



# MARRI LAXMAN REDDY

## INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi &amp; Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade &amp; Recognized Under Section 2(f) &amp; 12(B) of the UGC act, 1956

II B.Tech I Sem Supplementary Examination, February-2022

**Thermodynamics**

(MECHANICAL)

**Time: 3 Hours.****Max. Marks: 70**

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

- |   |   |     |     |    |
|---|---|-----|-----|----|
| 1 | a) Describe various types of system with suitable examples.   | 7M  | C01 | BL |
|   | b) What do you mean by Thermodynamic Equilibrium? Explain.  | 7M  | C01 | BL |
| 2 | How do you differentiate path function and point function. Explain in detail.                             | 14M | C01 | BL |
| 3 | a) What is Carnot cycle? Draw p-v and T-s plots. Explain various processes.                               | 7M  | C02 | BL |
|   | b) Write a note on Third law of Thermodynamics.   | 7M  | C02 | BL |
| 4 | Derive Maxwells Relations.  | 14M | C02 | BL |
| 5 | a) How do measure dryness fraction with throttling calorimeter? Explain with the help of suitable sketch. | 7M  | C03 | BL |
|   | b) Derive $pv^{\gamma}=c$   | 7M  | C03 | BL |

Find the enthalpy and entropy of steam when the pressure is 2 MPa and the specific volume is  $0.09 \text{ m}^3/\text{kg}$ .

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|---|---|-----|-----|----|
| 6 | Properties of steam at 2 Mpa are, Saturation Temperature= $212.4^{\circ}\text{C}$ ,<br>Specific Volume $v_f=0.001177 \text{ m}^3/\text{kg}$ $v_g=0.09955 \text{ m}^3/\text{kg}$<br>Specific Enthalpy $h_f=908.5 \text{ kJ/kg}$ $h_g=2797.2 \text{ kJ/kg}$<br>Specific Entropy $s_f=2.447 \text{ kJ/kg-K}$ $s_g=6.337 \text{ kJ/kg-K}$ | 14M | C03 | BL |
| 7 | a) Explain in detail about Dalton's Law of partial pressure and Avogadro's Laws of additive volumes.  | 7M  | C04 | BL |
|   | b) Define the terms Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Specific Humidity, Relative Humidity, saturated Air and Degree of saturation.  | 7M  | C04 | BL |
| 8 | Draw lay out and suitable property plots for Rankine cycle and explain in detail.   | 14M | C05 | BL |