Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

CM-3005-CBGS

B.E. III Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Chemical Engineering Thermodynamics

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. Define following:
   i) Carnot cycle
   ii) Joule Thompson effect

2. Derive the first law of thermodynamics for steady-state flow process. Explain all the notations used.

3. A carnot engine using 0.020 mole of an ideal gas operates between reservoirs at 1000.0 K and 300.0 K. The engine takes in 25 J of heat from the hot reservoir per cycle. Find the work done by the engine during each of the two isothermal steps in the cycle.

4. Which of the following is in the correct order of standard state entropy?
   i) Liquid water < gaseous water
   ii) Liquid water < solid water
   iii) $NH_3 < H_2$

5. Discuss the PVT behavior of pure fluid with a neat and clean *p*-*v* and *p*-T diagram.

6. Explain Joule-Thompson effect for inversion curve with the help of P-T diagram and show the inversion points and region of heating and cooling.

7. Discuss the limitations of a single-stage air compressor and the problems associated with it. Write the advantages of multi-stage compression.

8. Write short notes on any four:
   i) Entropy and its calculation
   ii) Second law of Thermodynamics
   iii) Third law of Thermodynamics
   iv) Virial equation of states
   v) Critical properties and law of corresponding states

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