M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)
BANGALORE – 560 054

SEMESTER END EXAMINATIONS – DEC 2013 / JAN 2014

Course & Branch : **B.E.- COMMON TO ALL BRANCHES** Semester : **I**

Subject : **Elements of Mechanical Engineering** Max. Marks : **100**

Subject Code : **ME101** Duration : **3 Hrs**

Instructions to the Candidates:
- Answer one full question from each unit.

UNIT – I

1. a) Write the difference between renewable energy sources and non renewable energy sources (06)

   b) Explain how geothermal energy could be harvested (08)

   c) Find the Specific volume and enthalpy of 1kg of steam at 0.8 Mpa when (06)
   i) Dryness fraction is 0.9
   ii) The steam is superheated to a temperature of 300^0c. the specific heat of superheated steam is 2.25KJ/Kg K

2. a) Sketch and Explain the construction and working of Babcock-Wilcox boiler (10)

   b) Write the differences between impulse turbine and reaction turbine (05)

   c) Sketch and explain closed cycle gas turbine (05)

UNIT – II

3. a) Define the following (03)
   i) Clearance Volume ii) Swept volume iii) Compression ratio

   b) Explain with neat sketch construction and working of CI Engine (10)

   c) A 4 cylinder 2S petrol engine develops 26KW brake power at 2200rpm. The mean effective pressure is 7 bar and mechanical efficiency is 87%. Determine the bore diameter and stroke of the engine. Given stroke length is 1.5 times the bore (07)

4. a) Define the following (04)
   i) Unit of refrigeration
   ii) Co-efficient of Performance

   b) Explain with neat sketch the working of vapour absorption refrigerator (08)

   c) With a Neat sketch, explain the working of typical room air conditioner (08)

UNIT – III

5. a) With neat sketches, Explain the following lathe operations (10)
   i) Facing ii) Cylindrical turning iii) Taper turning by swiveling the compound rest.

   b) Explain with neat sketch construction and working of radial drilling machine (10)

6. a) Explain with neat sketch the working of horizontal milling machine (08)
   b) Differentiate between up milling and down milling (06)
   c) With neat sketch explain working of cylindrical grinding machine (06)

UNIT – IV

7. a) Explain NC Coordinate system (06)
   b) Explain with block diagram the functioning of Computer numerical control system (10)
   c) Write the differences between soldering and Brazing (04)

8. a) Explain with neat sketch the working principle of Arc welding process (08)
   b) Sketch and Explain sliding contact bearing for axial loading (07)
   c) What are the advantages and limitations and applications of anti friction bearing? (05)

UNIT – V

9. a) Derive an Expression for ratios of tensions in the belts (08)

   b) Distinguish between (06)
      i) Open and cross belt drive
      ii) Simple and compound gear train

   c) In a cross belt drive, the difference in tension between tight and slack sides is 1200N.If the angle of contact is 160^0 and coefficient of friction is 0.28, find the tensions between the slack and tight sides (06)

10. a) Explain with sketches any three types of gears (09)
    b) The velocity ratio of a gear drive is 2. The driving wheel has 16 teeth and turns at 120rpm. Find the rpm and number of teeth on the driven wheel (04)
    c) Classify different methods of lubrication. Explain any one with neat sketch (07)

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