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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E.   **Semester: IV**

Branch: Mechanical Engineering   **Duration: 3 hrs.**

Course Code: 19ME4DCMMM   **Max Marks: 100**

Course: Mechanical Measurement and Metrology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	*CO*	*PO*	**Marks**
1	a)	Define Metrology. State its Objectives.	CO1	PO1	**10**
	b)	A calibrated meter end bar has an actual length of 1000.0003mm. It is to be used in the calibrated of two bars A & B, each having a basic length of 500mm. when compared with the meter bar L_A+L_B was found to be shorter by 0.0002mm. In comparing A with B, it was found that A was 0.0004mm longer than B. Find the actual length of A&B.	CO1	PO1	**10**
		OR			
2	a)	Describe with neat sketch i) Imperial standard yard ii) International Prototype meter.	CO1	PO1	**10**
	b)	Draw the conventional diagram of Limits and Fits. Explain the terms i) Basic size ii) Upper deviation iii) Lower deviation iv) Fundamental deviation v) Zero line.	CO2	PO2	**10**
		UNIT - II			
3	a)	How gauges are classified. Explain in detail as per their type, purpose, tested surface and design.	CO2	PO2	**10**
	b)	With the help of a neat sketch, explain the working principle of a Zeiss ultra-optimeter.	CO2	PO2	**10**
		OR			
4	a)	With the help of a neat sketch, explain the working principle of a Reed Type mechanical comparator.	CO4	PO2	**10**
	b)	Select the sizes of angle gauges required to build the following angles; Show the arrangement of gauges. i) 33^0 $16'$ $42''$ ii) 57^0 $34'$ $9''$	CO2	PO2	**10**

		UNIT - III			
5	a)	Explain the following terms; i) Hysteresis in measurement system ii) Linearity in measurement system iii) Loading effect iv) System response.	CO4	PO2	**10**
	b)	With a block diagram, explain the three stages of a generalized measurement system.	CO4	PO2	**10**
		OR			
6	a)	With a block diagram, explain the working of a general-purpose Cathode-Ray Oscilloscope (CRO).	CO3	PO2	**10**
	b)	With the necessary circuit diagram, explain the working of a ballast circuit.	CO3	PO2	**10**
		UNIT - IV			
7	a)	With the help of a neat sketch, explain the working of an analytical balance.	CO4	PO2	**10**
	b)	With a block diagram show the arrangement of resistance bridge for strain measurement. Explain in detail.	CO5	PO2	**10**
		OR			
8	a)	Describe with neat diagram of Prony Brake dynamometer.	CO3	PO2	**10**
	b)	Explain the construction and working of an optical pyrometer with the help of a schematic diagram.	CO4	PO2	**10**
		UNIT - V			
9	a)	Illustrate the constructional features of a Universal Measuring machine with neat diagram.	CO5	PO2	**10**
	b)	Describe with neat sketches of basic configuration of a Coordinate Measuring Machine.	CO4	PO2	**10**
		OR			
10	a)	Describe with neat sketch Transmission electron microscopy.	CO4	PO2	**10**
	b)	With the help of a sketch, explain the working principle of Scanning Electron Microscope.	CO4	PO2	**10**

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