DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

June, 2012

BME-053 : APPLIED THERMAL ENGINEERING

Time : 3 hours   *Maximum Marks : 70*

Note : Answer **any seven** questions. Assume any missiing data suitably. Use of scientific calculator is **allowed.**

1. (a) Derive an Expression for the Thermal efficiency of an Otto cycle.   5

   (b) For an ideal Otto engine working on air, the temperature at the end of isentropic compression is 452°C and at the end of expansion 1347°C. If the compression ratio is to be 7.5, find the work done in a cycle and efficiency.   5

2. (a) Explain the working of 4 - stroke diesel engine with neat sketch.   5

   (b) Compare 2 - stroke and 4 - stroke engines.   5

3. (a) What are the solid fuels ? And list out their merits and demerits.   5

   (b) Compare the Battery / Coil Ignition System with Magneto Ignition System.   5

4. (a) Explain the working of Spark Plug with neat 5
sketch.

(b) What are the liquid fuels ? And list out their 5
important characteristics.

5. (a) Explain the working of Water Pump in the 5
Water Cooling System.

(b) Differentiate between Air Cooling System 5
and Water Cooling System of IC engine.

6. (a) What are the desirable properties for good 5
lubricants ?

(b) Describe the working of Wet Sump 5
Lubrication System with neat sketch.

7. (a) Explain the basic principle and working of 5
Hydraulic Dynamometer.

(b) The air flow rate for a four stroke diesel 5
engine is measured by means of a circular
orifice of diameter 3 cm. The coefficient of
discharge for the orifice is 0. 62 and the
pressure across the orifice is 20 cm of water.
The pressure and temperature of air inside
the room is 1 bar and 25° C respectively .
The stroke volume is 0.0019 m^3. The brake
power developed at 2000 rpm is 30 KW.
Detemine the (I) Volumetric efficiency
(II) Brake mean effective pressure.

8. (a) Discuss the effect of clearance on the performance of a reciprocating compressor. **5**

(b) A single cylinder, single stage double acting compressor has cylinder diameter 40 cm, stroke 40 cm, piston rod diameter 5 cm, speed 300 rpm. The air is taken inside at 1 bar and 300 K and the delivery pressure is 8 bar. If the volumetric efficiency is 0. 85, isothermal efficiency is 0.75, mechanical efficiency is 0.88. Calculate the power required to drive the compressor and the adaibatic efficiency. **5**

9. (a) Explain the working of closed cycle gasturbine plant with neat sketch. **5**

(b) List out the various application of gas turbine power plant. ? **5**

10. Write short notes on the following : **4x2½=10**
   (a) Blast furnace gas
   (b) Firing order
   (c) Knocking
   (d) Clearance ratio