

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B Tech II Year II Semeste Supplementary Examinations May/June-2024**  
**ENGINEERING THERMODYNAMICS**

(Mechanical Engineering)

**Time: 3 Hours**

**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 1 | a Describe thermodynamic control volume.                       | CO1 | L1 | 6M |
|   | b Define Heat, Temperature and concept of thermal Equilibrium. | CO1 | L2 | 6M |

OR

- |   |   |     |    |    |
|---|---|-----|----|----|
| 2 | a Classify the differences between heat and work transfers. | CO1 | L4 | 6M |
|   | b Show that work is a path function and not a property.     | CO1 | L2 | 6M |

**UNIT-II**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 3 | a What are the limitations of the First law of Thermodynamics? | CO1 | L1 | 6M |
|   | b Gives an expression for entropy changes for open systems.    | CO2 | L3 | 6M |

OR

- |   |   |     |    |    |
|---|---|-----|----|----|
| 4 | a Define Statements of second law of thermodynamics<br>i) Clausius statement ii) Kelvin-plank statement . | CO2 | L1 | 6M |
|   | b Explain reversibility and irreversibility. List examples  | CO2 | L2 | 6M |

**UNIT-III**

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|---|--|-----|----|----|
| 5 | a Derive the equation for work done in a reversible adiabatic process. | CO3 | L1 | 6M |
|   | b How the partial pressure in gas mixture related to mole fraction?    | CO3 | L4 | 6M |

OR

- |   |  |     |    |    |
|---|--|-----|----|----|
| 6 | a What is a polytropic process? Write the work done formula.   | CO3 | L1 | 6M |
|   | b 90 kJ of heat are supplied to a system at a constant volume. The system rejects 95 kJ of heat at constant pressure and 18 kJ of work is done on it. The system is brought to original state by adiabatic process. Determine :<br>(i) The adiabatic work ; (ii) The values of internal energy at all end states if initial value is 105 kJ. | CO3 | L5 | 6M |

**UNIT-IV**

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|---|--|-----|----|----|
| 7 | a Find the saturation temperature change in specific volume and entropy during evaporation and latent heat of vaporization of steam at 1Mpa 380 <sup>o</sup> C | CO4 | L1 | 6M |
|   | b Recall a short note on dryness fraction.   | CO4 | L1 | 6M |

OR

- |   |  |     |    |    |
|---|--|-----|----|----|
| 8 | a Differentiate between Otto cycle, diesel cycle.            | CO4 | L2 | 6M |
|   | b Show the enthalpy, entropy and volume of steam at 1.4 MPa. | CO4 | L2 | 6M |

**UNIT-V**

- |    |  |     |    |     |
|----|--|-----|----|-----|
| 9  | Explain the Rankine cycle with PV and TS diagrams.                                     | CO5 | L2 | 12M |
|    | OR   |     |    |     |
| 10 | List the advantages and disadvantages of Regenerative cycle over Simple Rankine cycle. | CO5 | L1 | 12M |

\*\*\* END \*\*\*

