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MMTP-105

M.E./M.Tech. I Semester

Examination, June 2016

IC Engines and Alternate Fuels

Time : Three Hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Draw neat diagrams wherever required.

1. a) Explain the principal differences between fixed jet and variable jet carburettors. Why does the mixture strength become richer with increasing flow rate in a simple carburettor?
   b) List the advantages and disadvantages of electronic fuel injection.

2. a) Two spark ignition petrol engines having the same swept volume and compression ratio arc running at the same speed with open throttles. One engine operates on the two-stroke cycle and the other on the four-stroke cycle. State with reasons :
      i) Which has the greater power output?
      ii) Which has the higher efficiency?
   b) Why does the optimum ignition liming change with engine-operating conditions?

3. The Rover M16 spark ignition engine has a swept volume of 2.0 liters and operating on a 4-stroke cycle. When installed in the Rover 800, the operating point for a vehicle speed of 120 km/h corresponds to 3669 rpm and a torque of 71.85 N-m, for which the specific fuel consumption is 298 g/k Wh.

Calculate the BMEP at this operating point, the arbitrary overall efficiency and the fuel consumption (liters/100 km). If the gravimetric air/fuel ratio is 20:1, calculate the volumetric efficiency of the engine and comment on the value. The calorific value of the fuel is 43 MJ/kg and its density is 795 kg/m^3. Ambient conditions arc 27°C and 1.05 bars.

4. a) How air and sound is polluted by engines? Discuss remedial measures.
   b) What is meant by Supercharging? What is its effect on engine performance?

5. a) What is generalized performance map of IC engine? What is its advantage over conventional performance curves?
   b) Why do compression ignition engines have greater potential than spark ignition engines for improvement in power output and fuel economy as a result of turbo-charging? When is it most appropriate to specify an inter-cooler?

6. a) What is dual fuel engine? Explain in brief.
   b) Describe with suitable sketch the working principle of Wankel Rotary combustion engine.

7. a) What are the advantages and disadvantages of using LPG as an alternate fuel for S.I. engines?
   b) State about hydrogen production methods.

8. Write short notes on the following: (Any Two)
   a) Elements of MPFI system
   b) Hydrogen storage
   c) Necessity foe substitute fuels in I.C. engines.

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