Q.P. Code: 16ME307 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations Nov/Dec 2019

ENGINEERING THERMODYNAMICS

(Agricultural Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	**a**	Discuss the macroscopic and microscopic point of view of thermodynamics	**6M**
	b	Differentiate between the cyclic process and non-cyclic process.	**6M**
		OR	
2	**a**	What is quasi static process? What are its characteristics features?	**6M**
	b	What do mean by property"? Distinguish between intensive and extensive.	**6M**
		UNIT-II	
3	**a**	Derive Steady Flow Energy Equation for Turbine	**6M**
	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.	**6M**
		OR	
4	**a**	State first law of thermodynamics. Prove that internal energy is a property of the system.	**6M**
	b	A turbine operates under steady flow conditions, receiving the steam having an enthalpy of 2786 KJ/Kg and leaves with an enthalpy of 2513 KJ/Kg. Heat is lost to the surroundings at the rate of 5.30 KJ/sec. If the rate of steam flows though the turbine is 0.40Kg/sec. Find the power output of the turbine.	**6M**
		UNIT-III	
5	**a**	What are the limitations of the First law of Thermodynamics?	**6M**
	b	A reversible power cycle is used to drive a reversible heat pump cycle. The power cycle takes in $Q1$ heat units at $T1$ and rejects $Q2$ at $T2$. The heat pump abstracts $Q4$ from the sink at $T4$ and discharges $Q3$ at $T3$. Develop an expression for the ratio $Q4/Q1$ in terms of the four temperatures.	**6M**
		OR	
6		A copper rod is of length 1 m and diameter 0.01m. One end of the rod is at 100 0C, and the other at 0 0C. The rod is perfectly insulated along its length and the thermal conductivity of copper is 380 W/mK. Calculate the rate of heat transfer along the rod and the rate of entropy production due to irreversibility of this heat transfer.	**12M**
		UNIT-IV	
7	**a**	What is the gas equation of ideal gas?	**6M**
	b	What is Avogadro's law?	**6M**
		OR	
8		A cylinder Tank containing 4 kg of carbon monoxide gas at -500C has internal diameter of 0.2m and length of 1m.Determine the pressure exerted by the gas using (a) The generalize compressibility chart (b) The ideal gas of equation of state (c) Vander Walls equation of state.	**12M**

UNIT-V

9 Write down first and second Tds equations. And derive the expression for the difference in heat capacities Cp and Cv. What does the expression signify? **12M**

OR

10 In an air standard diesel cycle, the compression ratio is 16, and at the begging of isentropic compression, the temperature is 15 0C and the pressure is 0.1 MPa. Heat is added until the temperature at the end of constant pressure process is 1480 0C. Calculate (a) The Cut-off ratio (b) The heat supplied per kg of air(c) The cycle efficiency (d) the mean effective pressure. **12M**

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