U.S.N.										

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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

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

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

Course Code: 23ME5PCMMM / 22ME5PCMMM **Max Marks: 100**

Course: Mechanical Measurements 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.

<div style="writing-mode: vertical">**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.</div>

			UNIT - I	CO	PO	Marks
1	a)		Briefly explain i) Wringing mechanism ii) Significance of Wave length standard iii) Line standards iv) End standards.	CO1	PO1	**12**
	b)		Compare the concepts of interchangeability and selective assembly.	CO2	PO1	**08**
			OR			
2	a)		Differentiate i)Unilateral and bilateral tolerances ii)Clearance fit and interference fit	CO2	PO1	**08**
	b)		With simple sketches explain shaft basis system and hole basis system.	CO2	PO1	**08**
	c)		What are the objectives of metrology?	CO1	PO1	**04**
			UNIT - II			
3	a)		Briefly explain Taylor's principles of gauge.	CO2	PO1	**04**
	b)		Tolerances for a hole and shaft assembly having a nominal size of 50mm are as follows: $$H=50^{+0.02}_{+0.00} \text{ mm and Shaft}=50^{-0.05}_{-0.08} \text{ mm}$$ Determine the following: (a) Maximum and minimum clearances (b) Tolerances on shaft and hole (c) Allowance (d) MML of hole and shaft (e) Type of fit	CO2	PO1 PO2	**08**
	c)		Describe construction and working of LVDT	CO2	PO1	**08**
			OR			
4	a)		Elaborate measurement of Un-known angle of a component using Sine bar with a suitable sketch.	CO2	PO1	**10**
	b)		Explain working of Sigma comparator with a neat sketch.	CO2	PO1	**10**
			UNIT - III			
5	a)		Elaborate the three stages of generalized measuring system using any one example.	CO3	PO1	**06**

				CO	PO	
	b)	Differentiate: i) Sensor and Transducer ii)Primary and Secondary transducer iii)Accuracy and Precision iv)Error and Correction		*CO1*	*PO1*	**08**
	c)	Explain with a neat sketch Ballast circuit.		*CO3*	*PO1*	**06**
		OR				
6	a)	Discuss the inherent problems associated in Mechanical systems.		*CO2*	*PO1*	**10**
	b)	Elaborate classification of errors in measuring systems.		*CO4*	*PO1*	**10**
		UNIT - IV				
7	a)	Explain torque measurement using Prony brake dynamometer with a neat sketch.		*CO4*	*PO1*	**08**
	b)	Discuss the working of Inverted Bell manometer with a neat sketch.		*CO4*	*PO1*	**08**
	c)	Explain the principle of Pyrometry.		*CO4*	*PO1*	**04**
		OR				
8	a)	Explain working of Resistance Thermometer with a neat sketch.		*CO4*	*PO1*	**10**
	b)	What is gauge factor? Explain working of Electrical resistance strain gauges.		*CO4*	*PO1*	**10**
		UNIT - V				
9	a)	Differentiate between TEM and SEM.		*CO3*	*PO1*	**08**
	b)	Elaborate Classification of Nano Structures.		*CO4*	*PO1*	**04**
	c)	With a suitable sketch explain working of Laser Interferometer.		*CO4*	*PO1*	**08**
		OR				
10	a)	Illustrate autocollimator working with a neat sketch		*CO4*	*PO1*	**10**
	b)	Describe modes of operation of co-ordinate measuring machine.		*CO4*	*PO1*	**10**

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