FE – 2 (RC) 4

F.E. (Semester – II) (R.C.) Examination, Nov./Dec. 2008
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** figures/sketches if required.*
*3) Assume **any** data if found **necessary** and state **clearly**.*

MODULE – I

1. A) Answer the following :
   i) Show that the enthalpy of fluid before throttling is equal to that after throttling.
   ii) Is differentials of heat (or work) exact ? Is it correct to say heat content by the system is 5 kJ ?
   iii) What is essence of first law of thermodynamics ? Write down the expression for First law applied to (i) a cycle (ii) a process.
   iv) State the limitations of the first law of thermodynamics. **(4×3=12)**

   B) It is desired to compress 10 kg of gas from 15 m^3 to 0.3 m^3 at a constant pressure of 15 bar. During this compression process, the temperature rise from 20° C to 150° C and the increase in internal energy is 3250 kJ. Calculate the work done, heat interaction and change in enthalpy during the process. Draw the process on P-V diagram. **8**

2. A) Answer the following :
   i) Give statements of second law of thermodynamics.
   ii) Define thermal efficiency of heat engine. Can it be 100 percent ?
   iii) Brief about the concept of "Absolute Temperature Scale".
   iv) Define the terms compression ratio, clearance volume swept volume and total volume. **(4×3=12)**

   B) The following data pertains to petrol engine :
   Cylinder bore (Dia.) = 13.7 cm; Stroke length = 13 cm
   Clearance volume = 280 cm^3
   Calculate the air standard efficiency of the engine. **8**

P.T.O.

MODULE – II

3. A) Distinguish between Petrol and Diesel engines.

   B) Write a short note on domestic refrigerator.

   C) What is function of carburetor and fuel pump in I.C. Engine ?

   D) A diesel engine has brake thermal efficiency of 28 per cent. If calorific value of fuel is 42500 kJ/kg, find its brake specific fuel consumption. **(5+5+5+5)**

4. A) Explain the function of the following in steam power plant :

      i) Boiler

      ii) Feed water pump

      iii) Condenser

      iv) Turbine.

   B) Define coefficient of performance and tonne of refrigeration.

   C) Write a short note on Multi-Point Fuel Injection (MPFI).

   D) Define specific fuel consumption and brake thermal efficiency. **(6+4+6+4)**

MODULE – III

5. A) Write a short note on the following :

      i) Propeller shaft

      ii) Universal joints.

   B) What is clutch ? Where is clutch located ? And what are the features of good quality clutch ?

   C) What is universal joint ? Where is it used ? **(8+8+4)**

6. A) Describe with a neat sketch the construction and working of a single plate clutches.

   B) What are the requirements of good braking systems ? What are the functions of braking systems ?

   C) What are the requirements of transmission systems ?

   D) Give the classifications of automobiles. **(5+6+5+4)**