Combined First and Second Semester B.Tech. Degree
Examination, April 2016
(2008 Scheme)
08-107 : BASIC MECHANICAL ENGINEERING

Time : 3 Hours                                          Max. Marks : 100

Instruction : Answer all questions from Part I and two questions from each Module of Part II.

PART – I                  (4x10=40 Marks)

1. Explain the first law of thermodynamics applied to an open system.

2. In a single P-V diagram show isobaric, isochoric, isothermal and isentropic processes. Write the equation of each process.

3. Can the entropy of the universe increase indefinitely? Discuss the reason for your answer.

4. What is fluidised bed combustion? Name the two types of fluidised bed combustors.

5. List the fields of applications of reciprocating and centrifugal compressors.

6. Draw the schematic diagram of a simple closed cycle gas turbine plant.

7. Distinguish between comfort and industrial airconditioning.

8. What is forging? List any four typical components produced by forging.

9. What are the advantages of CNC machines?

10. What is a gear train? Why gear trains are used?
PART – II
Module – I

11. a) Draw the Otto cycle on P-V and T-S diagrams.

   b) A gas engine working on the Otto cycle has a cylinder of diameter 200 mm and stroke 250 mm. The clearance volume is 1570 cc. Find the air standard efficiency. Assume $C_p = 1.004 \text{ kJ/kg K}$ and $C_v = 0.717 \text{ kJ/kg K}$.  

12. Describe the fuel system of a diesel engine using a block diagram.  

13. Briefly describe:

   i) MPFI vehicle  
   ii) Hybrid vehicles  

Module – II

14. Describe the working of a reciprocating pump with the help of a simple sketch.  

15. i) What are the advantages of hydro electric power plant?  

   ii) Draw a simple schematic diagram of the arrangement of main components of a nuclear power plant.  

16. Explain the working of a steam turbine of the reaction type with the help of suitable diagrams.  

Module – III

17. a) Why gear drives are called positive drives, whereas belt and rope drives are not considered positive?  

   b) An engine shaft running at 200 rpm is required to drive a generator at 300 rpm by means of a belt. The pulley on the driving shaft is 500 mm diameter. Determine the diameter of the generator pulley of the thickness of belt is 8 mm. Assume a slip of 4%.  

18. Write short notes on welding, soldering and brazing.  

19. Describe the electrochemical machining process. Mention some typical applications of ECM process.