R18 Regulation *Subject code: 2E6CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, July 2024

THERMAL ENGINEERING - II

(ME)

Maximum Marks: 70 Date:19.07.2024 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 which carries 10M.
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)		CO	Bloom Tx
1	Mention various processes in a Rankine Cycle.	1	L1
2	Mention various Boiler mountings.	1	L1
3	What is the function of a steam nozzle?	2	L1
4	What is the stagnation temperature of steam nozzle?	2	L1
5	Write the details of a simple impulse turbine?	3	L1
6	What is meant by Degree of Reaction.	3	L1
7	Define Vacuum efficiency.	4	L1
8	What do you mean by the term under cooling of condensate.	4	L1
9	What is the working principle of Jet propulsion?	5	L1
10	What is the working principle of Rocket?	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	With the help of P-V and T-S diagrams explain various processes of a Rankine Cycle. [10]	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. [10]	1	L4
13	Derive an expression for the condition for maximum discharge through nozzle. [10]	2	L4
	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. [10]	2	L4

15	Draw the velocity triangle diagram for an impulse turbine blades and derive the expressions for work done and axial thrust. [10]	3	L4
	OR		
16	A Parsons reaction turbine while running at 400rpm, consumes 30 tons of steam per hour. The steam at a certain stage is at 1.6bar, with dryness fraction of 0.9 and the stage develops 10kw. The axial velocity of flow is constant and equal to 0.75 of the blade velocity. Find mean diameter of the drum and the volume of steam flowing per second. Take blade tip angles at inlet and exit as 35^0 and 20^0respectively. [10]	3	L4
17	Explain with sketches different types of Surface condensers. [10]	4	L2
	OR		
18	The steam is supplied to a steam turbine at 30bar and 300^0C. The expansion of steam is carried out isentropically to a condenser vacuum of 713 mm of Hg. The barometer reads 758 mm of Hg. The condenser temperature is 20^0C and rise in. [10]	4	L4
19	What are the different methods used to improve efficiency of a gas turbine plant. Explain any one method with a neat sketch. [10]	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. [10]	5	L4