

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2141901

Date: 06/06/2017

Subject Name: Mechanical Measurement & Metrology

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.

MARKS

Q.1 Short Questions

14

- 1 A Systematic errors are
(a) randomly distributed (b) regularly repetitive in nature (c) unknown error (d) of unpredictable error
- 2 A feeler gauge is used to check (a) radius (b) screw pitch (c) surface roughness (d) thickness of clearance
- 3 The thickness of light gauge sheet steel can be best checked with a
(a) Steel scale (b) depth gauge (c) micrometer (d) caliper
- 4 The least count of a metric vernier caliper having 25 divisions on vernier scale, matching with 24 divisions of main scale (1 main scale division = 0.5mm) is (a) 0.05mm (b) 0.01mm (c) 0.02mm (d) 0.001mm
- 5 Elements of the indicating device carrying the scale is called (a) dial (b) housing (c) index (d) Frame
- 6 The purpose of ratchet screw in micrometer screw gauge is (a) to lock a dimension (b) to impart blow motion (c) to maintain sufficient and uniform measuring pressure (d) to allow zero adjustment
- 7 External taper can be accurately measured with the help of (a) sine bar and slip gauges (b) dividing head (c) combination set (d) clinometer
- 8 Gear tooth caliper is used to find the chordal thickness of the following type of gear tooth (a) spur gear (b) helical gear (c) worm gear (d) bevel gear
- 9 Circular scale of the micrometer is marked on (a) anvil (b) barrel (c) ratchet (d) thimble
- 10 Error of measuring equipment is (a) the closeness with which a measurement can be read directly from a measuring instrument (b) a measure of how close the reading is to the true size (c) the difference between measured value and actual value (d) the smallest change in measurement that can be measured

	11	Precision is (a)the repeatability of a measuring process(b)agreement of the result of a measurement with the true value of the measured quantity (c) the ability of an instrument to reproduce same reading under identical conditions(d)error of judgment in reading an observation	
	12	The two slip gauges in precision measurement are joined by (a) assembling (b) sliding (c) adhesion (d)wringing	
	13	Profilometer is an instrument used to measure (a)gear involute(b)thread profile(c)taper(d)surface roughness	
	14	THE 'best size wire' for measuring the effective diameter of threads is of diameter (a) $p \sec \theta / 2$ (b) $p \cos \theta / 2$ (c) $p \sec \theta$ (d) $2p \sec \theta$. (Where p = pitch of thread and θ = semi-angle of thread)	
Q.2	(a)	Explain the term " Calibration".	03
	(b)	Define accuracy and precision.	04
	(c)	Describe errors and sources of errors.	07
		OR	
	(c)	Describe with neat sketch the construction and working of a micrometer.	07
Q.3	(a)	What is least count? How is it determined in case of vernier caliper?	03
	(b)	Explain Eddy current Dynamometer.	04
	(c)	State the various types of load cells and explain any one of them with neat sketch.	07
		OR	
Q.3	(a)	What are different types of transducers?	03
	(b)	Write a short note on seismic accelerometer.	04
	(c)	Explain the principles and types of thermocouples.	07
Q.4	(a)	Distinguish between line standard and End standard.	03
	(b)	Give comparison between involute and cycloidal gears.	04
	(c)	Describe with neat sketch the construction and use of Gear tooth vernier caliper.	07
		OR	
Q.4	(a)	Classify screw threads.	03
	(b)	Compare RTD and Thermistors as temperature measuring device.	04
	(c)	Derive the expression for best wire size.	07
Q.5	(a)	What are the important features of a good comparator.	03
	(b)	Define : (1) primary texture and (2) secondary texture	04
	(c)	Sketch and describe the construction and working of Tomlinson surface roughness tester.	07
		OR	
Q.5	(a)	Write the advantages of Coordinate measuring machines	03
	(b)	State the use of (i) Slip gauges , (ii) Dial indicator.	04
	(c)	Explain Tool Maker's Microscope.	07
