U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2025 Semester End Make-Up Examinations

Programme: B.E. **Semester : V**

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

Course Code: 23ME5PCMMM / 22ME5PCMMM **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.

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.

		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 calibration 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, PO2*	**10**
		OR			
2	a)	Describe with neat sketches 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*	*PO1*	**10**
		UNIT - II			
3	a)	How are gauges classified. List in detail as per their type, purpose, tested surface and design.	*CO2*	*PO1*	**10**
	b)	State and explain Taylor's principle of gauge design. Show the GO & NOT GO limits on hole & shaft.	*CO2*	*P12*	**10**
		OR			
4	a)	With the help of a neat sketch, explain the working principle of a Reed Type mechanical comparator.	*CO4*	*PO1*	**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*	*PO1, 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*	*PO1*	**10**
		b)	With a block diagram, explain the three stages of a generalized measurement system.	*CO4*	*PO1*	**10**
			OR			
	6	a)	With a block diagram, explain the working of a general purpose Cathode Ray Oscilloscope (CRO).	*CO3*	*PO1*	**10**
		b)	With the necessary circuit diagram, explain the working of a ballast circuit.	*CO3*	*PO1*	**10**
			UNIT - IV			
	7	a)	With the help of a neat sketch, explain the working of an analytical balance.	*CO4*	*PO1*	**10**
		b)	Discuss a servo-controlled dynamometer with a schematic diagram.	*CO5*	*PO1*	**10**
			OR			
	8	a)	Describe with neat diagram of Berry strain gauge extensometer.	*CO3*	*PO1*	**10**
		b)	Explain the construction and working of an optical pyrometer with the help of a schematic diagram.	*CO4*	*PO1*	**10**
			UNIT - V			
	9	a)	Explain the constructional features of a Universal Measuring machine with neat diagram.	*CO3*	*PO1*	**10**
		b)	Describe with neat sketches of basic configuration of a Coordinate Measuring Machine.	*CO4*	*PO1*	**10**
			OR			
	10	a)	Describe any five applications in nano metrology that are of significant interest to mechanical engineers.	*CO4*	*PO1*	**10**
		b)	With the help of a sketch, explain the working principle of Scanning Electron Microscope.	*CO4*	*PO1*	**10**

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