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BME-053

01853

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

December, 2012

BME-053 : APPLIED THERMAL ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any Ten** questions. All questions carry **equal** marks. Use of calculator is **permitted**.*

1. Define compression ratio. How does it affect the air standard efficiency of an Otto cycle ? 7

2. An air engine working on Otto cycle the compression ratio raised from 5 to 6. Compare the change in efficiency due to the rise in compression ratio. 7

3. Mention the various application of I.C. engines. How I.C. engines are classified ? 7

4. What are fuels ? How are they classified? List examples of various types of fuels. Enumerate the characteristics of a good fuel. 7

5. Describe in brief the conventional Ignition systems of SI engine. 7

6. Explain cooling systems in I.C. engine with the help of a neat diagram. 7

7. Enumerate the Lubrication system in I.C. Engine with neat diagram. 7

8. State the uses of compressed air. Explain the classification of air compressor. What are the advantages of multistage compression ? 7

9. Derive the expression for the volumetric efficiency of a reciprocating air compressor in terms of clearance ratio, pressure ratio, and index of compression. 7

10. What is a Gas Turbine? In what respect it is different from I.C. Engines ? 7

11. In a gas turbine plant, the air pressure and temperature before compression are 1 bar, and 28°C respectively. Pressure ratio is 3.5 and the temperature of gas before expansion is 700°C. If the isentropic efficiences of the compressor and turbine are 80% and 85% respectively, calculate. 7

(a) The efficiency of the cycle.

(b) The turbine exhaust temperature.

12. In an automobile device working on Otto cycle, the energy generated per cycle is twice as much rejected through the exhaust. Calculate the thermal efficiency and compression ratio. Consider the working fluid as an ideal gas with $\gamma=1.4$ 7