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**BIME-010**

01619

# B.Tech. MECHANICAL ENGINEERING (BTMEVI)

## Term-End Examination

## December, 2011

## BIME-010 : THERMAL ENGINEERING

*Time : 3 hours* *Maximum Marks : 70*

**Note:** *Attempt **any seven** questions. All the questions are to be answered in English language only. Use of scientific calculater is permitted.*

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1. (a) State the different uses of compressed air. 5

   (b) A single stage reciprocating air compressor takes 1 $m^3$ of air per minute at 1.01325 bar and 15°C, and delivers at 7 bar. Assuming that law of compression is $pV^{1.35} = \text{constant}$, and that clearance is negligible, calculate the indicated power. 5

2. (a) What are advantages of multi-stage compression ? 5

   (b) Prove that the work done in two stage compression with perfect intercooling is given by : 5

$$W = \frac{2n}{n-1} p_1 V_1 \left[ \left( \frac{p_3}{p_1} \right)^{\frac{n-1}{2n}} - 1 \right]$$

where $p_1$ is the suction pressure, $p_3$ is the delivery pressure and the compression follow the law $pV^n = C$.

3. (a) Compare the two stroke and four stroke of Internal combustion engine. 5

(b) Compare the spark Ignition and compression ignition engines. 5

4. Draw typical valve timing diagrams for low speed and high speed four stroke engines. Explain major differences if any, between two sets of valve timing diagrams. 10

5. Why volaticity of gasoline is important. Draw ASTM distillation curve of gasoline. Discuss how it effects performance of engine. 10

6. Draw sketches showing the contructional features of different types of nozzles used in diesel engines, explain the function of each. 10

7. Explain stages of combustion in C.I. engines. Explain how injection timing affects-delay period. 10

8. What are different ignition system for S.I. engines ? Explain magneto ignition system. 10

9. Describe the method of measurement of brake power with rope brake dynamometer with suitable diagram. 10

10. Write short notes on *any two* of the following :

(a) Solid injection system in diesel engine. 5

(b) Morse test for measurement of frictional power in engines. 5

(c) Volumetric efficiency of a reciprocating air compressor. 5