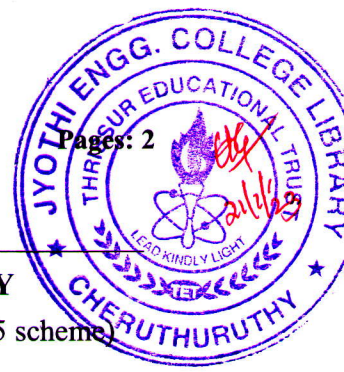


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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree (S,FE) Examination January 2023 (2015 scheme)

Course Code: MR307

Course Name: THERMODYNAMICS

Max. Marks: 100

Duration: 3 Hours

(Use of Psychrometric chart permitted)

PART A

Answer all questions. Each question carries 5 marks

- | | | |
|---|--|---|
| 1 | Discuss about Thermodynamic equilibrium. | 5 |
| 2 | Illustrate free expansion with an example. | 5 |
| 3 | What is a Carnot cycle and explain its four processes. | 5 |
| 4 | Derive Clausius inequality. | 5 |
| 5 | Write a short note on inversion curve. | 5 |
| 6 | State Third law of thermodynamics. | 5 |
| 7 | What is meant by specific humidity and relative humidity | 5 |
| 8 | Distinguish between DBT and WBT. | 5 |

PART B

Answer any three questions. Each question carries 10 marks

- | | | |
|----|--|---|
| 9 | a) Give a comparison between microscopic and macroscopic approach. | 6 |
| | b) Define the term Continuum concept. | 4 |
| 10 | a) Write a short note on Zeroth law of thermodynamics and its application. | 4 |
| | b) Define path function and point function with an example | 6 |
| 11 | a) State second law of thermodynamics with an example. | 6 |
| | b) Elucidate in detail about PMM2. | 4 |
| 12 | a) Illustrate the working of a refrigerator with neat figure | 5 |
| | b) Explain the working of a heat pump with neat figure | 5 |
| 13 | a) What is meant by dead state and availability | 5 |
| | b) List out the different types of irreversibility | 5 |

PART C

Answer any two questions. Each question carries 15 marks

- | | | |
|----|--|----|
| 14 | a) Derive an expression for Maxwell's equations | 5 |
| | b) Derive an expression for first and second Tds equations | 10 |

- 15 a) Explain Joule Kelvin effect plot T-P curve showing cooling and heating zones 10
b) Discuss about Throttling process 5
- 16 200 m³ of air per minute at 15°C DBT and 75% RH is heated until its temperature is 25 °C. 15
Find
i)RH of heated air
ii)WBT of heated air
iii)Heat added to air per minute
- 17 a) Write a short note on dew point temperature 5
b) An air-water vapour mixture enters an adiabatic saturator at 30°C and leaves at 20°C, which is the adiabatic saturation temperature. The pressure remains constant at 100 kPa. Determine the relative humidity and the humidity ratio of the inlet mixture 10
