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14EME14/24

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First/Second Semester B.E. Degree Examination, June/July 2018

## 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. Differentiate between renewable and non-renewable sources of energy. (05 Marks)
- b. Explain briefly comparison between Bio-fuels and petroleum fuels. (05 Marks)
- c. With the help of line diagram describe how solar and hydel energy can be used to generate electric power. (10 Marks)
- 2 a. What are boiler mountings and accessories? List them. (08 Marks)
- b. Describe the principle of operation of Babcock and Wilcox boiler with a neat sketch. (09 Marks)
- c. Define the terms: wet steam, and super heated steam. (03 Marks)

### Module – 2

- 3 a. Explain with neat sketches the working of a 4-stroke petrol engines with PV diagram. (08 Marks)
- b. Sketch and explain the working of a Pelton wheel turbine. (08 Marks)
- c. Differentiate between Open Cycle and closed cycle gas turbine. (04 Marks)
- 4 a. With neat sketch, explain the working of DeLaval's turbine. (08 Marks)
- b. Define the terms Indicated Power, Brake power and Brake thermal efficiencies with equations. (08 Marks)
- c. A single cylinder four stroke engine runs at 1000rpm and has a bore of 115mm and a stroke of 140mm. The brake load is 60N at 600mm radius and the mechanical efficiency is 80%. Calculate brake power and indicated power. (04 Marks)

### Module – 3

- 5 a. Define drilling, reaming, boring and Taping. (04 Marks)
- b. Explain with neat sketch taper turning by swiveling the compound rest method. (06 Marks)
- c. How are robots classified based on their physical configuration? Explain any two of them with neat functional sketches. (10 Marks)
- 6 a. Define automation and enumerate its applications (any three). (05 Marks)
- b. What are CNC machines? Name a few types of CNC machines and four applications. (06 Marks)
- c. Explain with sketches counter sinking, plane milling and slot milling. (09 Marks)

### Module – 4

- 7 a. What are engineering materials? Give few applications. (06 Marks)
- b. Define composite materials. What are its advantages and disadvantages? (08 Marks)
- c. Differentiate between soldering and Brazing. (06 Marks)
- 8 a. Briefly discuss three types of flames used in Gas welding. (09 Marks)
- b. What are ferrous and non ferrous metals? Give two examples for each. (06 Marks)
- c. Discuss principle of Arc welding with a neat sketch. (05 Marks)

### Module – 5

- 9 a. With a suitable sketch, explain the working of vapour compression refrigeration system. (12 Marks)
- b. With suitable sketch, explain the working of room air conditioning. (08 Marks)
- 10 a. Explain with suitable sketch, working of vapour absorption refrigeration system. (10 Marks)
- b. Define the terms: Refrigeration, Refrigeration effect, ton of refrigeration, Ice making capacity and refrigeration cycle. (08 Marks)
- c. List properties of a refrigerant. (02 Marks)

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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.