

Reg. No: 

--	--	--	--	--	--	--	--	--	--

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

**B.Tech II Year I Semester Supplementary Examinations August-2021**

**ENGINEERING THERMODYNAMICS**

(Agricultural Engineering)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- 1 a Explain about Thermodynamic Equilibrium? 6M  
 b State the following 6M  
 i) Pressure ii) Temperature iii) volume iv) Density

**OR**

- 2 a What do mean by property"? Distinguish between intensive and extensive? 6M  
 b Show that heat and work is a path function and not a property of the system? 6M

**UNIT-II**

- 3 a In a cycle which has five processes, the following are the heat transfers at five points.  $Q_1 = 50\text{KJ}$ ,  $Q_2 = 85\text{KJ}$ ,  $Q_3 = -30\text{KJ}$ ,  $Q_4 = -70\text{KJ}$  and  $Q_5 = 135\text{KJ}$ , the work transfers are  $W_1 = 60\text{KJ}$ ,  $W_2 = -40\text{KJ}$ ,  $W_3 = 35\text{KJ}$ ,  $W_4 = -20\text{KJ}$  and  $W_5 = ?$  Find out the work transfer at the fifth point. 6M  
 b What are the Limitations of First laws of thermodynamics? 6M

**OR**

- 4 a State the concept of entropy of gas and availability and unavailability? 8M  
 b The system contains piston and cylinder is subjected to a process, such that its volume increases from  $0.004\text{ m}^3$  to  $0.034\text{ m}^3$  at constant pressure of  $750\text{KN/m}^2$ . The heat supplied through the walls of cylinder the process is  $8\text{ KJ}$ . Calculate the change in internal energy of the system. 4M

**UNIT-III**

- 5 a Explain the differences between isothermal and adiabatic processes? 6M  
 b Determine the i) final temperature, ii) external work done and iii) change in internal energy, in the case of  $2\text{ kg}$  of gas at  $20^\circ\text{C}$  being heated at constant volume until the pressure is doubled. 6M

**OR**

- 6 a Derive an expression for work done during polytropic process? 7M  
 b Explain the Specific heat capacities ( $C_p$  &  $C_v$ )? 5M

**UNIT-IV**

- 7 a Derive an expression for the thermal efficiency and mean effective pressure of an Otto cycle by cycle by drawing PV and TS diagrams? 6M  
 b Explain the P-V, P-T, T-S diagrams of Pure Substances? 6M

OR

- 8 a State the followings 6M  
 i) Mollier Diagram ii) Dryness Fraction  
 b Find the change in enthalpy steam, initial pressure 15 bar and 0.95 then it will reach 6M  
 25 bar and 400 temperature. By using mollier diagram.

**UNIT-V**

- 9 a A steam power plant operates on a theoretical reheat cycle. Steam at boiler at 550°C, 8M  
 150 bar expands through the high pressure turbine. It is reheated at a constant  
 pressure of 40bar to 550°C and expands through the low pressure turbine to a  
 condenser at 0.1bar. Draw T-S and h-s diagrams. Find i) Quality of steam at turbine  
 exhaust ii) Cycle Efficiency iii) Steam rate in Kg/ Kw-hr.  
 b Write the followings i) Enthalpy of Wet steam ii) Enthalpy of Dry steam iii) 4M  
 Enthalpy of super-heated steam

OR

- 10 a State the methods of increasing the thermal efficiency of Rankine cycle? 6M  
 b Explain with the help of neat diagram about Regenerative Cycle? 6M

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