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15EME14/24

**First/Second Semester B.E. Degree Examination, Dec.2019/Jan.2020**

## Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 80

**Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. Draw relevant and neat sketches, wherever necessary.**

### Module-1

- 1 a. Give the classification of Energy sources. (04 Marks)  
 b. Mention the advantages and disadvantages of renewable energy sources. (05 Marks)  
 c. Explain with a neat sketch, harnessing of wind power. (07 Marks)

OR

- 2 a. Explain working principle of water tube boilers and fire tube boilers. (06 Marks)  
 b. Define the following terms : (04 Marks)  
     i) Wet steam   ii) Enthalpy   iii) Dryness fraction   iv) Specific volume.  
 c. State any three mountings and accessories mentioning their functions. (06 Marks)

### Module-2

- 3 a. Differentiate between the impulse and reaction turbines. (04 Marks)  
 b. Draw a constant pressure open cycle gas turbine diagram and explain its working. (06 Marks)  
 c. Give the classification of Internal Combustion engine. (06 Marks)

OR

- 4 a. Give the classification of water turbines. (04 Marks)  
 b. Distinguish between 2 – stroke and 4 – stroke engines. (05 Marks)  
 c. A 4 – stroke engine has a piston diameter 250mm and stroke 400mm. The mean effective pressure is 4 bar and speed is 500 rpm. The diameter of the brake drum is 1000mm and the effective brake load is 400N. Find the indicate power , brake power and frictional power. (07 Marks)

### Module-3

- 5 a. With a neat sketch, explain the mechanism of taper turning by swelling compound rest. (07 Marks)  
 b. Briefly explain the following operations : (09 Marks)  
     i) Drilling   ii) Plain milling   iii) End milling.

OR

- 6 a. Give the classification of robots and explain Cartesian co-ordinate system. (06 Marks)  
 b. Explain briefly the types of automation. (06 Marks)  
 c. State the applications of robots. (04 Marks)

### Module-4

- 7 a. Explain non – ferrous metals and alloys mentioning their applications. (08 Marks)  
 b. Define Composite Materials. List out any four applications of composite materials. (04 Marks)  
 c. Distinguish between Welding and Soldering. (04 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.



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OR

- 8 a. Briefly discuss the three types of flames used in gas welding and mention their applications. (06 Marks)
- b. Define Welding. Explain electric arc welding with a neat sketch. (06 Marks)
- c. List out the advantages of composite materials. (04 Marks)

Module-5

- 9 a. Define the following terms :  
i) Ton of Refrigeration.  
ii) Coefficient of Performance.  
iii) Ice making capacity.  
iv) Refrigeration effect. (08 Marks)
- b. Define Air conditioning. With a neat sketch, explain the working of a room air conditioner. (08 Marks)

OR

- 10 a. Explain with a sketch, the working of a Vapour Compression refrigeration. (08 Marks)
- b. List out the desirable properties of an ideal refrigerant. (04 Marks)
- c. Bring out the differences between vapour absorption and vapour compression refrigeration system. (04 Marks)

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