Combined First and Second Semester B.Tech. Degree Exam, April 2014
(2013 Scheme)
13.107 : BASIC MECHANICAL ENGINEERING (ACEFRT)

Time : 3 Hours
Max. Marks : 100

PART - A

Answer all questions. Each question carries 2 marks.
1. Define internal energy. Mention whether it is a property of the system or not.
2. What is a refrigerator and write an expression for its COP in terms of heat absorption and rejection?
3. Explain specific gravity. Write the values of specific gravity and specific weight of water at 4°C.
4. What are the different types of ignition systems used in IC engines?
5. Compare fire tube and water tube boiler.
6. What is the maximum theoretical suction head of centrifugal pump?
7. Which turbine is used in Peringalkuthu Power Station? Why?
8. Now which ecofriendly refrigerant is used in refrigeration industry? Why?
9. Why friction discs are not used when constant velocity ratio is required?
10. What are the main methods of mechanical power transmission from one shaft to another?

(2×10=20 Marks)

PART - B
Module - I

Answer any one full question from each Module.

11. a) Explain Carnot Cycle with PV and TS diagram. Derive a relation for Carnot efficiency in terms of source and sink temperatures T₁ and T₂.

15

b) What is a heat pump? How does it differ from a refrigerator?

5

OR

12. a) Derive continuity equation and state the assumptions.

12

b) State and explain Pascal’s Law. Write one application of this Law.

8

P.T.O.
13. a) Derive the expression for air standard efficiency of a Diesel cycle.
   b) Explain CRDI and MPFI.

   OR

14. a) Explain with a neat sketch, the working of a Babcock and Wilcox boiler.
   b) Compare four stroke petrol engine and four stroke diesel engine.

**Module – III**

15. a) Explain with a neat sketch the working of a centrifugal pump.
   b) Derive an expression for the efficiency of a gas turbine.

   OR

16. a) Explain Boiling Water Reactor (BWR) and Pressurized Water Reactor.
   b) Compare comfort and industrial air conditioning.

**Module – IV**

17. a) With the help of a belt, an engine running at 200 rpm, drives a line shaft. The diameter of the pulley on the engine is 80 cm and the diameter of the pulley on the line shaft is 40 cm. A 100 cm diameter pulley on the line shaft drives a 20 cm diameter pulley keyed to a dynamo shaft. Find the speed of the dynamo shaft when
   i) there is no slip
   ii) there is a slip of 2.5% at each drive.

   b) Explain different types of castings.

   OR

18. a) Explain EDM and ECM with neat sketches.
   b) Explain soldering and brazing.