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BIME-010

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B.Tech. MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

June, 2014

BIME-010 : THERMAL ENGINEERING

Time : 3 Hours *Maximum Marks : 70*

Note: *Attempt **any seven** questions. Assume missing data suitably, if **any**. Use of scientific calculator is **permitted**.*

1. Compare in detail. Four stroke and two stroke IC engines. **10**

2. Explain valve timm's diagram for Four stroke CI engine with neat sketch. **10**

3. From the point of view of fuel air cycle analysis how does fuel air ratio affect maximum temperature and maximum pressure ? **10**

4. Explain with a neat sketch of any one type of injection pump governors. **10**

5. Explain why rich mixture is required for the following : **10**
   (a) Idling
   (b) Maximum Power

6. With a neat sketch explain the battery ignition system. 10

7. Explain the process of combustion in CI engines with a neat sketch. 10

8. A six cylinder gasoline engine operates on 4 stroke cycle. The bore and stroke of each cylinder are 80 mm and 100 mm respectively. At a speed of 4000 rpm, the fuel consumption is 20 kg/hr and torque developed is 150 Nm. Calculate : 10
   (a) Brake power
   (b) Brake mean effective pressure
   (c) Brake thermal efficiency

9. A two stage reciprocations air compressor takes in 2.82 m^3 of air/min at a pressure of 1.05 bar and temperature of 22°C. It delivers air at 8.44 bar. The compression is carried out in each cylinder according to law $PV^{1.2} = C$ and the air is cooled to its initial temperature in inter cooler. Neglecting the clearance, determine the inter-cooler pressure and minimum power required to drive the compressor. 10

10. Write short notes on the following : 5x2=10
   (a) Knock in CI engines
   (b) Working principle of single acting single stage reciprocating air compressor