



Regulation R18
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 2E6CB

B.Tech VI Semester Supplementary Examinations, January 2023
THERMAL ENGINEERING - II

(Mechanical Engineering)

Maximum Marks: 70

07/01/2023

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.

(2X 10M=20Marks)

- 1 Mention various processes in a Rankine Cycle
- 2 Mention various factors considered for the selection of Boilers
- 3 Write various types of Steam nozzles
- 4 What is meant by Wilson Line
- 5 Mention the classification of Steam Turbines
- 6 Define 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 Briefly explain about the Thrust power

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Explain with a neat sketch Babcock and Wilcox water tube boiler. 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°C and ambient temperature is 22°C 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 Explain the principle of working of an Impulse Turbine 10

OR

16 The steam leaves the nozzle of a single row impulse turbine at 900m/s. The nozzle angle is 20° and blade angles are 30° at inlet and outlet. Calculate the blade velocity and work done per kg of steam. Assume the flow over the blade is frictionless. 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°C , inlet temperature of cooling water is 15°C , outlet temperature of cooling water is 30°C 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 propellant consumption is 80kg/s. Calculate the thrust, thrust power, and propulsive efficiency. 10