

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.

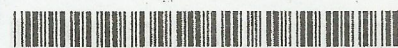
MODULE – I

1. a) State and explain Zeroth law of Thermodynamics. 4
b) 1 kg of an ideal gas with $\gamma = 1.4$, 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 cm³. 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