



R20 Regulation *Subject code: 3P5CC*
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, July 2024

Thermal Engineering-II
(Mechanical Engineering)

Maximum Marks: 70

Date:24.07.2024 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.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10X2M=20 Marks)			
1	Distinguish between boiler mountings and accessories.	CO1	II
2	Mention the four stages of Rankine cycle.	CO1	I
3	Write the function of divergent nozzle.	CO2	II
4	What is degree of undercooling in nozzle?	CO2	I
5	Define blade velocity coefficient in an impulse turbine.	CO3	I
6	Give the operating principle of an impulse turbine.	CO3	II
7	Why regenerators are normally preferred for high pressure ratio gas turbine cycle?	CO4	II
8	Define vacuum efficiency.	CO4	I
9	Explain Rocket engine.	CO5	I
10	Explain turbo get engines.	CO5	I
Part-B			Bloom Tx level
Answer All the following questions. (5X10M=50Marks)			
11	Discuss the construction and working of Loeffler Boiler with a neat sketch. [10]	CO1	II
OR			
12	A steam power plant working on Rankine cycle uses steam at 50 bar (dry saturated) and the steam is condensed at 0.05 bar. Find the thermal efficiency of the cycle and plot the cycle on T-S chart. [10]	CO1	IV
13	Dry saturated steam at 6.5 bar with negligible velocity expands isentropically in a convergent divergent nozzle to 1.4 bar and dryness fraction 0.95. Determine the final velocity of steam from the nozzle if 13% heat is lost in friction. Find the % reduction in the final velocity. [10]	CO2	IV
OR			
14	A convergent-divergent nozzle is supplied with dry saturated steam at 11 bar. If the divergent portion of the nozzle is 6 cm long and the throat diameter is 8 mm, determine the semi-cone angle of the divergent part of the nozzle so that the steam may leave the nozzle at 0.4 bar. Neglect the effect of friction in the nozzle. [10]	CO2	V

15	Describe the construction and working principle of reaction turbine with sketches. [10]	CO3,4	III
	OR		
16	In a single stage impulse turbine, nozzle angle is 20° and blade angles are equal. The velocity coefficient for blade is 0.85. Find maximum blade efficiency possible. If the actual blade efficiency is 92% of the maximum blade efficiency, find the possible ratio of blade speed to steam speed. [10]	CO3,4	IV
17	Discuss Brayton cycle with and without regeneration by including PV and TS diagram. [10]	CO4,5	II
	OR		
18	Explain parallel and counter flow type jet condensers with neat sketches. [10]	CO4,5	II
19	Give a complete classification of rocket engines and discuss the important characteristics of rocket propellants. [10]	CO5	III
	OR		
20	A. Differentiate turbojet and turboprop propulsion engines. [5] B. Describe the propulsive efficiency vs flight speed curve for turbojet engines. [5]	CO5	II