



Regulation R17

Subject code: IP6CA

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

B.Tech III Year II Semester Supplementary Examinations, June 2022
THERMAL ENGINEERING - II
(Mechanical Engineering)

Maximum Marks: 70

Date: 17.06.2022 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.

(2M X 10=20Marks)

- 1 Mention various processes in a Rankine Cycle.
- 2 Mention various factors considered for the selection of Boilers.
- 3 Describe various types of Steam nozzles.
- 4 What is meant by Wilson Line
- 5 Mention the classification of Steam Turbines
- 6 Define the degree of reaction.
- 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.

(10M X 5=50Marks)

- 11 With the help of P-V and T-S diagrams explain various processes of a Rankine Cycle. [10]
OR
- 12 A simple Rankine cycle steam power plant operates between the temperatures of 260°C and 95°C. 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]
- 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 32⁰C, inlet temperature of cooling water is 15⁰C, outlet temperature of cooling water is 30⁰C 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 Explain the working principle of Ramjet engine. [10]

OR

20 Explain the working principle of Rocket engine. [10]