

SEM 2 – 4 (RC 07-08)

F.E. (Semester – II) (Revised Course 2007-08)

Examination, Nov./Dec. 2012

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**.

MODULE – I

1. a) Explain the concepts of internal energy and enthalpy. 6
- b) Plot the following processes on a P-V diagram. 4
 - i) Constant volume
 - ii) Constant pressure
 - iii) Isothermal
 - iv) Adiabatic.
- c) Derive the expression for the first law of thermodynamics applied to condenser. 5
- d) What is the difference between otto and diesel cycle ? 5
2. a) Describe the ideal gas temperature scale. 5
- b) State and explain the zeroth law of thermodynamics. 5
- c) Derive the expression for the first law of thermodynamics applied to a boiler. 5
- d) With the help of a P-V diagram, describe the various processes that constitute the air standard diesel cycle. 5

MODULE – II

3. a) With the help of a neat sketch, describe the working of fuel system of an Internal Combustion Engine. 6
- b) Describe the working of a thermal power plant, using schematic diagram. 6
- c) Write a short note on vapour compression refrigeration system. 6
- d) Define Ton of refrigeration. 2

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4. a) Describe the multi-point fuel injection system with a neat sketch. 6
b) Compare spark ignition with compression ignition engines. 10
c) Explain the terms : 4
i) Latent heat ii) Dryness fraction.

MODULE – III

5. a) With a neat sketch, explain hydraulic brake system of a car. 8
b) State the functions of a clutch. With a neat sketch, explain the working of a single plate clutch. 8
c) Write a short note on power steering system. 4
6. a) Draw the layout of complete transmission system for front engine rear drive vehicle. 6
b) Write short notes on the following :
i) Constant velocity universal joint
ii) Automotive emissions and control. 8
c) With a neat sketch, explain the construction and working of differential. 6

MODULE – IV

7. a) Explain the hot chamber die casting process. 5
b) Compare between :
i) Brazing and Welding
ii) Die casting and sand casting. 5
c) Explain any three operations which can be carried out on Lathe. 5
d) Write a short note on laser beam welding. 5
8. a) Write short notes on the following : 8
i) Adhesive bonding ii) Impact extrusion.
b) What are the characteristics of forged components ? 4
c) Explain sheet metal spinning process. 4
d) Discuss the role of mechanical fasteners in metal joining process. 4