R20 Regulation *Subject code: 3P5CC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, November 2025

THERMAL ENGINEERING-II

(ME)

Maximum Marks: 70 Date: 22.11.2025 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	Name the various types of nozzles and their function.	2M	1	L1
2	Define Diagram efficiency.	2M	1	L1
3	What is meant by Degree of Reaction?	2M	2	L1
4	Define isentropic efficiency of a compressor and turbine.	2M	2	L1
5	Mention the classification of Steam Turbines.	2M	3	L1
6	What is the working principle of an Impulse Turbine?	2M	3	L1
7	Write the classification of Gas Turbines.	2M	4	L1
8	What is the function of a Steam Condenser?	2M	4	L1
9	What is the working principle of Jet propulsion?	2M	5	L1
10	Define the power.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	A simple Rankin cycle works between pressures 28 bar and 0.006 bar, the initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio and specific steam consumption.	10M	1	L2
	OR			
12	Explain the working principle of Babcock and Wilcox boiler with neat sketch.	10M	1	L2
13	Derive Critical pressure ratio of nozzle and determine the maximum mass rate of flowthrough steam nozzle?	10M	2	L2
	OR			
14	Dry saturated steam enters a steam nozzle at a pressure of 15 bar and discharged at a pressure of 1 bar. If the dryness fraction of discharge steam is 0.96, what will be the final velocity of steam? Neglect initial velocity of steam. If 10% of heat drop is lost infraction, examine the percentage reduction in the final velocity.	10M	2	L2
15	The velocity of steam exiting the nozzle of the impulse stage of turbine is 400 m/s. The blades operate close to the maximum blading efficiency.	10M	3	L2

	The nozzle angle is 12°. Considering equiangular blades and ne glecting blade friction, calculate for a steam flow of 0.6 kg/s, the diagram power and the diagram efficiency.			
	OR			
16	What are the comparisons between jet condenser and surface condenser?	10M	3	L2
17	Explain in detail Gas turbine cycle, with regeneration, intercooling and reheating.	10M	4	L2
	OR			
18	Explain working principle the central flow surface condenser with neat sketch.	10M	4	L2
19	Describe the working of ramjet engine with a neat sketch. List out its advantages and disadvantages.	10M	5	L2
	OR			
20	The effective jet exit velocity of a rocket is 2500 m/s, the forward flight velocity is 1250 m/s, and the propellant consumption if 65 kg/s. Calculate: i) The thrust; ii) The thrust power and iii) The propulsive efficiency.	10M	5	L2

NOTE: STEAM TABELES ARE ALLOWED