

CBCS SCHEME

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15NT553

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Fundamentals of Thermodynamics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define thermodynamics, thermodynamic processes and thermodynamic laws. (08 Marks)
b. Distinguish between work and heat. (08 Marks)

OR

- 2 a. Derive expressions for displacement work for different thermodynamic processes. (10 Marks)
b. Explain about mechanical definition of work and thermodynamic definition of work. (06 Marks)

Module-2

- 3 a. Write a brief note on energy. Prove that energy is a property of a system. (08 Marks)
b. Brief about different modes of energy. (08 Marks)

OR

- 4 a. Write a brief note on applications of SS and SFEE in adiabatic throttling process and heat exchangers. (08 Marks)
b. Derive an expression for the first law of thermodynamics to control volume. (08 Marks)

Module-3

- 5 a. State and explain Clausius's second law of thermodynamics. Add a note on equivalence of Kelvin-Planck's and Clausius's statements. (10 Marks)
b. Explain about available and unavailable energy. (06 Marks)

OR

- 6 a. Define and explain entropy. (08 Marks)
b. Discuss about clausius theorem and clausius inequality. (08 Marks)

Module-4

- 7 a. Discuss about gravimetric and molar analysis of ideal gas mixtures. (10 Marks)
b. Derive an expression for Dalton law of additive pressures and Amagat's law of additive volume. (06 Marks)

OR

- 8 a. Write a short note on latent heat of steam. Explain about steam dryness fraction. (08 Marks)
b. Write a note on Maxwell's equations, and heat capacity ratio. (08 Marks)

Module-5

- 9 a. Explain the working principle, process and thermal efficiency of a spark ignition-otto cycle with the help of P-V and T-S diagrams. (08 Marks)
b. Explain briefly about Carnot vapour power cycle. (08 Marks)

OR

- 10 a. Discuss about the processes in a simple Rankine cycle. Add a note on the analysis and performance of Rankine cycle. (08 Marks)
b. Write a detailed note on binary vapour cycle. (08 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.