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D – 5370

Reg. No. : .....

Name : .....

**First and Second Semester B.Tech. Degree Examination, March 2018  
(2008 Scheme)**

**08.107 : BASIC MECHANICAL ENGINEERING (CMNPHERUFBS)**

Time : 3 Hours

Max. Marks : 100

**Instructions :** Answer *all* questions in Part – A, *each* carries 4 marks.  
Answer *two full* questions from *each* Module in Part – B,  
*each* carries 10 marks.

PART – A

(10×4=40 Marks)

1. Explain the classification of thermodynamic systems.
2. How is work defined in thermodynamics ? What is free expansion ?
3. Explain the two statements of the second law of thermodynamics.
4. Draw the otto cycle in PV co-ordinates. Write down the expression for the air standard efficiency of an otto cycle.
5. What is a reciprocating compressor ? Draw the PV diagram for a reciprocating air compressor.
6. Explain the need for priming of pumps.
7. Explain the effect of refrigerants on ozone depletion.
8. What is velocity ratio of a belt drive ? Write down the expression for the velocity ratio of a belt drive considering slip and thickness of the belt.
9. Explain the following hand forging operations :
  - i) Drifting
  - ii) Swaging
10. What is Electro Chemical Machining ? Mention two applications of ECM.

P.T.O.



## PART – B

## Module – I

11. Derive the expression for the air standard efficiency of an otto cycle. 10
12. An ideal diesel cycle operates on 1 kg of standard air with an initial pressure of  $0.01 \text{ N/mm}^2$  and a temperature of  $35^\circ\text{C}$ . The pressure at the end of compression is  $3.5 \text{ N/mm}^2$  and cut-off is 6% of the stroke. Determine
- i) Compression ratio
  - ii) % clearance
  - iii) Heat supplied
  - iv) Heat rejected and
  - v) Mean effective pressure 10
13. With a neat sketch, explain any one type of fire tube boiler. 10

## Module – II

14. With neat sketches, explain the working of a centrifugal pump. 10
15. a) Explain any one type of nuclear reactor. 7  
b) Name three nuclear fuels and their sources. 3
16. With neat sketches, explain the working of a simple domestic refrigerator. 10

## Module – III

17. A shaft runs at 80 rpm and drives another shaft at 150 rpm through belt drive. The diameter of the driving pulley is 600 mm. Determine the diameter of the driven pulley for the following cases :
- i) Neglecting belt thickness
  - ii) Taking belt thickness as 5 mm
  - iii) Assuming for case ii, a total slip of 4%. 10
18. a) What is rolling ? Explain the different types of rolling mills. 5  
b) Explain the different operations which can be carried out in a milling machine. 5
19. a) Explain the principle of working of CNC machine. 5  
b) What are the applications and advantages of CNC machines. 5
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