BIMEE-031

DIPLOMA – VIEP – MECHANICAL ENGINEERING (DMEVI)
Term-End Examination
June, 2016

00596

BIMEE-031 : I.C. ENGINES

Time : 2 hours   *Maximum Marks : 70*

*Note : Question no. 1 is **compulsory**. Attempt five questions in all. All questions carry equal marks. Use of scientific calculator is permitted.*

1. Choose the correct answer from the given four alternatives.   7×2=14

    (a)   In a low speed S.I. engine, the inlet-valve closes approximately

          (i)   40° after BDC

          (ii)   30° before BDC

          (iii) 10° after BDC

          (iv)   10° before BDC

(b) The function of a fuel injector is to

(i) pump the fuel at high pressure

(ii) mix diesel with air

(iii) atomize the fuel

(iv) ignite the fuel

(c) For the same value of compression ratio and heat input, the order of thermal efficiency of Otto, Diesel and Dual cycles will be as under :

(i) $\eta_{Otto} > \eta_{Diesel} > \eta_{Dual}$

(ii) $\eta_{Otto} > \eta_{Dual} > \eta_{Diesel}$

(iii) $\eta_{Diesel} > \eta_{Dual} > \eta_{Otto}$

(iv) $\eta_{Dual} > \eta_{Diesel} > \eta_{Otto}$

(d) A heat engine receives 1120 kJ of heat and rejects 840 kJ of heat while operating between two temperature limits of 560 K and 280 K. It indicates that the engine operates on the following cycle :

(i) Reversible cycle

(ii) Irreversible cycle

(iii) Impossible cycle

(iv) Unpredictable cycle

(e) The thermal efficiency of an ideal Otto cycle

(i) increases with compression ratio

(ii) increases with specific heat ratio

(iii) increases with compression ratio and specific heat ratio

(iv) increases with compression ratio but decreases with specific heat ratio

(f) In C.I. engines, ignition delay can be reduced by

(i) decreasing compression ratio

(ii) increase in air inlet temperature

(iii) decrease in coolant temperature

(iv) decreasing the engine speed

(g) A machine produces 100 kJ work by consuming 100 kJ heat. This machine will be called

(i) PMM-I

(ii) PMM-II

(iii) PMM-III

(iv) None of the above

2. (a) Explain the function of a carburettor in a petrol engine with a neat sketch.

(b) Explain the phenomenon of knock in C.I. engines and compare it with S.I. engine knock.   7+7

3. (a) State the purpose of lubrication in I.C. engines.

   (b) Discuss briefly the following methods of cooling of I.C. engines :

   (i) Air cooling

   (ii) Liquid cooling

   Also state their relative advantages and disadvantages. 7+7

4. (a) Describe with suitable sketches, the battery-ignition system used in petrol engines.

   (b) The efficiency of an Otto cycle is 50% and γ is 1·5. What is the compression ratio ? 7+7

5. (a) What is supercharging ? Enumerate the main objectives of supercharging.

   (b) What are the main pollutants emitted by petrol engines ? Discuss the effects of emissions on human health. 7+7

6. (a) What are the main functions of the nozzle in a diesel injection system ? Describe the common types of nozzles used.

   (b) Compare the relative advantages and disadvantages of four-stroke and two-stroke cycle engines. 7+7