Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(New) EXAMINATION – SUMMER 2016

Subject Code:2142503 **Date:26/05/2016**

Subject Name:Metrology and Measurement

Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 Short Questions **14**

1 The Thread Micrometer measures 01

(a) The Major Diameter of Thread
(b) The Minor Diameter of Thread
(c) The effective Diameter of Thread
(d) The all Diameter of Thread

2 The Purpose of Ratchet Screw in Micrometer is 01

(a) To lock a dimension
(b) To impart blow motion
(c) To maintain sufficient and uniform measuring pressure
(d) To allow zero adjustment.

3 A Sine bar is specified by 01

(a) Its total length
(b) The centre distance between the two rollers
(c) The size of the rollers
(d) Weight of sine bar

4 The millimeter Scale in a micrometer is marked on 01

(a) Anvil
(b) Barrel
(c) Ratchet
(d) Thimble

5 Circular Scale of Micrometer is marked on 01

(a) Anvil
(b) Barrel
(c) Ratchet
(d) Thimble

6 Surface Roughness on a drawing is represented by 01

(a) Triangles
(b) Circles
(c) Squares
(d) All of the above

7 Bevel Protractor is used for 01

(a) Angular Measurement
(b) Linear Measurement
(c) Height Measurement
(d) Flatness Measurement

	8	Profilometer is an instrument used to measure (a) Thread Profile (b) Taper (c) Surface Roughness (d) Gear Involute	01
	9	The maximum amount by which the result differ from the true value is called (a) Correlation (b) Discrepancy (c) Accuracy (d) error	01
	10	Element of the indicating device carrying the scale is called (a) Dial (b) Housing (c) Frame (d) Transducer	
	11	Function of Radiation Pyrometer	01
	12	Function of Telescopic Gauge	01
	13	Function of Sine Bar	01
	14	Function of thread gauge	01
Q.2	**(a)**	What are the various types of errors occurs in measurement?	**03**
	(b)	Explain direct and indirect measurement with suitable example.	**04**
	(c)	What do you understand by systematic error and random errors? How the random errors are analyzed?	**07**
		OR	
	(c)	Describe the functional elements of Generalized Measurement System.	**07**
Q.3	**(a)**	Write process to find the least count of measuring instrument.	**03**
	(b)	Enlist the various angular measuring instruments.	**04**
	(c)	Explain the working principle and least Count of Vernier Calipers with net sketch.	**07**
		OR	
Q.3	**(a)**	Explain the function of Slip Gauges. Explain Wringing method in detail.	**03**
	(b)	Enlist the various linear measuring instruments.	**04**
	(c)	Explain the working principle and least Count of Micrometer with net sketch.	**07**
Q.4	**(a)**	Enlist different temperature measuring instruments.	**03**
	(b)	Enlist various angular measuring instruments.	**04**
	(c)	Describe with the neat sketch the working principle of 'Sine bar' with example. Why sine bar is not recommended for angle larger than 45^0 with reference plane.	**07**
		OR	
Q.4	**(a)**	Enlist various types of speed measuring instruments.	**03**
	(b)	Draw a net sketch of "Gear Tooth Vernier Calipers".	**04**
	(c)	Explain the function of Bevel Protector with net sketch.	**07**
Q.5	**(a)**	Enlist various types of Threads with Thread angle.	**03**
	(b)	Enlist the various factors influence to produce Rough surface during machining operations.	**04**
	(c)	Briefly explain "Tomlinson surface meter" with net sketch, advantages, disadvantages and applications.	**07**
		OR	
Q.5	**(a)**	Explain various Temperature Measuring Instruments. Explain any one of them with neat sketch.	**03**
	(b)	Write Short note on "Tool Maker's Microscope".	**04**

(c) Explain the various Thread Measuring Methods. Explain any One of them with net sketch. **07**

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