

**B.Tech. – VIEP – MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

December, 2018

00013

BIME-010 : THERMAL ENGINEERING – II

Time : 3 hours

Maximum Marks : 70

Note : Attempt any seven questions. All questions carry equal marks. Use of scientific calculator is permitted.

1. Describe with a neat sketch the construction and working of a single-stage single-acting reciprocating air compressor. 10

2. What is meant by volumetric efficiency of a reciprocating compressor ? How is it affected by
 - (a) speed of the compressor,
 - (b) delivery pressure, and
 - (c) throttling across the valves ? 10

3. Explain with suitable sketches, the working of a four-stroke Otto engine. 10

4. Compare the relative advantages and disadvantages of four-stroke and two-stroke cycle engines. 10
5. What is the difference between air cycle and fuel-air cycle ? What are the assumptions in fuel-air cycle ? 10
6. A diesel engine contains 0.1 m^3 of air at 0.98 bar and 30°C at the beginning of compression. The compression ratio is 15 and the volume at cut-off is 0.0125 m^3 . Determine for the corresponding air standard cycle :
- (a) The cut-off ratio,
 - (b) The percent clearance,
 - (c) The work done, and
 - (d) The air standard efficiency. 10
- Take $C_p = 1.005 \text{ kJ/kg K}$, and $\gamma = 1.4$.

7. (a) Describe with the help of a neat sketch, a Magneto ignition system.
- (b) State the functions of an ignition coil and a condenser in the battery ignition system of a multi-cylinder SI engine. 5+5

8. Explain the phenomena of knocking in SI engine. What are the different factors which influence the knocking ? Describe the methods used to suppress it. 10

9. (a) What do you mean by performance of IC engine ?

(b) Discuss with suitable sketch, the brake rope dynamometer. 5+5

10. The following observations were recorded during a trial of a four-stroke engine with rope brake dynamometer :

Engine speed = 650 rpm

Diameter of brake drum = 600 mm

Diameter of rope = 50 mm

Dead load on the brake drum = 32 kg

Spring balance reading = 4.75 kg

Calculate the brake power in kW. 10
