

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR**

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**QUESTION BANK****Subject with Code: METROLOGY & MEASUREMENTS (20ME0321)****Course & Branch: B. Tech – ME****Year/ Sem: III-B. Tech & II-Sem****Regulation: R20****UNIT I**

1.		Define fit? With neat sketch describe three types of fits.	L1	CO1	12M
2.		Construct the conventional diagram of limits and fits and explain all terms.	L2	CO1	12M
3.		In a hole and shaft assembly of 30mm nominal size, the tolerances for hole and shaft are as specified below: Hole: $30^{+0.02}_{-0.00}$ mm Shaft: $30^{-0.040}_{-0.070}$ mm Determine: i) Maximum and minimum clearance obtainable ii) Allowance iii) Hole and shaft tolerance iv) The type of fit.	L3	CO1	12M
4.		Between two mating parts of 100 mm basic size, the actual interference fit is to be from 0.05mm to 0.12mm. The tolerance for hole is the same as the tolerance for the shaft. solve the size of the shaft and the hole on (a) hole basis unilateral system b) Shaft basis unilateral system	L3	CO1	12M
5.	(a)	Define Maximum, Minimum Metal limits and Maximum, Minimum clearances with the help of neat sketches.	L1	CO1	6M
	(b)	Distinguish unilateral and bilateral tolerance system.	L2	CO1	6M
6.	(a)	Distinguish between 'Hole basis system' and 'Shaft basis system' of fits.	L2	CO1	6M
	(b)	Define deviations. Explain types of deviations with the help of sketches.	L1	CO1	6M
7.	(a)	Explain selective assembly.	L2	CO1	6M
	(b)	List out types of assembly systems? Elaborate interchangeability.	L2	CO1	6M
8.		Describe briefly the principal features of the Indian standard System of limits and fits.	L2	CO1	12M
9.		What are the different types of limit gauge? Explain any five limit gauges.	L1	CO1	12M
10.	(a)	What is Taylor's principle of gauge design?	L1	CO1	6M
	(b)	Distinguish between the GO and NO-GO gauges	L2	CO1	6M

**UNIT II**

1.		Elaborate the construction and uses of a) Vernier gauge b) Vernier height gauge	L2	CO2	12M
2.	(a)	What is mean by wringing process? Describe briefly the manufacture of slip gauges.	L1	CO2	6M
	(b)	What is procedure for buildup slip gauge blocks for required dimension	L1	CO2	6M
3.	(a)	State the principle of a micrometer. Explain with neat Sketch an outside micrometer.	L2	CO2	6M

	(b)	Estimate possible sources of errors in micrometers.	L3	CO2	6M
4..		Enumerate the requirements of a good dial indicator and its advantages.	L2	CO2	12M
5.	(a)	How do you classify dial indicators?	L2	CO2	6M
	(b)	With neat sketch explain the working mechanism of a dial indicator.	L2	CO2	6M
6.		Construct in detail the working of the Sine Bar to measure unknown angle.	L2	CO2	12M
7.	(a)	How can you measure angle? List the angular measuring instruments.	L1	CO2	4M
	(b)	Explain Vernier bevel protractor with suitable diagram.	L2	CO2	8M
8.	(a)	Explain why it is not preferred to use sine bar for measuring angles more than 45°.	L2	CO2	6M
	(b)	A 100mm sine bar is to be set up to angle of 33°, determine the slip gauges needed from 87 pieces set.	L3	CO2	6M
9.	(a)	Give the limitations of sine bar.	L2	CO2	6M
	(b)	Discuss about the sources of error in sine bars.	L2	CO2	6M
10.	(a)	What are clinometers? Explain Vernier clinometers.	L2	CO2	6M
	(b)	Calculate the angle of taper and minimum diameter of an internal taper from the following reading: Diameter of bigger ball=10.25 mm Diameter of smaller ball = 6.07 Height of top of bigger ball from datum =30.13 mm Height of top of smaller ball from datum =10.08 mm	L3	CO2	6M

### UNIT III

1.	(a)	What are the factors affecting surface roughness?	L2	CO3	6M
	(b)	Discuss the principal reasons for controlling the surface texture.	L2	CO3	6M
2.	(a)	Define the terms (a) Primary texture (b) Secondary texture	L1	CO3	6M
	(b)	Define the various elements of surface texture with neat sketch.	L1	CO3	6M
3.		Express the following methods of qualifying surface roughness: (a) Ra value. (b) RMS value. (c) Rz value.	L2	CO3	12M
4.		Briefly describe the construction, principle and operation of Talysurf with a neat sketch	L2	CO3	12M
5.		Explain with the help of neat sketches the principle and construction of an auto collimator	L2	CO3	12M
6.		List out the various elements that you would measure in a screw thread? Also list the instruments that are required for measuring these elements.	L2	CO4	12M
7.	(a)	Describe measurement of effective diameter with two wire method with neat sketch.	L2	CO4	6M
	(b)	What are the errors and its causes in screw threads?	L2	CO4	6M
8.		Sketch and explain working and application of versatile instrument of toolmakers microscope	L2	CO4	12M

