Total No. of Questions :10] *[Total No. of Printed Pages :2*

Roll No .....

ME - 604

B.E. VI Semester

Examination, June 2014

Internal Combustion Engines

Time : Three Hours

Maximum Marks : 70

Note: 1. Attempt any five questions.
2. Internal choice is given in all the questions.

1. a) A four cylinder four stroke S.I. Engine has a compression ratio of 8 and bore of 100mm, with stroke equal to the bore. The volumetric efficiency of each cylinder is equal to 75%. The engine operates at a speed of 4800 rpm with an air fuel ratio 1:5. Given that the calorific value of fuel = 42MJ/kg, atmospheric density = 1.12kg/m^3, mean effective pressure in the cylinder = 10 bar and mechanical efficiency of the engine = 80%, determine the indicated thermal efficiency and the brake power.
   b) What is meant by cylinder row and cylinder bank? Explain the various types of cylinder arrangements in brief.

OR

2. An engine with 200mm cylinder diameter and 300mm stroke works on theoretical Diesel cycle. The initial pressure and temperature of air used are 1 bar and 27°C. The cut off is 8% of the stroke. Determine
   i) Pressure and temperature at all salient points
   ii) Theoretical air standard efficiency
   iii) Mean effective pressure
   iv) Power of the engine if the working cycles per minute are 380.

   Assume that compression ratio is 15 and working fluid is air. Consider all conditions to be ideal.

3. a) Explain the phenomenon of knocking in S.I. Engines. Compare it with C.I. engine knock.

   b) What are the various types of combustion chamber used in S.I. engine? Explain them briefly.

OR

4. a) What is abnormal combustion knock? How can we differentiate between normal combustion knock and abnormal combustion knock?
   b) What is ignition lag? Discuss the effect of engine variables on ignition lag.
5. a) What is the difference between D.I. and I.D.I. types of Diesel engines?
   b) Explain the various stages of combustion in C.I. engine.

OR

6. a) What is air swirl? Compare air swirl in C.I. engine with turbulence in S.I. engine?
   b) Explain the various factors affecting the delay period.
7. a) A simple carburetor is required to supply 6kg of air per minute and 0.45kg of fuel of density 740kg/m^3. The air is initially at 1.013 bar and 27°C. Calculate the throat diameter of the choke for a flow velocity of 92m/s. Velocity coefficient = 0.8. If the pressure drop across the fuel metering orifice is 0.75 of that at the choke, calculate orifice diameter assuming $C_d = 0.60$.
   b) What are the advantages and disadvantages of using hydrogen in S.I. engine?

OR

8. a) What is the cause of diesel smoke? What are the ways of controlling diesel smoke?
   b) Compare battery ignition system with magneto ignition system.
9. a) Explain the effect of supercharging on the performance of engine.
   b) Explain in brief various types of turbo charging.

OR

10. a) What are supercharging limits for S.I. Engine and C.I. engine?
    b) How supercharging of two stroke engine is done?

