SEM 2 – 4(RC 07-08)

F.E. (Semester – II) (Revised in 2007 – 08) Examination, November/December 2017
BASIC MECHANICAL ENGINEERING

Duration : 3 Hours | Total Marks : 100

***Instructions**: 1) Answer **any five** questions with at least **one** question from **each** Module.*
*2) Assume suitably **any** missing data.*

MODULE – I

1. a) State and explain Zeroth law of Thermodynamics. **4**

   b) 1 kg of an ideal gas with Y = 1.4, initially at 300 K and 1 bar is compressed reversibly and adiabatically to 6 bar and then it is cooled at constant pressure to the original temperature. The gas is then restored to the initial state through an isothermal process. Plot the cycle on a P-V diagram and calculate the net work and heat interactions. **10**

   c) State the First Law of Thermodynamics. List out it's limitations and explain how they are overcome in the Second Law. **6**

2. a) With the help of a P-V diagram, describe the various processes that constitute a Air Standard Diesel Cycle. **7**

   b) Derive the equation for the law of thermodynamics applied to a Boiler. **5**

   c) An engine having 20 cm bore and 30 cm stroke works on Otto cycle. The clearance volume is 1600 cm^3. The initial pressure and temperature are 1 bar and 60°C respectively. If the maximum pressure is limited to 24 bar, find the Air Standard efficiency. **8**

MODULE – II

3. a) Compare Spark ignition with Compression Ignition engines. **6**

   b) With a neat sketch, describe the various components of an Internal combustion engine. **10**

   c) Define i) Tonne of Refrigeration ii) COP. **4**

P.T.O.

4. a) With a neat schematic diagram, explain Basic Rankine Cycle. 8

   b) Describe the multi-point fuel injection system with a neat sketch. 8

   c) Write a descriptive note on refrigerants. 4

MODULE – III

5. a) With a neat sketch, explain the construction and working of differential. 8

   b) Give the classification of automobiles. 6

   c) What is a clutch ? Explain the functional requirements of a good clutch. 6

6. a) With a neat sketch explain the layout and working of air brake system. 8

   b) Describe the construction and working of a constant mesh gear box. 8

   c) State the objectives a Vehicle Suspension System. 4

MODULE – IV

7. a) Explain the principle of rolling. Sketch the various roll arrangements used in rolling mills. 6

   b) Explain the process used for making a green sand mould with sketches. 8

   c) Compare between :

      i) Direct and Indirect Extrusion.

      ii) Open and Closed Die Forging. 6

8. a) With a neat sketch explain true Centrifugal Casting Process. 8

   b) Distinguish between Brazing and Soldering. 4

   c) Explain any four operations that can be performed on a Lathe with neat sketches. 8