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ET-201(B)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering) / B.Tech. (Aerospace Engineering)

00877 **Term-End Examination**

December, 2017

ET-201(B) : ENGINEERING THERMODYNAMICS

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **seven** questions. All questions carry equal marks. Use of steam tables and scientific calculator is permitted.*

1. Explain the following terms : $4 \times 2\frac{1}{2}$

(a) System, Surrounding and Boundary

(b) Control Volume and Isolated System

(c) State, Process and Path

(d) Thermodynamic Equilibrium

2. (a) Differentiate between Work and Heat.

(b) Energy is a property. Discuss. 2×5

3. Explain with a neat diagram : *2×5*

(a) Kelvin-Planck Statement

(b) Clausius Statement

4. (a) Derive the expressions of work done for the following : *5*

(i) Reversible constant pressure process

(ii) Reversible constant volume process

(b) Establish the relationship between pressure ratio and temperature ratio in a reversible polytropic process. *5*

5. Define Enthalpy. Enthalpy of air at 1 bar and 27°C is 300·2 kJ/kg. Assuming the air as an ideal gas, determine the specific enthalpy of air at 5 bar and 27°C. *10*

6. Explain the following diagrams for a pure substance : *2×5*

(a) Temperature-Enthalpy Diagram

(b) Enthalpy-Entropy Diagram

7. An ideal wet compression refrigeration cycle with R-12 as the refrigerant, operates between an evaporator temperature of $-10°C$ and a condenser temperature of 40°C. Calculate : *10*

(a) Refrigerating effect

(b) Compression work

(c) COP

8. Derive the minimum work in two-stage compression with intercooling. *10*

9. Write short notes on the following : *2×5*

   (a) Principle of Energy Conservation

   (b) Brayton Cycle