B.Tech(Integrated M.Tech/MBA) 1st Semester Examination
Jan.2014
Elements of Mechanical Engineering
Subject Code: MEL-101
Time Allowed: 03 hours.              Maximum Marks: 100

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.

1 (a) Explain second law of thermodynamics.
(b) What is the concept of internal energy, enthalpy and entropy in thermodynamics?
(c) Define stress & strain.
(d) What is the mechanical advantage and velocity ratio of lifting machine?
(e) What is the taper turning operation of Lathe Machine?  (5x4)

SECTION A

2(a) Explain construction and working with neat labeled sketch of Cochran boiler.  (12)
(b) Make a comparison between water tube and fire tube boilers.  (8)

3(a) A straight bar 450mm long is 10mm in diameter for the first 200mm length &20mm in diameter for the remaining length. If the bar is subjected to an axial Compressive load of 10kN, calculate the decrease in length of the bar. Take E = 2 x 10^5 N/mm^2  (10)
(b) Explain construction and working with neat labeled sketch of Francis turbine.  (10)

4(a) Explain with sketch different type of gear train used for power transmission.  (10)
(b) Derive an expression for velocity ratio of single purchase winch crab with sketch.  (10)

SECTION B

5(a) Define milling machine tool. Draw neat sketch of milling machine and label it.  (10)
(b) Differentiate between shaper and planer machine tool.  (10)

6(a) Define pattern. Explain different types of allowances provided for pattern making using diagram.  (12)
(b) Write in detail about the steps of casting.  (8)

7(a) Explain in detail the construction, working, advantages, disadvantages ad applications of Metal Inert Gas (MIG) Welding.  (14)
(b) Describe the Distortion welding defect and its causes.  (6)