viscoelastic material?	5	3
Q 5	a) Give examples of four fermented foods and the microbes (specific names) used for their preparation. Give only two methods of measuring sphericity or roundness of an object in food industry.	5	1
	b) You are to design an instrument which can measure water activity in a food material. Write the principle and accessories which you may require for this task.	5	1