



R18 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

Subject code: 2P3CB

B.Tech III Semester Regular/Supplementary Examinations, February 2021

THERMODYNAMICS
(MECHANICAL ENGINEERING)

Maximum Marks: 70

Date: 17.02.2021 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 which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Define thermodynamic equilibrium.
- 2 State first law of Thermodynamics.
- 3 What is PMM-2.
- 4 Define third law of thermodynamics.
- 5 What is the use of mollier diagram?
- 6 Explain free expansion process.
- 7 Define mass fraction and mole fraction.
- 8 What is Vanderwaals equation of state?
- 9 Define air standard efficiency.
- 10 Sketch Diesel cycle on P-V and T-S graph.

Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 A. Differentiate microscopic and macroscopic approach of thermodynamics. [5M]
B. What is quasi static process. [5M]

OR

- 12 A. Explain the construction and working of a constant volume gas thermometer. [5M]
B. Define zeroth law of thermodynamics. What are its applications? [5M]

- 13 A. Derive steady flow energy equation. [5M]
B. What are the limitations of first law of thermodynamics. [5M]

OR

- 14 A. Show the equivalence of Clausius and Kelvin planck statements of second law of thermodynamics. [5M]
B. Define availability and irreversibility. [5M]

- 15 A. Define (i) Triple point (ii) Critical point [5M]
B. Sketch and explain P-V-T diagram. [5M]

OR

- 16 A. Calculate the dryness fraction of steam which has 1.5kg of water in suspension with 50kg of steam.[5M]
B. What is Clapeyron equation.[5M]

- 17 A. What is compressibility chart. [5M]
B. A sample of fuel has the following percentage composition: Carbon=86 percent; Hydrogen=8 percent; Sulphur=3 percent; Oxygen=2 percent; Ash=1 percent. for an air fuel ratio of 12:1, calculate:
(i) Mixture strength as percentage rich or weak.
(ii) Volumetric analysis of the dry products of combustion. [5M]

OR

- 18 A. Explain the process of phase change ice to liquid state. [5M]
B. Explain Dalton's law of partial pressure.[5M]
- 19 A. Compare Otto cycle and Diesel cycle. [5M]
B. Explain the processes in Atkinson cycle and sketch P-V graph. [5M]

OR

- 20 A. The efficiency of an Otto cycle is 60% and $\gamma=1.4$. What is compression ratio?[5M]
B. Explain the processes in otto cycle. [5M]