

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : 14ME2006
Sub. Name : METROLOGY AND MEASUREMENT SYSTEMS

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

Q. No.	Questions	Course outcome	Marks
PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)			
1.	The theoretical size of a dimension, which is free from any errors of measurements.		
	a. Exact size b. Actual size c. True size d. All the above	CO1	(1)
2.	Extend to which the instrument repeats its result when making repeated measurement		
	b. Precision C .Accuracy d. Sensitivity d. Sensitivity	CO1	(1)
3.	The ability of a measurement to match the actual value of the quantity being measured.		
	a. Repeatability b. Sensitivity c. precision d. accuracy	CO1	(1)
4.	Angle measurement by using sine bar is an example for		
	a. direct method of measurement b. Indirect method c. Transposition method d. comparative method	CO1	(1)
5.	Which of the following is a derived unit?		
	a. Length b. mass c. density d. time	CO1	(1)
6.	_____ standard is not subjected to destruction by wear and tear.		
	a. Line standard b. End standard c. Wavelength standard d. all the above	CO1	(1)
7.	Ratio between scale spacing and scale division is		
	a. Repeatability b. Sensitivity c. precision d. accuracy	CO1	(1)
8.	Engineer's steel rule is an example for _____		
	a. line standard b. end standard c. wavelength standard d. None of the above	CO1	(1)
9.	The success of precision measurement by slip gauges depends on		
	a. Accuracy b. Precision c. Sensitivity d. Wringing	CO1	(1)
10.	Error occurs due to the faulty reading of the instrument by the human eye is called as		
	a. Interpolation error b. Random error c . Parallax error d. Systematic error	CO1	(1)
11.	_____ implies the ease with which observation can be made accurately		
	a. Repeatability b. Readability c. Reproducibility d. Sensitivity	CO1	(1)
12.	Slip gauges are also called as _____.		
	a. gauge blocks b. measuring blocks c. Precision blocks d. end standards	CO1	(1)
13.	_____ is the world's largest developer and publisher of International Standards.		
	a. ISI b.ISO c.BIS d.Hall mark	CO1	(1)
14.	Ability of a measuring device to detect small differences in a quantity being measured.		
	a. Error b. accuracy c. standard deviation d. Sensitivity	CO1	(1)
15.	Which of the following is not the part of vernier height gauge		
	b. Ratchet c. beam d. locking screw d.	CO1	(1)
16.	Least count of vernier caliper is _____mm.		

