copies

SEM 2-4 (RC 07-08)

F.E. (Semester – II) Examination, November 2009
(Revised in 2007-08)
BASIC MECHANICAL ENGINEERING

Duration : 3 Hours | Total Marks : 100

Instructions : *1) Answer **five** questions, selecting **one** from **each** Module.*
*2) Illustrate your answers with **neat** sketches, **if** required.*
*3) Assume **any** missing data.*

MODULE – I

1. A) Differentiate between the following : 4
   i) Reversible and irreversible process.
   ii) Adiabatic and polytropic process.

   B) Derive the expression for first law of thermodynamics applied to turbine. 5

   C) Explain the concept of thermodynamic equilibrium. 3

   D) One kg of air at 1 bar and 300 K is compressed adiabatically till its pressure becomes 5 times the original pressure. Subsequently it is expanded at constant pressure and finally cooled at constant volume to return to its original state.

   Calculate the heat and work interactions and change in internal energy for each process and cycle. 8

2. A) How is a steady flow system characterized ? 5

   B) What is flow energy ? Derive an expression for the same. 5

   C) What is a thermodynamic cycle ? Do internal combustion engines operate on a thermodynamic cycle ? 5

   D) Derive the expression for first law of thermodynamics applied to condenser. 5

MODULE – II

3. A) Write a short note on MPFI system. 5

   B) Explain with a neat sketch the working of a 4 stroke petrol engine. 4

   C) What are the properties of a good refrigerant ? List some of the refrigerants being used in air conditioning systems. 4

   D) A 4 stroke single cylinder I.C. engine of 250 mm cylinder diameter and 400 mm stroke runs at a piston speed of 8 m/s. If the engine develops 50 kW indicated power, find the mean effective pressure and crankshaft speed.

4. A) Compare 4 stroke and 2 stroke Diesel engines. 6

B) With a neat sketch, explain the working of a domestic refrigerator. 5

C) With a neat sketch, explain the working of a thermal power plant. 5

D) Describe the various components of an I.C. Engine. 4

MODULE – III

5. A) Explain with a neat sketch the construction and working of air-brake system. 6

B) Explain with a neat sketch the construction and working of hydraulic steering system. 6

C) Write a short note on automotive emissions and control. 4

D) What are the objectives of vehicle suspension system ? 4

6. A) Describe with a neat sketch, the construction and working of a constant mesh gear box. 6

B) Explain the necessity of a differential is an automobile. 6

C) Give the classification of automobiles. 4

D) How is the length of propeller shaft varied automatically ? 4

MODULE – IV

7. A) Explain with a neat sketch the spinning process. 5

B) Give the classification of rolling mills with sketches. 5

C) Differentiate between drawing and extrusion process. 5

D) Describe the grinding process. How does it differ from turning ? 5

8. A) Explain the hydrostatic extrusion process with a neat sketch. 5

B) Write a short note on cold chamber die casting process. 6

C) What are the advantages of adhesive bonding ? 5

D) Explain what do you understand by the terms : 4

i) Ingot ii) Slab

iii) Bloom iv) Billet