I.C. Engines
(ME 1.1, DEC 2006)

Time: 3 Hrs
Max Marks: 60

Note: Section A is compulsory. Attempt any four questions from Section B and any two from section C.

Section-A
1. a) What do you understand by scavenging and scavenging losses?
   b) Explain the function of thermostat in Engine and cooling system.
   c) Explain the need and working of Pre-combustion chamber.
   d) List down viscosity and service ratings for diesel engine oils.
   e) Differentiate between lower and higher calorific values of fuel and their applications.
   f) Explain the function of choke in carburetor.
   g) What is the need for supercharging and what is Turbo charger?
   h) Explain Octane rating of S.I. fuels.
   i) What is Willian's line test and specify its application.
   j) How does Petrol injection differ from diesel injection in I.C. engines?

Section-B
2. Why actual valve timing diagram deviates from theoretical one, draw port timing diagram for a two stroke engine.
3. Compare the performance of Otto, Diesel and Dual air standard cycles on different aspects with the help of P-V and T-S diagrams.
4. The following data relate to a Petrol engine:
   Petrol consumed per hour = 7.2 kg
   Specific gravity of fuel = 0.75
   Temperature of air = 27ºC
   Air-fuel ratio = 1:15
   Diameter of choke tube = 24 mm
   Height of top of petrol jet above petrol level = 4.2 mm
   Coefficient of discharge for fuel = 0.7
   Atmospheric pressure = 1.0132 bar
   Calculate the diameter of the fuel jet of simple carburetor
5. Calculate the amount of theoretical air required for the combustion of 1 kg of acetylene (C_2H_2) to CO_2 and H_2.
6. What is need of Governor? Explain working of one type of Governor.

Section-C
7. Discuss in detail the different stages of combustion in a S.I. engine. Explain briefly the influence of various factors on knocking in S.I. engine.
8. A diesel engine working on diesel cycle takes in air at pressure of 1 bar and temperature of 30ºC, the pressure at the end of compression is 30 bar and cut off is 6% of the stroke. Calculate (a) compression ratio, (b) % clearance, (c) heat supplied, (d) heat rejected, (e) thermal efficiency, (f) mean effective pressure.
9. Following data relate to the testing of a four stroke, eight cylinder diesel engine: Bore = 70 mm, stroke = 89 mm, speed = 1250 rpm, load on dynamometer = 950 N, fuel consumption = 19.5 kg/h. L.C.V = 43542 k J/kg, jacket water flow = 1400 kg/h and its temperature rise = 30ºC, Exhaust gas temperature = 400ºC, fuel analysis 15%H_2 and 85%C, partial pressure of water vapor in the exhaust gas = 0.02 bar, C_P of vapor = 2.09 k J/kg and that of dry exhaust gases = 1.005 k J/kg and the constant of hydraulic dynamometer is 17280. Draw the Heat balance sheet.