R18 Regulation *Subject code:2E6CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Supplementary Examinations, May 2025

THERMAL ENGINEERING - II

(ME)

Maximum Marks: 70 Date: 16.06.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Mention various processes in a Rankine Cycle	2M	1	L1
2	Mention various factors considered for the selection of Boilers	2M	1	L1
3	Describe various types of Steam nozzles	2M	2	L1
4	What is the stagnation temperature of steam nozzle	2M	2	L1
5	Draw the velocity tringle diagram for an Impulse turbine blades.	2M	3	L1
6	What is the pressure- velocity compounding	2M	3	L1
7	Classify the steam condenser	2M	4	L1
8	Define isentropic efficiency of a compressor and turbine	2M	4	L1
9	What are the advantages of a ramjet engine	2M	5	L1
10	Write the difference between a propeller engine and jet engine	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Difference between Carnot vapor power cycle and Rankine cycle?	10M	1	L2
	OR			
12	A simple Rankine cycle steam power plant operates between the temperatures of 260^0C and 95^0C. The steam is supplied to the turbine at a dry saturated condition. In the turbine it expands in an isentropic manner. Determine the efficiency of the Rankine cycle operating between these two temperature limits.	10M	1	L2
13	Derive an expression for the condition for maximum discharge through nozzle	10M	2	L2
	OR			
14	Calculate the critical pressure and throat area per unit mass flow rate of steam expanding through a convergent-divergent nozzle from 10bar, dry saturated down to atmospheric pressure of 1bar. Assume that the inlet velocity is negligible and that the expansion is isentropic.	10M	2	L2
15	What is the pressure-velocity compounding write its advantages?	10M	3	L2
	OR			

16	In a single stage impulse turbine the steam jet leaves the nozzle at 20^0 to the plane of the wheel at a speed of 670m/s and it enters the moving blades at an angle of 35^0 to the drum axis. The moving blades are symmetrical in shape. Determine the blade velocity and diagram efficiency	10M	3	L2
17	Define isothermal efficiency of the compressor and turbine	10M	4	L2
	OR			
18	A surface condenser is designed to handle 12000 kg of steam per hour. The steam enters at 8kpa, 0.9 dry. The condensate leaves the condenser at the corresponding saturation temperature. Calculate the rate of cooling water, if cooling water temperature rise is limited to 12^0C.	10M	4	L2
19	State the difference between air breathing and non air breathing propulsion systems	10M	5	L2
	OR			
20	The effective jet velocity from a rocket engine is 3000m/s. The forward velocity is 1500m/s and propellent consumption is 80kg/s. Calculate the thrust, thrust power, and propulsive efficiency.	10M	5	L2