



**B.Tech V Semester Regular/Supplementary Examinations, February 2024**  
**Thermal Engineering-II**  
(Mechanical Engineering)

**Maximum Marks: 70**

**Date:20.02.2024 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		CO	Bloom Tx
All the following questions carry equal marks (10x2M=20 Marks)			
1	Classify the boilers according to circulation of gases and water respectively.	CO1	II
2	Give the significance of factor of evaporation in boilers.	CO1	II
3	Define critical pressure ratio in steam nozzles.	CO2	I
4	What do you mean by metastable flow?	CO2	I
5	What is compounding of steam turbines?	CO3,4	I
6	How does pressure and velocity change as the flow proceeds through the runner of impulse turbine?	CO3,4	I
7	Compare a gas turbine with an IC engine.	CO4,5	II
8	Define condenser efficiency.	CO4,5	I
9	Give the main difference between jet propulsion and rocket propulsion.	CO5	II
10	What are the fuels of rocket?	CO5	I
Part-B			
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
11	Discuss the construction and working of La Mont Boiler with a neat sketch. [10]	CO1	II
OR			
12	A steam power plant works between 16 bar and 0.3 bar. If the steam supplied is dry and saturated and the cycle of operation is Rankine, find (a) Cycle efficiency (b) Specific steam consumption. [10]	CO1	IV
13	Dry saturated steam at 3 bar is expanded through a convergent nozzle to 1.5 bar. The exit area is 2.5 cm <sup>2</sup> . Calculate the exit velocity and mass flow rate, assuming (a) isentropic expansion (b) supersaturated flow. [10]	CO2	III
OR			
14	Briefly explain the nozzle and its types with a neat sketch [10]	CO2	III
15	Discuss the various methods of compounding steam turbines with pressure and velocity variations. [10]	CO3	III

	OR		
16	In a reaction turbine, the fixed blades and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are $32^\circ$ and that of discharging tips is $18^\circ$ . Find the power developed per pair of blades for a steam consumption of 2.9 Kg/s, when the blade speed 48 m/s and the heat drop per pair is 10 KJ/Kg. Also find the efficiency of pair. [10]	CO3	V
17	Describe the Brayton cycle with regeneration, reheat and intercooling. Include the PV and TS diagrams. [10]	CO4	II
	OR		
18	Discuss the elements of a steam condensing plant with a neat layout. [10]	CO4	III
19	Write short notes on (a) multi stage rocket (b) hybrid propellant rockets. [10]	CO5	II
	OR		
20	Give a complete classification of rocket engines and discuss the important characteristics of rocket propellants. [10]	CO5	II