Enrolment No/Seat No.: _____

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT

(An Autonomous Institute U/s UGC Act 1956)

B.Voc. SEMESTER-III, SEMESTER END EXAMINATION – WINTER 2025

SUBJECT CODE: 1IC302 **DATE: 18-12-2025**

SUBJECT NAME: UNIT OPERATIONS-2 (HEAT TRANSFER)

TIME: 11:00 AM to 01:00 PM **TOTAL MARKS: 50**

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Attempt all questions in the question paper.
3. The figures to the right of each question indicate full marks. Make suitable assumptions with proper justification wherever required.
4. Simple, non-programmable scientific calculators are permitted.
5. BL - Cognitive Level (As per Revised Bloom's Taxonomy) (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

			Marks	BL	CO
Q.1	**(a)**	Explain Fourier's law of heat conduction.	**05**	**U**	**1**
	(b)	Explain insulation and its types.	**05**	**U**	**1**
Q.2	**(a)**	Define: (i) Convection (ii) Sensible heat (iii) Fouling factor (iv) Nusselt number (Nu) (v) Grashof number (Gr).	**05**	**R**	**2**
	(b)	Explain Wilson plot.	**05**	**U**	**2**
		OR			
Q.2	**(a)**	Define: (i) Condensation (ii) Latent heat (iii) Convective heat transfer coefficient (iv) Prandtl number (Pr) (v) Pool boiling.	**05**	**R**	**2**
	(b)	Explain drop wise and film wise condensation.	**05**	**U**	**2**
Q.3	**(a)**	Analyze the Kirchhoff's law governing thermal radiation.	**05**	**N**	**3**
	(b)	Explain the concept of black and grey body.	**05**	**U**	**3**
		OR			
Q.3	**(a)**	Analyze the Stefan-Boltzmann law governing thermal radiation.	**05**	**N**	**3**
	(b)	Explain absorptivity and reflectivity.	**05**	**U**	**3**
Q.4	**(a)**	Classify heat exchangers according to transfer processes.	**05**	**N**	**4**

	(b)	Write the applications of heat exchangers.	**05**	**A**	**4**

OR

Q.4	**(a)**	Analyze the causes of fouling in a heat exchanger and write the prevention method of fouling.	**05**	**N**	**4**
	(b)	Write the applications of condenser and reboiler.	**05**	**A**	**4**
Q.5	**(a)**	Define evaporation and state the principle of evaporation.	**05**	**R**	**5**
	(b)	Write the applications of natural circulation evaporator and explain its construction and operation.	**05**	**A**	**5**

OR

Q.5	**(a)**	What is capacity and economy of evaporator?	**05**	**R**	**5**
	(b)	Write the applications of calendria evaporator and explain its construction and operation.	**05**	**A**	**5**

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