Regulation R18. *Subject code: 2E6CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, February 2024

THERMAL ENGINEERING - II

(Mechanical Engineering)

Maximum Marks: 70 Date:15.02.2024 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.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

Answer All the following questions. **(10X2M=20Marks)**

		CO	Blooms Tx
1	What are the methods used to improve cycle performance of a Rankine cycle	CO1	L1
2	What are the essential features of good steam boiler	CO1	L1
3	Describe various types of Steam nozzles	CO2	L1
4	What is meant by Wilson Line	CO2	L1
5	Mention the classification of Steam Turbines	CO3	L1
6	Explain the principle of working of an Impulse Turbine	CO3	L1
7	Write the function of a Steam Condenser	CO4	L1
8	Write the classification of Gas Turbines	CO4	L1
9	What is the working principle of Jet propulsion	CO5	L1
10	Briefly explain about the Thrust power	CO5	L2

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	CO1	L3

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	CO1	L3

13	Derive an expression for the mass of steam discharged through a Nozzle.	10	CO2	L3
	OR			
14	Dry saturated steam at a pressure of 15bar enters in a nozzle and is discharged at a pressure of 1.5bar. Find the final velocity of steam, when the initial velocity of the steam is negligible. If 10% of the heat drop is lost in over the blade due to friction, find the percentage reduction in the final velocity.	10	CO2	L3
15	Explain the principle of working of of an Impulse Turbine	10	CO3	L3
	OR			
16	The steam leaves the nozzle of a single row impulse turbine at 900m/s. The nozzle angle is 20^0 and blade angles are 30^0 at inlet and outlet. Calculate the blade velocity and work done per kg of steam. Assume the flow over the blade is frictionless.	10	CO3	L4
17	Explain with the help of a neat sketch the requirements of a Steam condensing plant	10	CO4	L3
	OR			
18	The data refers to a test of surface condenser of a steam turbine. Absolute pressure of the steam entering the condenser is 5.628kpa, temperature of condensate leaving the condenser is 32^0C, inlet temperature of cooling water is 15^0C, outlet temperature of cooling water is 30^0C and mass of cooling water per kg of steam is 32kg.Assuming that all the heat lost by the exhaust steam is taken up by the circulating water, determine the dryness fraction of the steam as it enters the condenser.	10	CO4	L4
19	Explain the differences between Gas turbine and Steam turbine.	10	CO5	L3
	OR			
20	A simple closed cycle gas turbine plant receives air at 1bar and 15^0C and compresses it to 5bar and then heats it to 800^0C in the heating chamber. The hot air expands in a turbine back to 1bar. Calculate the power developed per kg of air supplied per second. Take CP= 1kj/kg k.	10	CO5	L5