

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Second Semester B.E. Degree Examinations, July 2026

ELEMENTS OF MECHANICAL ENGINEERING

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
<u>Module-1</u>			
1.	a. Explain the classification of engineering materials and discuss the properties of ferrous and non-ferrous materials.	10	(2 :1: 1.6.1)
	b. Define composite materials and explain their applications in aerospace and automobile industries.	10	(2 :1: 1.6.1)
(OR)			
2.	a. Discuss smart materials with examples. Highlight their advantages and applications.	10	(2 :1: 1.6.1)
	b. Discuss nanomaterials highlighting their advantages and applications.	10	(2:1: 1.6.1)
<u>Module-2</u>			
3.	a. Describe modes of heat transfer with suitable examples.	10	(2 :2: 1.6.1)
	b. Explain steam formation stages with a neat sketch.	10	(2 :2: 1.6.1)
(OR)			
4.	a. Explain the working principle of 4 stroke petrol engines with a neat sketch and pv diagram.	10	(2 :2: 1.6.1)
	b. Discuss working of hybrid vehicles with a neat sketch and state their advantages over conventional vehicles.	10	(2 :2: 1.6.1)
<u>Module-3</u>			
5.	a. Explain any 4 operations performed on a lathe machine with a neat sketch.	10	(2 :3: 1.6.1)
	b. Explain drilling, boring, reaming operations performed on drilling machine with a neat sketch.	10	(2 :3: 1.6.1)
(OR)			
6.	a. Explain up milling and down milling operations with a neat sketch.	10	(2 :3: 1.6.1)
	b. Describe electric arc welding process with a neat sketch and state its applications.	10	(2 :3: 1.6.1)
<u>Module-4</u>			
7.	a. Discuss the open belt and cross belt drives with a neat sketch and state the advantages of V-belts.	10	(2 :4: 1.6.1)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

b. Discuss the types of gear drives. State the advantages and application. 10 (2 :4: 1.6.1)

(OR)

8. a. Describe types of robots and their applications in manufacturing industries. 10 (2 :4: 1.6.1)

b. Describe robots configurations with a neat sketch. 10 (2 :4: 1.6.1)

Module-5

9. a. What is CNC machines? Write their advantages over conventional machines. 10 (2 :5: 1.6.1)

b. Describe the components of CNC machines with their importance. 10 (2 :5: 1.6.1)

(OR)

10. a. Discuss additive manufacturing (3D printing) and its applications in engineering with examples. 10 (2 :5: 1.6.1)

b. Discuss applications of AI in automobile and manufacturing industry. 10 (2 :5: 1.6.1)

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