Reg. No. : ....

Name : ....

Combined First and Second Semester B.Tech. Degree Examination, 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 T_1 and T_2.   **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**

Module – II

13. a) Derive the expression for air standard efficiency of a Diesel cycle. 12

    b) Explain CRDI and MPFI. 8

OR

14. a) Explain with a neat sketch, the working of a Babcock and Wilcox boiler. 12

    b) Compare four stroke petrol engine and four stroke diesel engine. 8

Module – III

15. a) Explain with a neat sketch the working of a centrifugal pump. 12

    b) Derive an expression for the efficiency of a gas turbine. 8

OR

16. a) Explain Boiling Water Reactor (BWR) and Pressurized Water Reactor. 15

    b) Compare comfort and industrial air conditioning. 5

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. 10

    b) Explain different types of castings. 10

OR

18. a) Explain EDM and ECM with neat sketches. 15

    b) Explain soldering and brazing. 5