

B TECH
(SEM II) THEORY EXAMINATION 2018-19
THERMODYNAMICS & HEAT ENGINE

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Differentiate between open and closed system.
 - b. What is internal energy?
 - c. State the Kelvin-Plank statement.
 - d. Explain the Carnot cycle.
 - e. Explain entropy.
 - f. Explain change in entropy at constant volume.
 - g. List two desirable properties of working fluid for a power plant.
 - h. Classify steam boilers.
 - i. What is mean effective pressure?
 - j. Define air standard efficiency.

SECTION B

- 2. Attempt any three of the following: 10x3=30**
- a. Define different types of system. Also define control volume.
 - b. Write the desirable properties of working fluid used in power plants.
 - c. 0.05 m^3 of air at a pressure of 8bar and temperature 280°C expands to eight times its original volume and the final temperature after expansion is 25°C . Calculate the change of entropy of air during process. Assume $C_v = 0.712\text{KJ/kg.K}$ and $C_p = 1.005 \text{ KJ/kg.K}$
 - d. Draw and explain Economizer.
 - e. Write the short note on (i) Boiler mountings and (ii) Boiler accessories

SECTION C

- 3. Attempt any one part of the following:**
- a. Explain Quasi-static process.
 - b. Write the short note on (i) Zeroth law of thermodynamics and (ii) First law of thermodynamics.
- 4. Attempt any one part of the following:**
- a. Explain the P-dV work or displacement work.
 - b. Explain Rankine cycle with P-V and T-S diagram.
- 5. Attempt any one part of the following:**
- a. Explain both statements of second law of thermodynamics.
 - b. Briefly explain Otto cycle with P-V and T-S diagram.

6. **Attempt any *one* part of the following:**
- a. Find the change of entropy during constant pressure process.
 - b. Explain Carnot theorem in brief.
7. **Attempt any *one* part of the following:**
- a. Draw and explain Locomotive boiler.
 - b. Prove that heat and work is a path function.