SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai
Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &
Accredited by NBA (B.E - CSE, EEE, ECE, Mech&B.Tech.IT)
COIMBATORE-641 035, TAMIL NADU

Reg. No: | | | | | | | | | | | | |

A

B.E/B.Tech- Internal Assessment – II
Academic Year 2024-2025 (ODD Semester)
Fifth Semester
Aerospace Engineering
19ASE304 – Heat Transfer

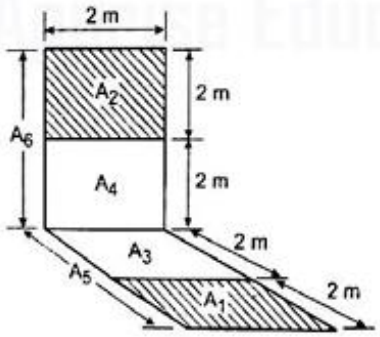
Time: 1 ½ Hours **Maximum Marks: 50**

Answer All Questions

		CO	Blooms
1.	Define forced convection.	CO2	Und
2.	How does turbulent flow differ from laminar flow in terms of velocity profiles?	CO2	Ana
3.	Give the merits of dropwise condensation.	CO3	Und
4.	What is meant recuperators in radiation?	CO3	Rem
5.	How does radiation heat exchange occur between grey surfaces? Mention the role of emissivity in this process.	CO3	Ana

PART – B (2*13=26 Marks) & (1*14=14 Marks)

				CO	Blooms
6.	(a)	A vertical plate of 0.75m height is at 170^0C and is exposed to air at a temperature of 105^0C and 1 atmosphere. Calculate (i) Mean heat transfer coefficient (ii) Rate of heat transfer per unit width of the plate.	13	CO2	App
		(or)			
	(b)	Briefly explain in detail about the concept of Heat exchangers.	13	CO2	Rem
7.	(a)	A block body at 3000K emits radiation. Calculate the following (i) Monochromatic emissive power at 1 x 10^{-6}m (ii) Wave length at which emission is maximum (iii) Maximum emissive power (iv)Total emissive power.	13	CO3	App
		(or)			
	(b)	Find the shape factor F_{1-2} for the figure shown below.	13	CO3	Eva



8.	(a)	In a case study give the implications of heat transfer on the performance of the thermal imaging camera and suggest design modifications to improve heat dissipation.	14	CO2	Cre
		(or)			
	(b)	An aerospace industrial facility uses large grey surfaces for its heating system, which involves radiative heat exchange between different surfaces. Define the concept of radiation heat exchange between grey surfaces and how it differs from black body radiation.	14	CO3	Cre

Bloom's Taxonomy:

REM – Remember **UND** – Understand **APP**– Apply **ANA**– Analyze **EVA -** Evaluate

CRT - Create

Faculty in-charge **Teaching Coordinator** **HoD/Aerospace**

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B

B.E/B.Tech- Internal Assessment – II
Academic Year 2024-2025 (ODD Semester)
Fifth Semester
Aerospace Engineering
19ASE304 – Heat Transfer

Time: 1 ½ Hours **Maximum Marks: 50**

Answer All Questions

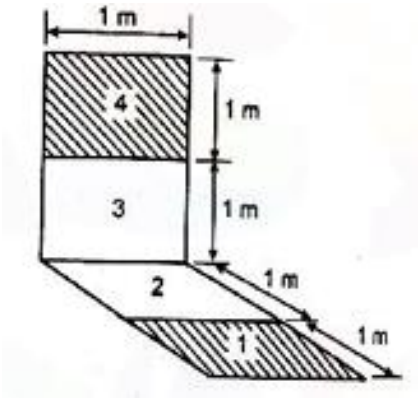
			CO	Blooms
1.	Define the Logarithmic Mean Temperature Difference (LMTD) and its application in heat exchangers.		CO2	Und
2.	Why overall heat transfer coefficient is important in heat transfer analysis?		CO2	Rem
3.	What is the shape factor?		CO3	Rem
4.	List out the electrical network analogy application in thermal radiation systems.		CO3	Und
5.	Write down the Planck's Law equation of black body radiation.		CO3	App

PART – B (2*13=26 Marks) & (1*14=14 Marks)

				CO	Blooms
6.	(a)	A plate of 6cm x 8cm x 14cm size maintained at temperature of 60^0C and heat lost to the air at 0^0C. The vertical dimension is 14cm. Determine heat transfer coefficient.	14	CO2	App
		(or)			
	(b)	A vertical plate of 0.7m wide and 1.2m height maintained at a temperature of 90^0C in a room at 30^0C. Calculate the convective heat loss.	13	CO2	App
7.	(a)	Emissivities of two large parallel plates maintained at 800^0C and 300^0C are 0.3 and 0.5 respectively. Find net radiant heat exchange per square meter for these plates. Find the percentage reduction in heat transfer when a polish aluminium radiation shield of emissivity 0.06 is placed between them. Also find the temperature of the shield.	13	CO3	App

(or)

(b) Find the shape factor F_{1-4} for the figure shown below.



13 CO3 Eva

8. (a) Imagine you are an engineer at a major aerospace company tasked with improving the thermal efficiency and lifespan of gas turbine blades used in jet engines. Analyze the advantages and disadvantages of each cooling method in terms of thermal efficiency, manufacturing complexity, and weight considerations. 14 CO2 Cre

(or)

(b) A researcher is studying the thermal radiation properties of a newly designed spacecraft. The spacecraft's surface is modeled as a black body to simplify calculations. Explain the concept of a black body and its significance in thermal radiation analysis. 14 CO3 Cre

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