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

B.Tech II Year II Semester Supplementary Examinations July-2021

THERMODYNAMICS & HEAT ENGINES

(Agricultural Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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|---|---|--|----|
| 1 | a | Define Cyclic process. | 2M |
| | b | What is First law Thermodynamic. | 2M |
| | c | State work done. | 2M |
| | d | Specify Enthalpy of super-heated steam. | 2M |
| | e | Write short note on Supercharged boiler. | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|---|--|----|
| 2 | a | Explain about Thermodynamic Equilibrium. | 5M |
| | b | What is the difference between a closed system and an open system? | 5M |

OR

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|---|---|--|----|
| 3 | a | State the differences between heat and work. | 5M |
| | b | Explain the following | 5M |
| | | i) Enthalpy ii) Internal Energy iii) Specific heat iv) Thermodynamic cycle | |

UNIT-II

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|---|---|--|----|
| 4 | a | What is Steady Flow Process? Derive SFEE for any one engineering system. | 5M |
| | b | The enthalpy of a steam 3015.6 KJ/Kg enters a nozzle and leaves with an enthalpy of 2819.8 KJ/Kg. Calculate the velocity of steam at the exit, if the velocity of steam at the entry is 50 m/sec | 5M |

OR

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|---|---|--|----|
| 5 | a | What are the different modes in which energy is stored in a system? | 5M |
| | b | The system contains piston and cylinder is subjected to a process, such that its volume increases from 0.004 m ³ to 0.034 m ³ at constant pressure of 750KN/m ² . The heat supplied through the walls of cylinder the process is 8 KJ. Calculate the change in internal energy of the system. | 5M |

UNIT-III

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|---|---|--|----|
| 6 | a | What is the gas equation of ideal gas? | 5M |
| | b | Sketch the following processes on P-V and T-S diagrams (i) constant volume (ii) Constant pressure (iii) constant temperature (iv) isentropic process (v) polytropic process. | 5M |

OR

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|---|---|--|----|
| 7 | a | Draw P-V and T-S diagrams on Isochoric process and Isobaric process with derive the (i) work done (ii) heat transfer (iii) internal energy. | 6M |
| | b | Determine the final temperature, external work done, change in internal energy, in the case of 2 kg of gas at 200 c being heated at constant volume until the pressure is doubled. | 4M |

UNIT-IV

- 8 a An engine working on the otto cycle is supplied with air at 0.1 MPa ,350C .the compression ratio is 8.the heat supplied is 2100 kJ/kg .calculate the Maximum pressure and temperature of the cycle ,the cycle efficiency and the mean effective pressure.(for air $C_p=1.005\text{kJ/kg.k}$, $C_v = 0.717 \text{ kJ/kgk}$, and $R=0.287 \text{ kJ/kgk}$) **6M**
- b Derive an expression for the thermal efficiency of Diesel cycle and draw P-V & T-S diagrams. **4M**

OR

- 9 a Explain the P-V, P-T, T-S diagrams of Pure Substances. **5M**
- b A power plant operating between 30 bars and 0.02 bars. If the steam supplied is 350 o C and the cycle of operation is Rankine, Find (i) cycle efficiency, (ii) change in enthalpy **5M**

UNIT-V

- 10 a Explain with neat sketch of Water Tube boiler- Babcock and Wilcox Boiler **5M**
- b What are the advantages of artificial draughts over the natural draught? **5M**

OR

- 11 a Enumerate the factors that should be considered while selecting a boiler. **5M**
- b Explain the terms with neat sketch.
(i) Fusible plug, (ii) feed check valve, (iii) Water level Indicator, **5M**

END