R18

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations February-2022
THERMODYNAMICS
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 60

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

1	a	What is meant by thermodynamics equilibrium?	2M
	b	State First law of Thermodynamics	2M
	c	Define an Ideal gas	2M
	d	What do you understand triple point?	2M
	e	Write about the term availability	2M

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

UNIT-I

2	a	List the difference between a closed system and an open system	5M
	b	What do mean by property? Distinguish between intensive and extensive properties.	5M

OR

3	Classify different work transfers. Explain any three types.	10M

UNIT-II

4	a	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
	b	A heat engine receives heat at the rate of 1500 KJ/min and gives an output of 8.2 kW. Determine i) The thermal efficiency ii) The rate of heat rejection.	5M

OR

5	What is Steady Flow Process? Derive SFEE for anyone engineering system.	10M

UNIT-III

6	a	A fluid is having a temperature of 150°C and a specific volume of 0.96 m^3/kg. Find for 1 kg of fluid, the work, heat transferred and final temperature if i) the fluid is air ii) the fluid is steam.	5M
	b	State and Explain Dalton law of partial pressure.	5M

OR

7	A cylinder contains a 0.45m^3 of gas at 1x105 N/m^2 and 80°C. The gas is compressed to volume of 0.13 m^3 the final pressure being 5x105 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 $\gamma=1.4$, R=294.2 J/kgK.	10M

UNIT-IV

3	Derive the expression for air standard efficiency, work done of an otto cycle.	10M

OR

9	The swept volume of a diesel engine working on dual cycle is 0.0053m^3. The maximum pressure is 65 bar. Fuel injection end at 5% of stroke. The temperature and pressure at the stroke of compression are 80°C and 0.9 bar. Determine efficiency of air take $\gamma=1.4$.	10M

UNIT-V

10 Explain with neat sketch the construction and working of following high pressure boiler i) lamont boiler   ii) Benson Boiler   **10M**

OR

11 Explain with neat sketch of super Air preheater in boiler accessories.   **10M**

END