



Department of Food Technology
School of Interdisciplinary Sciences and Technology
Jamia Hamdard, New Delhi-110062
END SEM EXAMINATION
December, 2023. B Tech 7th SEM

Roll No.

2023
74 Sem.

Paper Title: Food Process & Equipment Design ; Paper Code: BFTD-706

Time allotted: 3Hrs.

Max Marks: 75

Note: Important: At the END, mention how many questions from each section you have attempted.

Students are supposed to carry their own Calculator. Sharing of Calculator Isn't allowed.

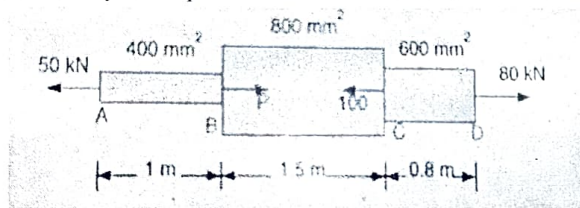
Section-A (15 Marks, Attempt All)

Questions

	<u>Marks</u>	<u>Mapping</u>
Q1. Define stress?	(2)	PO: 1,2/CO: 3,5
Q2. What is Hook's law?	(2)	PO: 1,3/CO: 2,4
Q3. What is the unit of thermal conductivity?	(2)	PO: 1,4/CO: 3,5
Q4. What is Fourier's law of conduction?	(2)	PO: 1,4/CO: 3,5
Q5. What is thermal resistance	(2)	PO: 1,2,4/CO: 1,2,5
Q6. Write down the three examples of regenerators.	(2)	PO: 1,2,3/CO: 2,6
Q7. What is Wien's law?	(2)	PO: 1,2,4/CO: 2,5
Q8. Write down the expression for critical thickness of insulation for cylinder.	(1)	PO: 1,2,3/CO: 2,3

Section- B (Attempt any 5) (6 Marks Each)

- Q10. A steel bar ABCD of varying sections is subjected to the axial forces as shown in figure. Find the value of P necessary for equilibrium. If $E=210 \text{ KN/mm}^2$. Determine the



total elongation of the bar.

- Q11. What do you understand by thermal resistance? Write down the expression for thermal resistance for conduction, convection and radiation process process. PO: 1,3,4/CO: 2,4,5
- Q12. Calculate the rate of heat transfer per unit of area through a copper plate 45mm thick, whose one face is maintained at 350 C and the other face at 50 C. ($K=370 \text{ W/mC}$). PO: 1,3/CO: 1,2,4
- Q13. What do you understand by radiation? Explain the laws of radiation. PO: 1,4/CO: 1,3,5
- Q14. Explain the following terms: Total Emissive power, Monochromatic emissive power and White body. PO: 1,4/CO: 3,6,7
- Q15. Discuss the concept of black body. Also write down the properties of a black body. PO: 1,4/CO: 3,6,7
- Q16. What do you understand by recuperators? Explain with examples. PO: 1,3,4/CO: 1,3,6

Section C (Attempt any 2) (15 Marks Each)

- Q17. What do understand by heat exchanger? Explain the parallel and counter flow heat exchanger with neat diagram? PO: 1,4/CO: 3,5
- Q18. What is critical thickness of insulation? Derive the expression for the critical thickness of insulation in case of sphere. PO: 1,3,4/CO: 1,3,7
- Q19. A surface having an area of 1.5 m^2 and maintained at 300 C exchanges heat by radiation with another surface at 40 C. The value of shape factor is 0.52. Calculate (a) heat lost by radiation (b) the value of thermal resistance (c) the value of equivalent convection coefficient PO: 1,4/CO: 3,5
- Q20. Write short notes on (a) logarithmic mean temperature difference (b) Convective heat transfer coefficient and overall heat transfer coefficient PO: 2,4/CO: 2,5