Regulation R18 *Subject code: 2E6CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, June/July 2023

THERMAL ENGINEERING - II

(Mechanical Engineering)

Maximum Marks: 70 Date:22.06.2023 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)

1 What are the methods used to improve cycle performance of a Rankine cycle?
2 What are the essential features of good steam boiler?
3 What is the function of a steam nozzle?
4 What is the stagnation temperature of steam nozzle?
5 Mention the classification of Steam Turbines.
6 Write the principle of working of an Impulse Turbine.
7 Write the function of a Steam Condenser.
8 Write the classification of Gas Turbines.
9 What is the working principle of Jet propulsion?
10 Write about the Thrust power.

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

OR

12 Calculate the height of chimney required to produce a draught equivalent to 1.7cm of water if the flue gas temperature is 270^0C and ambient temperature is 22^0C and minimum amount of air per kg of fuel is 17kg. 10

13 Derive an expression for the mass of steam discharged through a Nozzle. 10

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 friction, find the percentage reduction in the final velocity. 10

15	Draw the velocity triangle diagram for an impulse turbine blades and derive the expressions for work done and axial thrust	10
	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
17	Explain with the help of a neat sketch the requirements of a Steam condensing plant.	10
	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
19	What are the different methods used to improve efficiency of a gas turbine plant. Explain any one method with a neat sketch.	10
	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