Total No. of Questions : 5] [Total No. of Printed Pages : 3

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ME–604(N)

B. E. (Sixth Semester) EXAMINATION, June, 2010

(New Scheme)

(Mechanical Engg. Branch)

INTERNAL COMBUSTION ENGINES

[ME–604(N)]

Time : Three Hours

Maximum Marks : 100

Miximum Pass Marks : 35

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

1. (a) Compare between four-stroke and two-stroke engines on the following points :
   (i) Working
   (ii) Weight
   (iii) Efficiency
   (iv) Scavenging

   (b) Explain the factors responsible for causing deviations between theoretical and actual cycles of IC engines.

Or

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

(b) A six cylinder, 4-stroke SI engine having a piston displacement of 700 cm^3 per cylinder developed 78 kW at 3200 r.p.m. and consumed 27 kg of petrol per hour. The CV of petrol is 44 MJ/kg. Calculate the volumetric efficiency of the engine if the air-fuel ratio is 12 and the intake air is at 0·9 bar, 32°C.

2. (a) Explain flame development and propagation.

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

Or

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

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

3. (a) What do you mean by Octane Number and Cetane Number of fuels ? How are they determined ?

(b) Explain the working and principles of Rotary I.C. engines.

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 CI engines on the following points :

(i) Injection pressure

(ii) Spray angle and characteristics

(iii) Recommended type of combustion chamber

(iv) Clogging problem

4. (a) Enlist the advantages of supercharging. Discuss turbo charging of a two-stroke engine.

(b) What are the requirements of ignition system for petrol engine ? Explain. Describe a suitable ignition system for multicylinder engine.

Or

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

(b) A simple jet carburettor is required to supply 5 kg of air and 0·5 kg of fuel per minute. The fuel specific gravity is 0·75. The air is initially at 1 bar and 300 K. Calculate the throat diameter of the choke for a flow velocity of 100 m/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 $r = 1·4$.

5. Write short notes on any *four* of the following :

(a) Deletonation or unlocking in S.I. engine

(b) Design of combustion chambers for C.I. engines

(c) Fuel additives and their purpose

(d) Multifuel engines and their performance

(e) Air pollution from I. C. Engines

(f) Governing of I. C. engines