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14EME14/24

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)**

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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