

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Fourth Semester B.E. Degree Examinations, July 2026

MECHANICAL MEASUREMENTS AND METROLOGY

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

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<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTl:CO: PI)</u>
<u>Module-1</u>			
1.	a. Explain the concept of metrology, discuss the main objectives, and classification.	10	(2 :1: 1.4.1)
	b. Compare line standards with end standards with suitable sketches and examples.	10	(2 :1: 1.4.1)
(OR)			
2.	a. Discuss the construction and working principle of Vernier calipers and micrometer.	10	(2 :1: 1.4.1)
	b. Describe the principle and working of bevel protractor and sine bar for angular measurements.	10	(2 :1: 1.4.1)
<u>Module-2</u>			
3.	a. Explain the concepts of limits, fits, and tolerances with suitable examples.	10	(2 :2: 1.4.1)
	b. Discuss the principle of interchangeability and selective assembly in manufacturing.	10	(2 :2: 1.4.1)
(OR)			
4.	a. Describe the working principle and advantages of a sigma comparator.	10	(2 :2: 1.4.1)
	b. Explain the working principle and advantages of optical comparator (Zeiss Ultra-Optimeter).	10	(2 :2: 1.4.1)
<u>Module-3</u>			
5.	a. Explain the terminology of screw threads with neat sketches.	10	(2 :3: 1.4.1)
	b. Explain the two-wire method for screw thread measurement with suitable calculations.	10	(2 :3: 1.4.1)
(OR)			
6.	a. Describe the measurement of involute gear profile and its significance.	10	(2 :3: 1.4.1)
	b. Explain the construction and working of a gear roll tester for checking composite errors.	10	(2 :3: 1.4.1)

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

Module-4

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| 7. | a. | Define the terms threshold, hysteresis, repeatability, linearity, and loading effect with suitable examples. | 10 | (2 :4: 1.4.1) |
| | b. | Describe the generalized measurement system with a neat block diagram. | 10 | (2 :4: 1.4.1) |

(OR)

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| 8. | a. | Compare electrical, mechanical, and electronic transducers with their applications | 10 | (2 :4: 1.4.1) |
| | b. | Explain the construction and working of CRO. | 10 | (2 :4: 1.4.1) |

Module-5

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| 9. | a. | Explain the method of force measurement using proving ring and load cell. | 10 | (2 :5: 1.4.1) |
| | b. | Sketch and explain the construction and working of a Prony brake dynamometer. | 10 | (2 :5: 1.4.1) |

(OR)

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| 10. | a. | Explain the theory of strain gauges, and electrical resistance type strain gauges. | 10 | (2 :5: 1.6.1) |
| | b. | Describe the construction, working, and applications of an optical pyrometer with a neat sketch. | 10 | (3 :5: 1.6.1) |