Roll No ....

ME - 604
B.E. VI Semester
Examination, December 2012
Internal Combustion Engines

Time : Three Hours

Maximum Marks : 100   ***Minimum Pass Marks :35***

Note: Attempt all questions. All questions carry equal marks. Assume suitable data if necessary.

1. (a) Define the following efficiencies as applied to an engine and correlate them: Indicated thermal efficiency, Brake thermal efficiency, Volumetric efficiency, Relative efficiency and Mechanical efficiency

   (b) A two stroke cycle internal combustion engine has a mean effective pressure of 6 bar. The speed of engine is 1000 r.p.m. If the diameter of piston and stroke are 110mm and 140 mm respectively, find the indicated power developed.

   <div align="center">OR</div>

   (a) Explain the performance characteristics of SI and CI engines?

   (b) A 4- cylinder four- stroke petrol engine develops 14.7 kw at 1000 r.p.m. The mean effective pressure is 5.5 bar. Calculate the bore and stroke of the engine, if the length of stroke is 1.5 times the bore.

rgpvonline.com

2. (a) What is a diesel knock? Explain, how it affects engines performance? Discuss effects of the following on it: (i) Fuel quality, (ii) Degree of atomization, (iii) Compression ratio

   (b) Explain valve timing and firing order with neat sketch?

   OR

   (a) What do you understand by ignition timing? Discuss the various factors which effect ignition timing requirements?

   (b) Discuss the desirable characteristics of combustion chamber design for spark ignition engines.

3. (a) Explain and discuss the term delay period as referred to C. I.engines.

   (b) A four cylinder, four stroke diesel engines develops 90 KW at 3600 r.p.m. The brake specific fuel consumption is 170gms per kwh. Calculate volume of fuel injected per cycle per cylinder. Specific gravity of fuel being 0.88.

   OR

   (a) Discuss in brief different phases of combustion in CI engine.

   (b) Prepare a comparative statement for single- hole , multi-hole , and pintle nozzles for Cl engines on the following points: (1) injection pressure, (2) spray angle and characteristics, (3) recommended type of combustion chamber, (4) clogging problem

4 (a) Discuss the functions of lubricant in an I.C. engine and enlist the desirable properties of good lubricant which affect engine performance.

  (b) A four cylinder engine running at 1200 rpm delivers 20kw. The average torque when one cylinder was cut is 110Nm. Find the indicated thermal efficiency, if the calorific value of the fuel is 43MJ/kg and the engine uses 360grams of gasoline per kWh.

OR

a) Distinguish between speed characteristics and load characteristics of IC engine. To which type of engine they are applicable .

b) A four- cylinder petrol engine has a compression ratio of 7.5:1 and produces 52KW of brake power at 2000 rpm. A morse test is carried out and the brake torque reading are 177 Nm 170Nm respectively. For normal running at this speed , the bsfc is 0.364 kg/kWh. The heating value of fuel is 44200kj/kg. Calculate mechanical , brake, thermal and relative efficiencies of the engine.

5 (a) Enlist advantages of supercharging. Discuss turbo charging of a two stroke engine.

(b) What are requirements of ignition system for petrol engine? Explain Describe a suitable. Ignition system for multi cylinder engine.

OR

(a) List the various alternatives fuels for S.I. engine. Also write the alteration requirement in the engine.

(b) A Simple jet carburetor is required to supply 5kg of air and a 0.5 kg of fuel per minute. The fuel specific gravity is 0.75. The air is initially at 1 bar and 300k. Calculate the throat diameter of the choke for a flow velocity of 100m/s. Velocity coefficient is 0.80. If the pressure drop across the fuel metering orifice is 0.80. of that of the choke, calculate orifice diameter assuming Cdf = 0.60 and =1.4.

*****

ME - 604