CBCS SCHEME

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Third Semester B.E. Degree Examination, Feb./Mar. 2022
Engineering Thermodynamics

Time: 3 hrs.
Max. Marks: 100

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

Module-1

1 a. Differentiate between the following:
   (i)   Macroscopic and microscopic
   (ii) Intensive and extensive property
   (iii) Cyclic and non-cyclic process   **(10 Marks)**
  b. What do you mean by zeroth law of thermodynamics? Explain with an example.   **(10 Marks)**

OR

2 a. Compare Work and Heat.   **(10 Marks)**
  b. Explain the following work:
   (i)   Shaft work
   (ii) Electrical work   **(10 Marks)**

Module-2

3 a. Show that violation of Kelvin Plank statement leads to the violation of Clausius statement.
    (10 Marks)
  b. Show that energy – A property of the system.   **(10 Marks)**

OR

4 a. Describe Clausius theorem.   **(10 Marks)**
  b. Explain Joule's experiment for 1st law of thermodynamics.   **(10 Marks)**

Module-3

5 a. Derive an expression for efficiency of Otto cycle.   **(10 Marks)**
  b. Sketch and explain the working of ORSAT Apparatus for flue gas measurement.   **(10 Marks)**

OR

6 a. Derive an expression for efficiency of Diesel cycle.   **(10 Marks)**
  b. A four cylinder engine running at 1200 rpm delivers 20 KW. The average torque when one cylinder was cut is 110 Nm. Find the indicated thermal efficiency if the calorific value of the fuel is 43 MJ/kg and the engine uses 360 grams of gasoline per KWh.   **(10 Marks)**

Module-4

7 a. Sketch and explain steam jet refrigeration system.   **(10 Marks)**
  b. Explain the desirable properties of refrigerants.   **(10 Marks)**

OR

8 a. Explain the following psychrometric process:
   (i)   Cooling and dehumidification
   (ii) Adiabatic mixing of two streams   **(10 Marks)**

   b. Define the following:
   - (i) Dry bulb temperature
   - (ii) Specific humidity
   - (iii) Relative humidity
   - (iv) Refrigerating effect
   - (v) Dew point temperature   **(10 Marks)**

Module-5

9   a. Explain the working principle of single state reciprocating compressor.   **(10 Marks)**

   b. Derive an expression for work done during polytropic compression in a single stage compressor neglecting clearance.   **(10 Marks)**

OR

10   a. Mention the advantages and disadvantages of closed cycle gas turbine.   **(10 Marks)**

   b. Explain the principle of jet propulsion and rocker propulsion.   **(10 Marks)**

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