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Total No. of Questions : 09

B.Tech.(AE) (2011 & 2012)   (Sem.–4)
INTERNAL COMBUSTION ENGINES
Subject Code : BTAE-401
Paper ID : [A1161]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1) **Write briefly :**

   a) Explain scavenging process.

   b) What is valve timing diagram?

   c) What is function of tail pipe?

   d) Explain post ignition.

   e) Write the name of two methods for cold ignition in C.I. engines.

   f) What does mean by viscosity rating of lubricants?

   g) What is the function of radiator in I.C. Engines?

   h) Explain super charging in brief.

   i) What is the relation between indicated power, brake power and frictional power for I.C. engine?

   j) Define specific fuel consumption rate.

SECTION-B

2) Explain working of Wankel engine with the help of neat sketch.

3) Describe function of piston rings, crank shaft, cam shaft, rocker arm and manifold in I.C. engines.

4) What are the main factors which affect the tendency to detonate? Describe them.

5) How C.I. engines combustion chambers are classified? What type of swirl is used in these chambers?

6) Describe construction and working of cooling with thermostat with a neat sketch.

SECTION-C

7) Explain simple carburettor limitations. Then describe following additional system of carburettor with suitable sketches :

   i)   Main metering system

   ii) Idling system

   iii) Power enrichment and economiser system

   iv) Acceleration pump system

8) Describe following fuel injection system with the help of suitable sketches

   i)   Jerk pump system,

   ii) Common rail system, and

   iii) Distributor system.

   Discuss their relative advantages and disadvantages.

9) A four stroke cycle petrol engine has six single acting cylinders of 75 mm bore and 90 mm stroke. The engine is coupled to a brake having a torque arm radius 380 mm. At 3300 rev/min, with all cylinders operating the net brake load is 324N. When each cylinder in turn is rendered inoperative, the average net brake load produced at the same speed by the remaining five cylinders is 245N. Estimate the indicated mean effective pressure of engine.

   With all cylinders operating the fuel consumption is 0.3 kg/min; (fuel calorific value 42000 kJ/kg); the jacket water flow rate and temperature rise are 65 kg/min. and 12°C. On test, the engine is enclosed in a thermally and acoustically insulated box, through which the output drive, water, fuel, air and exhaust connections are pass. Ventilation air blown up through the box at the rate of 14 kg/min. enters at 10°C and leaves at 55°C. Draw up a heat account of the engine.