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First/Second Semester B.E. Degree Examination, Dec.2015 / Jan.2016
Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks:100

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

Module – 1

- 1 a. Name three renewable and non-renewable energy sources and compare them for advantages and disadvantages. (08 Marks)
- b. Define calorific value of fuel. Explain higher calorific value and lower calorific value. (06 Marks)
- c. With a neat sketch, explain application of solar flat plate collector. (06 Marks)
- 2 a. Define the following terms in relation to steam:
 - i) Dryness fraction.
 - ii) Latent heat.
 - iii) Degree of super heat.
 - iv) Saturation temperature (08 Marks)
- b. Differentiate between water tube Boiler and Fire tube Boiler. (06 Marks)
- c. List the boiler mountings and accessories and also mention their uses. (06 Marks)

Module – 2

- 3 a. Sketch and explain working of reaction steam turbine. (08 Marks)
- b. Describe the working principle of a closed cycle gas turbine with neat sketch. (07 Marks)
- c. How water turbines are classified? (05 Marks)
- 4 a. Explain with neat sketch construction and working of 4-stroke diesel engine with the help of theoretical P-V diagram. (10 Marks)
- b. A Gas Engine working on 4-stroke cycle has a cylinder diameter 300 mm and stroke length of 500 mm is running at 220 rpm. Its mechanical efficiency is 80% when the mean effective pressure is 0.65 MPa. Find i) Indicated power ii) Brake power iii) Friction power. (10 Marks)

Module – 3

- 5 a. With a neat sketch, explain the following lathe operations:
 - i) Facing
 - ii) Cylindrical turning.
 - iii) Knurling.
 - iv) Thread cutting. (08 Marks)
- b. Define automation. Discuss the different types of automation. (06 Marks)
- c. Differentiate between:
 - i) Drilling and Boring.
 - ii) Counter boring and counter sinking. (06 Marks)
- 6 a. Explain any two types of Robot-configuration. (08 Marks)
- b. What are NC and CNC machines? Mention the difference between them. (06 Marks)
- c. What are the different operations commonly performed on milling machine? Explain any two. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module – 4

- 7 a. State the composition and applications of Carbon steels used in Engineering applications. (07 Marks)
b. Define composite material. How composites are classified? (07 Marks)
c. With neat sketches, explain different types of Flames used in Gas welding. (06 Marks)
- 8 a. What is welding? Explain electric arc welding with sketch. (07 Marks)
b. Differentiate between soldering, brazing and welding. (07 Marks)
c. Explain the advantages and limitations of composites. (06 Marks)

Module – 5

- 9 a. What are the desirable properties of Good refrigerants? (06 Marks)
b. With suitable sketch, explain working of vapour compression refrigeration. (08 Marks)
c. Define the following:
i) Ton of refrigeration.
ii) Refrigeration effect.
iii) C.O.P. (06 Marks)
- 10 a. What is principle of refrigeration? Name essential parts of refrigerator, and briefly explain their functions. (06 Marks)
b. Explain the construction and working of room air conditioner. (08 Marks)
c. Explain the various applications of air conditioning. (06 Marks)

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