Q.P. Code: 19ME0361 **R19**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

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

THERMAL & FLUID ENGINEERING

(Electrical and Electronics Engineering)

Note: Use of Steam table is permitted.

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	a	Explain the factors to be considered for selection of site for steam power plant	6M
	b	What are the different types of feed water treatments in thermal power plant and explain any one.	6M

OR

2	a	Explain important parts in thermal power plant.	6M
	b	Differentiate between the boiler and condenser.	6M

UNIT-II

3	a	What do you understand by path function and point function?	4M
	b	A closed system undergoes a thermodynamic cycle consisting of four separate and distinct processes. The heat and work transferred in each process are as tabulated below. Process Heat transfer in kJ/min Work done in kJ/min 1-2 20,000 0 2-3 -10,000 30,000 3-4 0 20,000 4-1 15,000 -25,000 Show that the data is consistent with the first law of thermodynamics. Also evaluate the network output in kW and the change in internal energy	8M

OR

4	a	What is meant by thermodynamics equilibrium? Explains it briefly.	6M
	b	State first law of thermodynamics. Prove that internal energy is a property of the system.	6M

UNIT-III

5	a	A steam power plant works between 40 bar and 0.05 bar. If the steam supplied is dry saturated and the cycle of operation is Rankine, Find (i) cycle efficiency, (ii) Specific steam consumption.	6M
	b	Draw the P-V and T-S diagrams of Rankine cycle and Carnot cycle.	6M

OR

6	a	Compare Rankine cycle and Carnot cycle.	4M
	b	A steam power plant is supplied with dry saturated steam at a pressure of 12 bar and exhausts into a condenser at 0.1 bar, Calculate the Rankine efficiency by using steam tables and Mollier chart.	8M

UNIT-IV

7	a	Define the following fluid properties: Density, weight density, specific volume and specific gravity of a fluid.	6M
	b	An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9 m × 0.9 m and an inclined plane having an angle of inclination 200. The weight of the square plate is 392.4 N and it slides down the plane with a uniform velocity of 0.2 m/s. Find the dynamic viscosity of the oil.	6M

OR

8	a	Explain the terms: (i) Path line (ii) Streak line (iii) Stream line, and (iv) Stream tube		6M
	b	If 5 m3 of certain oil weighs 50 kN, calculate specific weight, density and specific gravity of oil.		6M

UNIT-V

9	a	Define and explain the terms: (i) Hydraulic gradient line and (ii) Total energy line.		6M
	b	An orifice-meter with orifice diameter 15 cm is inserted in a pipe of 30 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter give readings of 14.715 N/cm2 and 9.81 N/cm2 respectively. Find the rate of flow of water through the pipe in liters/s. Take C = 0.6.		6M

OR

10	a	What is a venturimeter? Derive an expression for the discharge through a venturimeter.		6M
	b	A horizontal venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to inlet and throat is 10 cm of mercury. Determine the rate of flow. Take C = 0.98		6M

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