

**DIPLOMA IN MECHANICAL ENGINEERING  
(DME)**

**Term-End Examination,**

**December 2019**

**BME-053 : APPLIED THERMAL ENGINEERING**

*Time : 2 Hours]*

*[Maximum Marks : 70*

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*Note : (i) Answer any five questions.*

*(ii) Use of scientific calculator is permitted.*

*(iii) Assume missing data suitably.*

*(iv) Standard symbols and notations have usual meaning.*

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1. a) Define compression ratio. How does it affect the air standard efficiency of an otto cycle? 7
- b) For 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
2. a) Differentiate between battery and magneto ignition system. 7
- b) Explain the working of water cooling system of 4-cylinder engine with the help of a neat schematic. 7
3. a) Enumerate the desirable properties for good lubricants. 7
- b) Describe the working of wet sump lubrication system with neat sketch. 7

(2)

4. a) What is a gas turbine? In what respect is it different from I.C. engine? 7
- b) In a gas turbine the compressor is driven by the high pressure turbine. The exhaust from the high pressure turbine goes to a free low pressure turbine which runs the load. The air flow rate is 20kg/S and the minimum and maximum temperatures are respectively 300K and 1000K. The compressor pressure ratio is 4. Calculate the pressure ratio of the low pressure turbine and the temperature of the exhaust gases from the unit. The compressor and turbine are isentropic.  
Cp of air and exhaust gases = 1 kJ/kg K and  $\gamma = 1.4$ . 7
5. a) Define and explain the following : 7
- i) BHP
  - ii) IHP
  - iii) Mechanical efficiency
  - iv) Specific fuel consumptions
- b) Discuss any two types of losses which affect an ideal fuel-air cycle. 7
6. a) Explain the working of spark plug with a neat sketch. 7
- b) What are liquid fuels and their important characteristics? 7
7. Write short notes on **any two** of the following :  $2 \times 7 = 14$
- a) Eddy current dynamometer
  - b) Searching of I.C. engine
  - c) Axial flow compressor

