Q.P. Code: 18ME0309 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Regular Examinations October-2020

THERMODYNAMICS

(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

PART-A

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

1	**a**	Explain the term "System".	**2M**
	b	Define the term Entropy.	**2M**
	c	What is Boltzmann constant?	**2M**
	d	What are cyclic and non-cyclic heat engine?	**2M**
	e	Define the term availability.	**2M**

PART-B

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

UNIT-I

2	**a**	What do you understand by path function and point function? What are the exact and inexact differentials?	**5M**
	b	Show that work is a path function and not a property.	**5M**

OR

3	**a**	Classify the differences between heat and work transfers.	**5M**
	b	Explain about Heat transfer.	**5M**

UNIT-II

4	**a**	Explain zeroth law of thermodynamics.	**5M**
	b	Define Heat, Temperature and concept of thermal Equilibrium.	**5M**

OR

5	**a**	Define first law of thermodynamics. Justify that internal energy is a property of the system.	**5M**
	b	A Stationary mass of gas is compressed without friction from an initial state of 0.3 m^3 and 0.105 Mpa to a final state of 0.15 m^3 and 0.105 Mpa, the pressure remaining constant during the process. There is a transfer of 37.6 KJ of heat from the gas during the process. How much does the internal energy of the gas change?	**5M**

UNIT-III

6	**a**	State and Explain Dalton law of partial pressure.	**5M**
	b	How the partial pressure in gas mixture related to mole fraction?	**5M**

OR

7		A cylinder contains a 0.45m^3 of gas at 1x10^5 N/m^2 and 80^{0}C. The gas is compressed to volume of 0.13 m^3 the final pressure being 5x10^5 N/m^2 Determine: i) The mass of gas ii) the value of index 'n' for compression iii) The increase in internal energy of the gas. iv) The heat received or rejected by the gas during the compression. Take γ=1.4, R=294.2 J/kg^{0}C.	**10M**

UNIT-IV

8	**a**	Develop an expression for Carnot Cycle and efficiency of cycle.	**5M**
	b	A carnot engine working between 400^0 C and 40^0 C produce 130 KJ of work. Determine: i) The thermal efficiency. ii) the heat added iii) The entropy changes during the heat rejection process.	**5M**

OR

9		Develop the expression for air standard efficiency, work done of an otto cycle.	**10M**

UNIT-V

10	**a**	Classify Boilers.	**5M**
	b	Give the comparison between fire tube and water tube boilers.	**5M**

OR

11		Explain with neat sketches of the following boiler mountings i) Water level Indicator ii) pressure gauge	**10M**

END