

G-27/2071

5964/MJ

BASIC THERMODYNAMICS (MCE-202)

Bachelor of Technology (Mechanical Engineering)

End Semester Exam

TIME ALLOWED: 3 Hour

Roll No. -----

Maximum Marks: 50

Note:- 1. Section C is compulsory. Attempt any Six questions selection Three questions from each section A & B

2. Use of Scientific calculator is allowed.

3. Use of Steam table is allowed.

SECTION-A

Q1. Define with example: open system and closed system.

Q2. Explain with the help of neat sketch statements of second law of thermodynamics.

Q3. Initial temperature and pressure of 3 kg of gas contained in piston cylinder arrangement are 10°C and 1.01 bar. If the gas is heated at constant pressure to 150°C then, find: (a) final volume of air (b) work done (c) change in internal energy of gas (d) change in enthalpy of gas. Take $c_p = 1.005 \text{ KJ/Kg K}$ and $c_v = 0.718 \text{ KJ/Kg K}$ and density = 2.1 Kg/m^3 .

Q4. Show that internal energy is a property of a system.

Q5. State and derive an equation of steady flow energy equation. (3×5)

SECTION-B

Q6. An engine working on Otto cycle has a cylinder diameter of 18 cm and a stroke of 25 cm. The clearance volume is 1400 cm^3 . Find the air standard efficiency for this engine.

Q7. Derive an expression air standard efficiency of diesel cycle.

Q8. Define the following: (a) Specific humidity (b) Absolute humidity (c) Relative humidity (d) Dew point temperature.

Q9. Explain how the wet steam, dry saturated steam and superheated steam is produced.

Contal-2

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Q10. Show the following processes on the psychometric chart:-

(a) Sensible heating and sensible cooling

(b) Humidification and dehumidification

(3×5)

SECTION-C

Q11.

a. Name three intensive and extensive properties.

b. Define entropy.

c. What are the assumptions of air standard cycle.

d. Define quasi static process.

e. Define enthalpy of gas.

f. Define third law of thermodynamics.

g. Write the limitations of first law of thermodynamics.

h. What is meant by perpetual motion machine of second kind.

i. How does heat pump differs from a refrigerator.

j. What is control volume.

(10×2 = 20)

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