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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.

Branch: Common to all Branches

Course Code: 18ME1ESEME / 18ME2ESEME

Course: Elements of Mechanical Engineering

Semester: I / II

Duration: 3 hrs.

Max Marks: 100

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. | 04 |
| | b) | Compare conventional and non-conventional sources of energy. | 06 |
| | c) | Explain the construction and working of Pelton-wheel turbine. | 10 |

OR

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

UNIT - II

- | | | | |
|---|----|---|----|
| 3 | a) | With a neat sketch explain the working of vapour compression refrigeration system. | 10 |
| | 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. | 10 |

UNIT - III

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

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**
