U.S.N.										

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

Autonomous Institute Affiliated to VTU

April 2024 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.

				CO	*PO*	Marks
			UNIT - I			
1	a)		Define Standards. Explain wringing phenomenon of slip gauges with a help of diagram	CO1	*PO1*	**06**
	b)		What are comparators? Which type of comparator is best suited for checking multiple dimensions and conditions on a part simultaneously in least possible time and also easily used for a line measurement of parts as they are being machined and take corrective actions. Explain your answer with a neat sketch. Also, Give its limitations	CO1	*PO2*	**14**
			OR			
2	a)		It is required to set a dimension of 58.975mm with the help of slip gauge blocks. Two set available for the purpose are M45 (Grade 0) and M112 (Grade II). Permissible error in the mean length(μm) of gauges is given below:	CO3	*PO3*	**08**

Normal size	0.5	10	20	30	40	50	60	70	80	90	100
Grade (0)	0.1	0.12	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.28	0.30
Grade (II)	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5

Determine the set you will prefer and the range of the set dimensions.

	b)		There are two systems by which a fit can be accomplished. Explain with a neat schematic representation.	CO2	*PO2*	**06**
	c)		Explain the Taylor's principle in the design of GO and NOGO limit gauges and briefly explain the gauge tolerance.	CO1	*PO1*	**06**
			UNIT - II			
3	a)		What is the best wire? Derive the expression for the same in terms of the pitch and angle of the thread.	CO2	*PO2*	**08**
	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.	CO2	*PO2*	**08**

		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*	**04**
			UNIT - III			
	4	a)	Differentiate between primary and secondary texture with an example	CO1	*PO1*	**08**
		b)	How Tomlinson surface meter is used for measuring surface roughness? Explain with neat sketch.	CO1	*PO1*	**12**
			UNIT - IV			
	5	a)	Define the following with respect to an instrument: i)Sensitivity ii)Response time iii)Threshold iv) Hysteresis v) Reproducibility	CO2	*PO2*	**10**
		b)	Explain with block diagram generalized measurement system with example for each stage elements.	CO2	*PO2*	**10**
			OR			
	6	a)	What is transducer? List the advantages of electrical transducers over mechanical transducers.	CO2	*PO2*	**06**
		b)	Explain with the help of a neat sketch the principle of working and construction of LVDT. Also draw and explain briefly the characteristic curve.	CO4	PO9 PO12	**14**
			UNIT - V			
	7	a)	Mention and explain the Applications of laser interferometer	CO3	PO3	**08**
		b)	Explain the main features of CMM and mention the main structures of CMM. Also mention its advantages.	CO4	PO9 PO12	**12**

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