

II B.Tech II Semester Supplementary Examinations, April/May 2005
THERMAL ENGINEERING-I
(Mechanical Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Name the lubrication systems available and which one uses splash lubrication in i.c .engines.
(b) Explain cylinder wise classification of i.c. engines.
2. Discuss the effects of the following operating variables on detonation
 - (a) compression ratio
 - (b) Inlet temperature of mixture
 - (c) Spark timing
 - (d) Engine speed
 - (e) Size of bore
3. Explain the term delay period as referred to C.I engines. Explain the effect of the following operating parameters on delay period in C.I engines
 - (a) Speed
 - (b) Fuel / air ratio
 - (c) Injection advance
 - (d) Cetane number of fuel
4. (a) What is the significance of conducting the MORSE test? Explain the same in detail.
(b) During the trial of a four stroke diesel engine the following observations were recorded:
Area of the indicator diagram = 475 mm^2
Length of indicator diagram = 62 mm
Spring number = 1.1 bar / mm
Diameter of piston = 100 mm
Length of the stroke = 150 mm
Engine RPM = 375
Determine
 - i. indicated mean effective pressure
 - ii. indicated power in kW.
5. (a) What are the effects of clearance on the performance of reciprocating air compressors?

- (b) What is meant by brake power and indicated power of an air compressor?
6. (a) Explain the terms slip factor and power input factor in centrifugal compressors.
- (b) A centrifugal compressor operating at a pressure ratio of 4:1 has inlet temperature of 15°C . Calculate the overall diameter of impeller given that speed of operation 15000 rpm.
Slip factor 0.9
Power input factor 1.03
Isentropic efficiency 0.85
7. (a) Derive the expression for COP of vapour compression refrigeration system in terms of enthalpies?
- (b) Explain effects of under cooling and super heating.
8. (a) Define wet bulb and dry bulb temperature and illustrate its application with respect to air conditioning applications?
- (b) How the refrigerants are named according to their composition? Discuss the important properties of refrigerants?
