

Reg No.: _____

Name: _____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
V SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019**

Course Code: MR307

Course Name: THERMODYNAMICS

Max. Marks: 100

(Use of Psychrometric chart
permitted)

Duration: 3 Hours

PART A

Answer all questions. Each question carries 5 marks

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|---|---|---|
| 1 | Explain the concept of continuum | 5 |
| 2 | Why does free expansion have zero work transfer? | |
| 3 | A carnot engine absorbs 200J of heat from a reservoir at the temperature of the normal boiling point of water and rejects heat to a reservoir at the temperature of the triple point of water (273.15K). Find the heat rejected, the work done by the engine and the thermal efficiency | 5 |
| 4 | Explain the inequality of clausius | 5 |
| 5 | Derive Clausius – Clapeyron equation | 5 |
| 6 | State and explain third law of thermodynamics | 5 |
| 7 | What is meant by specific humidity, relative humidity and degree of saturation? | 5 |
| 8 | Define DPT and WBT | 5 |

PART B

Answer any three questions. Each question carries 10 marks

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|----|--|----|
| 9 | a) Explain different types of system | 5 |
| | b) What is meant by control volume | 5 |
| 10 | State first law of thermodynamics. Explain with Joule's experiment | 10 |
| 11 | Explain Carnot cycle and elucidate the four processes that are associated with the cycle | 10 |
| 12 | a) What is PMM2? Why it is impossible? | 5 |

- b) Elaborate second law of thermodynamics 5
- 13 Explain entropy principle with suitable application 10

PART C

Answer any two questions. Each question carries 15 marks

- 14 a) What is meant by throttling process? 5
- b) Explain Joule-Kelvin effect and plot the T-P curve showing the important regions. 10
- 15 a) Derive Maxwell equation. 10
- b) Derive TdS equations 5
- 16 a) A sleeve psychro meter reads 40°C DBT and 28°C WBT. Assuming the barometric pressure as 1.01325 bar. Determine 15
- a) Specific humidity
 - b) Relative humidity
 - c) Partial pressure of water vapour
 - d) Vapour density in air
 - e) DPT
 - f) Enthalpy of mixture per kg of dry air.
- 17 a) In a laboratory test, a sling psychrometer recorded DBT and WBT as 30°C and 25°C respectively. Calculate 15
- a) Vapour pressure
 - b) Relative humidity
 - c) Specific humidity
 - d) Dew point temperature
 - e) Enthalpy of mixture.