Total No. of Questions : 10] [Total No. of Printed Pages : 3

Roll No. .....

BE–203(GS)

B. E. (First/Second Semester) EXAMINATION, June, 2011

(Common for all Branches)

BASIC MECHANICAL ENGINEERING

Time : Three Hours

Maximum Marks : 70

Minimum Pass Marks : 22 (D Grade)

Note : Attempt any *five* questions. Use of Steam table is permitted. Support your answer with figures, charts, etc. All questions carry equal marks.

1. (a) Sketch stress-strain diagram for M. S. and cast iron. Discuss various points for M. S.

   (b) Discuss the effect of alloying elements on the properties of cast iron.

Or

2. (a) Describe the various mechanical properties of materials in short.

   (b) Define Steel. Discuss its various types, uses and their applications.

3. (a) Discuss any *three* operations that can be performed on a radial drilling machine. Also draw a tabelled diagram of a radial drilling machine.

P. T. O.

(b) Explain the following properties of any measuring instrument :

(i) Hysteresis

(ii) Sensitivity

(iii) Accuracy and precision

(iv) Errors

(v) Response time

Or

4. (a) What is the use of sine bar ? State the process to measure any angle using sine bar with neat sketch.

(b) Draw a neat labelled diagram of shaper machine. Also state the operations performed on it.

5. (a) Describe the construction and working of any *one* hydraulic turbine.

(b) What do you understand by fluid coupling ? Explain its working. State its uses.

Or

6. (a) State the function of a compressor. State its various types. Discuss the working of any *one* type.

(b) Discuss in short any *three* of the following properties related to fluids :

(i) Viscous flow

(ii) Laminar flow

(iii) Turbulent flow

(iv) Pressure, viscosity, density

7. (a) Differentiate between vapour absorption system and vapour compression system.

(b) Calculate the equivalent evaporation from and at 100°C for a boiler, which receives water at 60°C and produces steam at 1·5 MPa and 300°C. The steam generation rate is 16000 kg/hr. Coal is burnt at the rate of 1800 kg/hr. The calorific value of coal is 34750 kJ/kg. Also calculate the thermal efficiency of boiler.

Or

8. (a) Discuss Eco-Friendly refrigerants. State their properties. Why are they more important in present time ?

(b) A chimney of 30 m high is discharging hot gases at 320°C, when outside temperature is 30°C. The air-fuel ratio is 20. Calculate :

(i) The draught produced in mm of water column.

(ii) The temperature of gases for maximum discharge in a given time and what would be the draught produced corresponding ?

9. (a) Discuss the working principle and functions of each part of steam engine.

(b) Discuss the working of two-stroke petrol engine.

Or

10. (a) Explain Otto cycle and derive an expression for efficiency of Otto cycle.

(b) In an engine working on ideal Otto cycle, the temperature at the beginning and at the end of compression 27°C and 327°C. Find the compression ratio and air standard efficiency of the engine.