9.	(a)	<b>Explain</b> the elements of gear tooth profile <b>with neat sketch</b> .	L1	CO4	6M
	(b)	<b>Classify</b> the various sources of errors in manufacturing of gears.	L2	CO4	6M
10.	(a)	<b>Describe</b> measurement of pitch by base <b>Tangent method</b> .	L2	CO4	6M
	(b)	Elaborate method of measuring the gear tooth thickness by Constant Chord method	L2	CO4	6M

**UNIT IV**

1.		<b>List</b> out Displacement transducers? Explain inductive transducer with suitable sketch.	L2	CO5	12M
2.	(a)	<b>Define</b> transducer? List and explain two important and closely related parts	L1	CO5	6M
	(b)	<b>Classify</b> transducers? Discuss active and passive transducers with examples	L2	CO5	6M
3.		<b>Prove</b> variable Capacitance Transducer is the most common form of measurement of displacement?	L4	CO5	12M
4.		<b>With neat</b> sketch discuss the working principle of potentiometer transducer and its advantages, limitation.	L2	CO5	12M
5.	(a)	<b>Classify</b> measurement of angular speed tachometers. Explain D.C. tachometer generator.	L2	CO5	6M
	(b)	Discuss about A.C. tachometer generator and drag cup rotor A.C. tachometer.	L2	CO5	6M
6.		<b>Write short</b> notes on: (i) Photoelectric tachometer (ii) toothed rotor variable reluctance tachometer (iii) stroboscopic tachometer.	L2	CO5	12M
7.		<b>What is</b> the principle of strain gauge? Explain the method of usage for measurement of strains	L1	CO5	12M
8.	(a)	<b>Describe</b> the principle of bonded and un bonded strain gauges?	L2	CO5	6M
	(b)	<b>List</b> the essential characteristics required for the backing material of a bonded strain gauge.	L1	CO5	6M
9.	(a)	<b>Define</b> strain rosette? Depending on the arrangement of strain gauges, list out strain rosettes	L1	CO5	6M
	(b)	<b>Elaborate Rectangular</b> strain gauge rosette	L2	CO5	6M
10.		What do you understand about measurement of torque? Discuss about strain gauge torque meter.	L2	CO5	12M

**UNIT V**

1.		<b>List</b> out thermal expansion methods and describe electrical resistance sensor of RTD with neat sketch.	L1	CO6	12M
2.		<b>Discuss</b> in detail about the principle and working of thermo couple with neat sketch.	L2	CO6	12M
3.		<b>Sketch</b> a Mcleod gauge and explain working principle and its applications, limitations.	L2	CO6	12M
4.	(a)	<b>Define</b> pyrometer? With neat sketch elaborate total radiation pyrometer.	L1	CO6	6M
	(b)	<b>Write short</b> notes on electric resistance sensor.	L2	CO6	6M
5.	(a)	<b>Define</b> manometer? Elaborate the U- tube Manometer in detail	L1	CO6	6M

	(b)	<b>What is</b> the formula for dead weight tester? Discuss the Dead Weight gauge in detail.	<b>L1</b>	<b>CO6</b>	<b>6M</b>
6.		<b>List</b> out very high pressure measuring instruments and draw with neat sketch C type Bourdon tube	<b>L2</b>	<b>CO6</b>	<b>12M</b>
7.	(a)	<b>Discuss</b> the Differential U-Tube Manometer in details and Derive the expression for pressure difference.	<b>L2</b>	<b>CO6</b>	<b>12M</b>
	(b)	List out very high pressure measuring instruments and draw with neat sketch C type Bourdon tube.			
8.		What are the methods employed for the measurement of torque? Sketch a strain gauge torque meter and elaborate it	<b>L2</b>	<b>CO6</b>	<b>12M</b>
9.		What are the basic methods of force measurement? Elaborate elastic force devices with neat sketch	<b>L1</b>	<b>CO6</b>	<b>12M</b>
10.	(a)	<b>Explain</b> the principle and working of dynamometer with neat sketch.	<b>L2</b>	<b>CO6</b>	<b>6M</b>
	(b)	List out the dynamometers classification and explain any one with neat sketch?	<b>L1</b>	<b>CO6</b>	<b>6M</b>

