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: III**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM3PCIME **Max Marks: 100**
Course: Industrial 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)		Consider the instance of Imperial Standard Yard, Slip Gauges and Monochromatic Light Source. Interpret the following instance to differentiate their characteristics of respective standards.	*CO1*	*PO1*	**12**
	b)		State the basic difference between comparator and measuring instruments with an application.	*CO1*	*PO1*	**08**
			OR			
2	a)		Determine the tolerances on the hole and the shaft for a precision running fit designated by 50H7g6 Given: i. 50mm lies between 30 – 50 mm ii. $i = 0.45 (D)^{1/3} + 0.001D$ microns iii. fundamental deviation for 'H' hole = 0 iv. fundamental deviation for 'g' shaft = $-0.25D^{0.34}$ v. IT7 = 16i IT6 = 10i State the actual maximum and minimum sizes of the hole and shaft and maximum and minimum clearances.	*CO3*	*PO3*	**08**
	b)		Explain the Taylor's principle in the design of GO and NOGO limit gauges and briefly explain the gauge tolerance.	*CO1*	*PO1*	**06**
	c)		With the help of schematic representation differentiate between Hole Basis System and Shaft Basis System with their application.	*CO1*	*PO1*	**06**
			UNIT – II			
3	a)		With a neat sketch explain the construction and working principle of a Tool Maker's microscope. Mention its application.	*CO1*	*PO1*	**08**
	b)		Sketch and explain the working principle of Parkinson's Gear Tester	*CO1*	*PO1*	**08**
	c)		Using a diagram, explain the following terms in relation to Gear Tooth: (i) Addendum (ii) Face of the tooth	*CO1*	*PO1*	**04**
			OR			
4	a)		What is the best wire? Derive the expression for the same in terms of the pitch and angle of the thread.	*CO1*	*PO1*	**8**

		b)	Explain the constant chord method of checking the gear tooth thickness and find the expression for the value of constant chord and its depth from the tip of the tooth.	*CO1*	*PO1*	**8**
		c)	With a sketch define the following terms with respect to a screw thread. i)Major diameter ii)Pitch iii) Effective diameter iv) Angle of thread	*CO1*	*PO1*	**4**
			UNIT - III			
	5	a)	State how surface finish is designated on drawing.	*CO1*	*PO1*	**04**
		b)	Analyze the irregularities given below and categorize on which orders of geometrical irregularities it falls and explain. (i) Due to weight of the material itself (ii) Feed mark of the cutting tool (iii) Chatter marks on the surfaces of the parts.	*CO2*	*PO2*	**06**
		c)	Mention some of the Inspection by comparison methods. Explain any 2 in detail.	*CO1*	*PO1*	**10**
			OR			
	6	a)	Differentiate between primary and secondary texture with an example	*CO1*	*PO1*	**8**
		b)	How Taylor Hobson Talysurf instrument is used for measuring surface roughness? Explain with neat sketch.	*CO1*	*PO1*	**12**
			UNIT – IV			
	7	a)	Define the following with respect to measurement system: i. Calibration ii. Accuracy iii. Precision iv. Threshold v. Repeatability	*CO1*	*PO1*	**10**
		b)	By considering bourdon tube as a pressure measuring instrument, explain generalized measurement system. Describe your answer using a block diagram.	*CO2*	*PO2*	**10**
			OR			
	8	a)	What is pyrometer? Explain the construction and working principle of optical pyrometer.	*CO1*	*PO1*	**14**
		b)	Explain working principle and applications of elastic members.	*CO1*	*PO1*	**06**
			UNIT – V			
	9	a)	What is Laser interferometer? Briefly explain its working principle.	*CO1*	*PO1*	**10**
		b)	Define 3 D scanning? Describe its applications.	*CO1*	*PO1*	**10**
			OR			
	10	a)	Explain the principles of CMM with a neat diagram	*CO1*	*PO1*	**10**
		b)	How laser interferometer is used to determine the angular measurements. Support the answer with a suitable diagram	*CO2*	*PO2*	**10**

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