

**DIPLOMA IN MECHANICAL ENGINEERING  
(DME)**

**Term-End Examination**

**00404**

**June, 2017**

**BME-053 : APPLIED THERMAL ENGINEERING**

*Time : 2 hours*

*Maximum Marks : 70*

**Note :** Answer any **five** questions. Assume missing data suitably, if any. Use of scientific calculator is permitted.

1. (a) Explain the following in IC engines :
  - (i) Compression ratio
  - (ii) Cut-off ratio
  - (iii) Mean effective pressure of cycle
- (b) Calculate the efficiency of diesel cycle for which the compression ratio is 15 and the cut-off ratio is 2. What will be the efficiency if the cut-off ratio is increased to 3 ? Assume  $\gamma = 1.4$ . 7+7
2. (a) Explain the working of a 2-stroke cycle engine with a neat sketch.
- (b) Compare four-stroke SI engine and four-stroke CI engine. 7+7

3. (a) Explain the magneto-ignition system with a neat sketch.
- (b) What is firing order ? State the advantages of it. 7+7
4. (a) Explain the air cooled system with a neat diagram.
- (b) List out the merits and demerits of a water cooling system. 7+7
5. (a) What are the properties of good lubricating oils ? Define viscosity and viscosity index.
- (b) What is oil filter ? Explain any one type of oil filter with a neat sketch. 7+7
6. (a) Explain any one method of measuring brake power with a neat sketch.
- (b) A gasoline engine consumes 8 litres of gasoline/hr and develops 30 kW of power. The specific gravity of gasoline is 0.8 and its calorific value is 44 MJ/kg. Determine the indicated thermal efficiency of the engine. 7+7
7. (a) Define the following terms used in reciprocating air compressors :
- (i) Volumetric efficiency
  - (ii) Adiabatic efficiency
  - (iii) Intercooling

(b) A two-stage air compressor is used to compress air from 100 kPa to 1500 kPa (Take flow rate =  $10 \text{ m}^3/\text{min}$ ). What will be the pressure in the intercooler for minimum work of compression? If  $n = 1.3$ , determine the minimum work of compression required. 7+7

8. (a) Explain the working of an open cycle gas turbine power plant with a neat sketch.

(b) Explain with a neat sketch, the working principle of a combustor. 7+7

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