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# B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

## September / October 2023 Supplementary Examinations

**Programme: B.E.**

**Semester: I / II**

**Branch: Common to all Branches**

**Duration: 3 hrs.**

**Course Code: 18ME1ESEME / 18ME2ESEME**

**Max Marks: 100**

**Course: Elements of Mechanical Engineering**

**Date: 25.09.2023**

**Instructions:** 1. Answer any FIVE full questions, choosing one full question from each unit.  
 2. Missing data, if any, may be suitably assumed.  
 3. Calculator is permitted for numerical calculations.

### UNIT - I

1	a) Discuss the differences between water tube boilers and fire tube boilers.	<b>04</b>
	b) Compare conventional and non-conventional sources of energy.	<b>06</b>
	c) Explain the construction and working of Pelton-wheel turbine.	<b>10</b>

### OR

2	a) Summarize the various stages of steam generation using a temperature-enthalpy diagram.	<b>06</b>
	b) Explain how the potential energy of water can be converted into electricity with a neat sketch.	<b>06</b>
	c) Explain the construction and working of Francis turbine with a sketch of any one view.	<b>08</b>

### UNIT - II

3	a) With a neat sketch explain the working of vapour compression refrigeration system.	<b>10</b>
	b) A single cylinder 4-stroke engine runs at 1000 rpm and has a bore of 115 mm and has a stroke of 140 mm. The brake load is 6kg at 600 mm radius and mechanical efficiency is 80 %. Calculate the brake power, indicated power, mean effective pressure and frictional power.	<b>10</b>

### UNIT - III

4	a) List any four differences between brazing and welding.	<b>04</b>
	b) Sketch and explain the process of plain turning and taper turning by swiveling the compound tool rest.	<b>08</b>
	c) Sketch and explain the process of boring and reaming.	<b>08</b>

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

**OR**

5 a) Explain the principle of arc welding with a neat sketch. Highlight the importance of flux coating on the filler material. **10**

b) List the lathe specifications with a neat sketch. Highlight the importance of carriage assembly and tailstock. **10**

**UNIT - IV**

6 a) A simple gear train is made up of four gears A, B, C and D having 20, 40, 60 and 70 teeth respectively. If gear A is the main driver rotating at 500 rpm clockwise, calculate the following: **08**

- i. Speeds of intermediate gears, ii. Speed and direction of the follower,
- iii. Train value.

b) Define and classify bearings. **06**

c) Explain the different types of lubricants with examples. **06**

**UNIT - V**

7 a) Define closed loop control system with a block diagram. Illustrate with an example. **10**

b) Explain in brief eight step process of additive manufacturing (AM) and mention any two applications of AM. **10**

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