

Reg. No: 

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

**B.Tech I Year I Semester Regular & Supplementary Examinations March-2023**

**THERMAL FLUID ENGINEERING**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 1 | a Explain the concept of pumped storage power plants.      | CO1 | L2 | 6M |
|   | b What is thermodynamic equilibrium? Explain it in detail. | CO2 | L1 | 6M |

OR

- |   |  |     |    |    |
|---|--|-----|----|----|
| 2 | a Explain different types of thermodynamic systems.  | CO2 | L2 | 6M |
|   | b Define the following properties of the system with units.                                | CO2 | L1 | 6M |
|   | i) Pressure                      ii) Internal energy                      iii) Temperature |     |    |    |

**UNIT-II**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 3 | a Short notes on<br>i) Stop valve ii) safety valve   | CO2 | L1 | 6M |
|   | b What is the difference between super heater and air pre heater? Explain in detail with diagrams. | CO2 | L2 | 6M |

OR

- |   |  |     |    |    |
|---|--|-----|----|----|
| 4 | a Explain the following terms relating to steam formation:<br>(i) Enthalpy of wet steam (ii) Entropy of Steam (iii) Sensible heat of water | CO2 | L2 | 6M |
|   | b Write short notes on Pressure gauge.   | CO3 | L2 | 6M |

**UNIT-III**

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|---|--|-----|----|----|
| 5 | a Write a short note on Vapour Pressure, surface tension and capillarity.  | CO5 | L2 | 6M |
|   | b The capillary rise in the glass tube is not to exceed 0.2mm of water. Determine its minimum size, given that surface tension for water in contact with air = 0.0725 N/m. | CO5 | L2 | 6M |

OR

- |   |   |     |    |    |
|---|---|-----|----|----|
| 6 | a Define compressibility and specific weight and write their units.   | CO4 | L1 | 6M |
|   | b Derive an expression for surface tension inside the liquid droplet. | CO5 | L2 | 6M |

**UNIT-IV**

- |   |   |     |    |    |
|---|---|-----|----|----|
| 7 | a Derive the expression for loss of head due to sudden contraction. | CO5 | L3 | 6M |
|   | b List out types of flows and explain it.                           | CO4 | L1 | 6M |

OR

- |   |  |     |    |    |
|---|--|-----|----|----|
| 8 | a Derive an expression for force exerted by a fluid flow on bend pipe. | CO5 | L2 | 6M |
|   | b Explain about Energy gradient line                                   | CO6 | L2 | 6M |

**UNIT-V**

- |   |  |     |    |    |
|---|--|-----|----|----|
| 9 | a Define the terms<br>i) Fluid jet                      ii) Impact of jets.  | CO5 | L1 | 6M |
|   | b A jet of water 50mm strikes a flat stationary plate normally with a velocity of 30 m/s. Find the force experienced by the plate. | CO5 | L3 | 6M |

OR

- |    |   |     |    |    |
|----|---|-----|----|----|
| 10 | a Derive an expression for the hydraulic efficiency when a liquid jet strikes a single fixed curved vane. | CO5 | L3 | 6M |
|    | b Derive an expression for the force exerted by a jet on fixed vertical flat plate.                       | CO5 | L3 | 6M |

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