B.Tech / Integrated (MBA/M.Tech) 1st Semester Examination
June – July 2013
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: Attempt any five questions and all questions carry equal marks.

Section-A

1. (a) State and explain Zeroth, First and Second law of thermodynamics. (6)

(b) What is the concept of internal energy of the system. (4)

(c) Draw neat and labeled sketch of Babcock and Wilcox boiler and explain its working. (10)

2. (a) Draw neat and labeled sketch of a Pelton Turbine and explain its working. (10)

(b) A steel wire 2 m long and 3mm in diameter is extended by 0.75 mm when a weight W is suspended from the wire. If the same weight is suspended from a brass wire, 2.5m long and 2mm in diameter, it is elongated by 4.64mm. Determine the modulus of elasticity of brass if that of steel be $2.0 \times 10^5 \text{N/mm}^2$. (10)

3. (a) Draw a neat diagram of Single Purchase Winch crab & derive an expression for the velocity ratio(V.R). (8)

(b) A single purchase machine has the following particulars

(i) No. of teeth on pinion = 20
(ii) No. of teeth on spur wheel = 200
(iii) Diameter of the effort wheel = 300 mm
(iv) Diameter of the load drum = 150 mm

Find the V.R & efficiency of the machine if an effort of 20N is applied to lift a load of 360 N. (6)

(c) Explain different types of gears used in automobiles. (6)

Section B

4. (a) What are manufacturing processes. How will you classify manufacturing processes. (10)

(b) Differentiate between a Shaper and Planer. (10)

5. (a) What is a Pattern. Classify its types and explain any two types of pattern. (10)

(b) What are the constituents and different properties of moulding sand. (10)

6. (a) Differentiate between Soldering and Brazing. (6)

(b) What do you understand by gas welding? Describe the equipments required for oxy-acetylene welding process. (14)