

## FACULTY OF ENGINEERING

B.E. 2/4 (E&EE) I-Semester (Main) Examination, November / December 2012

Subject : Principles of Mechanical Engineering

Time : 3 Hours

Max. Marks: 75

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

### PART – A (10x2.5=25 Marks)

1. Enumerate the conditions which must be fulfilled by a reversible process.
2. What is LMTD and write the equation for a parallel flow heat exchanger?
3. Define Indicated power, brake power and mechanical efficiency for an IC engine.
4. Write the classification of Boilers.
5. Write an expression for velocity ratio for a compound gear train.
6. What are the applications of Belt drives?
7. A pipe of diameter 80mm and 800m long carries water at the rate of  $0.008\text{m}^3/\text{s}$ . Calculate the loss of head. Take coefficient of friction as 0.004636.
8. Define various unit quantities used in Hydraulic Turbines.
9. What is an air vessel? Describe the functions of air vessels.
10. What is priming? Why is it necessary?

### PART – B (5x10=50 Marks)

- 11.(a) Obtain steady flow energy equation for a Turbine. (5)
- (b) Explain the working of a vapour compression refrigeration system. (5)
- 12.(a) An engine with 90% mechanical efficiency has rating of 38 kw brake power. Estimate its indicated power and frictional power loss. (5)
- (b) Describe the working of a single stage single acting reciprocating air compressor. (5)
- 13.(a) What is an epicyclic gear train and what are its applications? (5)
- (b) The tension in two sides of belt are 600N and 300N respectively. If speed of driver is 250 rpm and its diameter is 1.25m, find power transmitted by the belt. (5)
- 14.(a) Derive Bernoulli's equation. (5)
- (b) A Hydraulic turbine develops 7225 kw power under a head of 25 meter at 135 rpm. Calculate the specific speed of the turbine. (5)
- 15.(a) Describe the working of centrifugal pump. (5)
- (b) What is the effect of acceleration in suction and delivery pipes. (5)
- 16.(a) Write the differences between petrol and Diesel engines. (5)
- (b) Describe the working of an impulse turbine. (5)
17. Write short notes on the following:
  - (a) Eco friendly refrigerants (3)
  - (b) Simple vertical Boiler (3)
  - (c) Differences between impulse turbine and reaction turbine (4)