



R20 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

Subject code: 3P4CF

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

B.Tech IV Semester Regular Examinations, July 2022

THERMAL ENGINEERING - I

(Mechanical Engineering)

Maximum Marks: 70

Date:02.08.2022 Duration: 3 hours

Note: Allow the Psychrometry chart

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 List the functions of a carburettor.
- 2 Mention the advantages of battery ignition system.
- 3 List the characteristics of a good combustion chamber.
- 4 What is air-fuel ratio in IC engine?
- 5 Define indicated power.
- 6 What are the major losses in an IC engine?
- 7 Define isentropic efficiency of compressor.
- 8 What is slip factor in compressor?
- 9 Define dry bulb temperature and wet bulb temperature.
- 10 Name any three commonly used refrigerants.

Part-B

Answer All the following questions.

(10M X5=50Marks)

- 11 Compare the following: (a) Two stroke and four stroke engine (b) CI and SI engines. (10M)
OR
- 12 Discuss the working of a magneto- ignition system with a neat sketch. (10M)
- 13 Explain the different phases of abnormal combustion in CI engine and add a note on various factors affecting delay period in CI engine. (10M)
OR
- 14 (a) Compare Knocking in SI and CI Engines. (b) Significance of octane and cetane number. (10 marks)
- 15 The following readings were taken during the test of a single cylinder four stroke oil engine:
Cylinder diameter = 250 mm, Stroke length = 400 mm, Gross MEP = 7 bar, Pumping MEP = 0.5 bar, Engine speed = 250 rpm, Net load on the brake = 1080 N, Effective diameter of the brake = 1.5 m; Fuel used per hour = 10 kg, Calorific value of fuel = 44300 kJ/kg. Calculate: (a) Indicated power, (b) Brake power, (c) Mechanical efficiency and (d) Indicated thermal efficiency. (10M)
OR
- 16 Derive the expression for work done by a single stage air compressor with and without clearance. (10M)
- 17 Describe the following with sketches: (a) Axial flow compressor (b) Vane type compressor. (10M)
OR
- 18 Explain the construction of velocity diagrams for a centrifugal compressor. (10M)
- 19 Describe the working of vapour compression refrigeration system. Also bring out any four differences between vapour absorption and vapour compression system. (10M)
OR
- 20 (a) Consider a room that contains air at 1 atm, 308 K and 40% relative humidity. Using the psychrometric chart, determine: the specific humidity, enthalpy, wet bulb temperature, dew point temperature and specific volume of air. (6M)
(b) What is COP? A refrigerator's food compartment is kept at 4 degrees Celsius by eliminating heat at a rate of 360 kJ/min. If the refrigerator's needed power input is 2 kW. Find the refrigerator's COP. (4M)

