

FACULTY OF ENGINEERING
B.E. 2/4 (E & EE) I Semester (New) (Main) Examination, December 2011
PRINCIPLES OF MECHANICAL ENGINEERING

Time : 3 Hours]

[Max. Marks : 75

Note : Answer all questions from Part A.

Answer any five questions from Part B

PART – A



(25 Marks)

1. Describe the various causes of irreversibility. 2
2. Define tonne of refrigeration and write the cooling capacity of a 5 KW cooling capacity refrigeration system in terms of tonne of refrigeration. 3
3. Write the differences between Petrol engine and Diesel engine. 3
4. Discuss the main fields of application of gas turbines. 2
5. Write the expression for velocity ratio for a compound gear train. 2
6. What are the different types of belt drives ? Write the expression for length of belt in one of the belt drive. 3
7. What are the practical applications of Bernoulli's equation. 2
8. What is the function of a Draft tube ? In which type of turbines a draft tube is used ? 2
9. What is the difference between single stage and multistage centrifugal pump ? 3
10. What are the various types of problems faced in pumps and what are the remedies for them. 3

PART – B

(50 Marks)

11. a) Obtain steady flow energy equation for a compressor. 4
 b) The walls of a room consist of concrete, brick and wood of thickness 2 cm, 30 cm, and 1 cm respectively. Find the rate of heat flow by conduction per square meter area, if the temperature of inside wall surface is 30°C, and out side is 5°C. The values of K for concrete, brick and wood are 0.29, 0.46 and 0.167 W/mK respectively. 6
12. a) Define mechanical efficiency and thermal efficiency for an ic engine. 5
 b) Describe the working of a Gas turbine cycle. 5

13. a) Write the various types of Gear trains and write their applications. 4
- b) The tension in two sides of belt are 600 N and 300 N respectively. If speed of driver is 250 rpm and its diameter is 1.25 m, find power transmitted by the belt. 6
14. a) Derive Bernoulli's equation. 4
- b) Water is flowing through a pipe having diameters 25 cm and 15 cm at section 1 and 2 respectively. The rate of flow through pipe is 40 lit/hr. The section 1 is 8 m above datum and section 2 is 6 m above datum. If the pressure at section 1 is 44.24 N/cm². Find the intensity of pressure at section 2. 6
15. A Pelton wheel is having a mean bucket diameter of 1 m and is running at 1000 rpm. The net head on the pelton wheel is 700 m. If the side clearance angle is 15° and discharge through nozzle is 0.1 m³/sec. Find
- a) Power available at the nozzle and
- b) Hydraulic efficiency of the turbine. 10
16. a) Discuss the effect of acceleration head and friction on the performance of a reciprocating pump. 5
- b) Describe the working of a double acting reciprocating pump and explain why air vessels are provided on reciprocating pumps. 5
17. Write short notes on the following :
- i) Eco friendly refrigerants. 3
- ii) Differences between 2 stroke and 4 stroke engines. 4
- iii) Differences between impulse and reaction turbines. 3