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First Semester B.E. Degree Examination, Dec.2014/Jan.2015
Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
ONE question from each part.**

PART – 1

- 1
 - a. Differentiate between renewable and non-renewable sources of energy. (05 Marks)
 - b. Discuss advantages of water tube boilers over fire tube boiler. (05 Marks)
 - c. Explain with neat sketch, working principle of Lancashire Boiler. (10 Marks)
- 2
 - a. Explain the factors, which favor the use of renewable energy. (06 Marks)
 - b. What are the various renewable energy resources available and show how wind turbine can be used for electrical power generation, with a schematic sketch. (08 Marks)
 - c. List out any five boiler mountings and explain briefly any two boiler mountings (only functions). (06 Marks)

PART – 2

- 3
 - a. Explain with neat sketch, impulse and reaction turbines. (10 Marks)
 - b. Compare closed cycle gas turbine with open cycle gas turbine. (05 Marks)
 - c. List any five advantages of two-stroke engine over four-stroke engine. (05 Marks)
- 4
 - a. Explain with block diagrams principle of operation of open cycle and closed cycle gas turbine. (06 Marks)
 - b. Compare impulse and reaction turbine. (04 Marks)
 - c. A four stroke diesel engine has a piston diameter 250mm and stroke 400mm. The mean effective pressure is 4 bar and speed is 500rpm the diameter of the brake drum is 1000mm and the effective brake load is 4000N. Find IP, BP, FP. (10 Marks)

PART – 3

- 5
 - a. Explain any three machine tool operation. (06 Marks)
 - b. Explain plane milling, end milling, slot milling, with neat sketch. (06 Marks)
 - c. Classify the robots on the basis of physical configuration. (08 Marks)
- 6
 - a. Explain types of automation with example. (06 Marks)
 - b. Explain taper turning operation by swiveling the compound rest. (06 Marks)
 - c. Explain NC and CNC machine with simple block diagram. (08 Marks)

PART – 4

- 7
 - a. Write down applications of ferrous metals. (05 Marks)
 - b. Define composites and list its classification. (05 Marks)
 - c. Explain electric arc welding and oxy-acetylene welding with neat sketch. (10 Marks)

- 8 a. What is alloy? Write down its application. (05 Marks)
b. Explain applications of composites. (05 Marks)
c. Compare soldering and brazing. (05 Marks)
d. Explain types of ferrous metals. (05 Marks)

PART – 5

- 9 a. What are the properties of good refrigerants? (04 Marks)
b. Explain with neat sketch working principle of vapour compression refrigeration. (10 Marks)
c. Explain the following:
i) Refrigeration effect
ii) Ton of refrigeration
iii) COP (06 Marks)
- 10 a. Explain the working principle of vapour absorption refrigeration process with neat sketch. (10 Marks)
b. Explain room air conditioner system with neat sketch. (10 Marks)