	a.0.05	b. 0.01	c. 0.001	d.0.02	CO1	(1)
17.	Internationally agreed standard value of temperature for metrology lab is (temp)					
	a. 20°C	b. 30°C	c. 22°C	d. 25°C	CO1	(1)
18.	_____ errors are regularly repetitive in nature.					
	a. Random	b. Parallax	c. calibration	d. Systematic	CO1	(1)
19.	Optical flat is made of _____.					
	a. glass	b. quartz	c. steel	d. aluminum	CO1	(1)
20.	Taper parallels are used for measurement of _____ of internal threads.					
	a. minor diameter	b. PCD	C . major diameter	d. all	CO1	(1)
21.	Sine principle is fairly reliable at angles less than					
	a. 10°	b. 15°	c. 25°	d. 45°	CO1	(1)
22.	Bevel protractor is used to					
	a. Angular measurements	b. linear measurements	c. height measurements	d. flatness measurements	CO1	(1)
23.	_____ is an example for direct method of measuring surface roughness.					
	a. Taylor-Hobson Talysurf	b. Wallace surface Dynamometer	c. Micro-Interferometer	d. All the above	CO2	(1)
24.	Auto-collimator is used for measuring _____					
	a. Flatness	b. Angle	c. Straightness	d. All	CO1	(1)
25.	Direction of the ‘ predominate surface pattern’ is called as					
	a.profile	b.flaws	c.lay	d. error of form	CO1	(1)
26.	Third order irregularities are created by _____					
	a. guide ways	b. machining marks	c. Improper handling of machines	d. vibrations	CO1	(1)
27.	Least count of bevel protractor is _____.					
	a.5'	b. 0.01mm	c. 1°	d. 0.5'	CO1	(1)
28.	Which of the following methods enable to determine a numerical value of the surface finish of any surface?					
	a.Tomlinson surface meter	b.Taylor Hobson talysurf	c.Profilograph	d.All the above	CO2	(1)
29.	_____ used for measuring surface finish.					
	a.profilometer	b. sine bar	c.micrometer	d. none	CO1	(1)
30.	In circular fringes obtained with Michelson’s Interferometer, the interference order of the central fringe is					
	a. Maximum	b. Zero	c. One	d. Can’t say	CO2	(1)
31.	A sine bar is specified by					
	a.Its total length	b.centre distance between the two rollers	c.size of the rollers	d.weight of the sine bar	CO1	(1)
32.	Sigma comparator is an example for _____					
	a. mechanical comparator	b. Electronic comparator	c. Optical comparator	d. pneumatic comparator	CO2	(1)
33.	The nature of a surface as defined by					
	a.lay	b.waviness	c.surface roughness	d.All the above	CO1	(1)
34.	_____ is not a mechanical comparator.					
	a. Dial Indicator	b. Johanssons Mikrokator	c. Sigma Comparator	d. LVDT	CO1	(1)
35.	Radial distance between the major and pitch cylinders in external screw thread is _____					
	a. addendum	b. dedendum	c. lead	d. pitch	CO1	(1)
36.	The number of fringes shifting in response to motion of the movable mirror in Michelson Interferometer, depends upon					
	a. Wavelength of the source used	b. Distance moved by the mirror	c. Interference order of the central fringe	d. Both a & b	CO2	(1)

37.	Minor diameter of the screw thread is also called as_____					
	a. Pitch diameter	b.Root diameter	c.major diameter	d.all the above	CO1	(1)
38.	In....., reflected beam is always parallel to the incidental beam.					
	a. Beam splitter	b. Beam benders	c. Retro reflectors	d.Micro controller	CO2	(1)
39. is the sensory part of a CMM responsible for sensing different parameters required for the measurement.					
	a. Data collection system	b. Data reduction system	c. CMM main structure	d. Probe	CO2	(1)
40.	Which type of laser is mostly preferred for laser interferometer?					
	a. He-Ne Laser	b. CO ₂ Laser	c. CO Laser	d. Nd-YAG laser	CO2	(1)

PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)

41.	Write short notes on (a) Readability (b) Calibration (c) Precision (d) accuracy (e) Sensitivity	CO1	(5)
42.	Describe the precautionary measures to be taken at various stages of using slip gauges.	CO1	(5)
43.	Explicate with neat sketch how a vernier caliper is used for linear measurements?	CO1	(5)
44.	In sine bar method for measuring taper angle of job, the following slip gauges with values 1.25mm, 0.75mm, 2mm and 3.25mm are wrung together to make the taper surface parallel to the surface plate. The distance between centre of two rollers is 300mm. Find the angle of job.		(5)
45.	Summarize any two angular measuring instrument used in metrology with suitable sketch.	CO1	(5)
46.	Illuminate the working principle of mechanical comparator with a neat sketch.	CO1	(5)
47.	List any five GDT terms with their representation on a part drawing.	CO2	(5)
48.	Elaborate on the topic of Tomlinson surface meter with neat sketch.	CO2	(5)
49.	How are CMMs classified with respect to constructional features? Sketch and state their main applications, merits and demerits.	CO2	(5)
50.	Draw and explain the terminology of screw thread.	CO1	(5)

PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)

51.	Discuss the various types of errors in measuring instruments and also explain their causes and remedies.	CO1	(10)
52.	With neat sketch, explain the construction and working of Tool maker's microscope. Also describe the procedure of screw thread by using Tool maker's microscope.	CO2	(10)
53.	Explain the construction and working principle of laser interferometer with neat sketch.	CO2	(10)

Course Outcome:

1. Ability to select and employ suitable instruments for measurement.
2. Ability to demonstrate the use of advanced measurement techniques.

ALL THE BEST