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(Autonomous)
QUESTION BANK (DESCRIPTIVE)

Subject with Code : Metrology & Measurements (18ME0321) **Course & Branch**: B.Tech - ME
Year & Sem: III-B.Tech & II-Sem **Regulation:** R18

UNIT –I

1.	a)	What is Taylor's principle?	L1	CO1	2M
	b)	Define limits and tolerances.	L1	CO1	2M
	c)	What indicates 50H7f8?	L1	CO1	2M
	d)	Differentiate between Allowance and Tolerance.	L2	CO1	2M
	e)	List out types of fits.	L2	CO1	2M
2.		Define fit? With neat sketch describe three types of fits.	L1	CO1	10M
3.		Construct the conventional diagram of limits and fits and explain all terms.	L6	CO1	10M
4.		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.	L5	CO1	10M
5.		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. Find the size of the shaft and the hole on (a) hole basis unilateral system b) Shaft basis unilateral system.	L6	CO1	10M
6.	a)	Define Maximum, Minimum Metal limits and Maximum, Minimum clearances with the help of neat sketches.	L1	CO1	5M
	b)	Distinguish unilateral and bilateral tolerance system.	L4	CO1	5M
7.	a)	Distinguish between 'Hole basis system' and 'Shaft basis system' of fits.	L4	CO1	5M
	b)	Define deviations. Explain types of deviations with the help of sketches.	L1	CO1	5M
8.	a)	Explain selective assembly.	L2	CO1	5M
	b)	List out types of assembly systems? Elaborate interchangeability.	L6	CO1	5M
9.		Describe briefly the principal features of the Indian standard System of limits and fits.	L1	CO1	10M
10.		What are the different types of gauges? Explain any five limit gauges.	L1	CO1	10M

UNIT –II

1.	a)	What are the purposes of Vernier calipers	L1	CO2	2M
	b)	Why micrometer carries a ratchet stop?	L2	CO2	2M
	c)	Mention the features of a Universal Bevel Protractor	L2	CO2	2M

	d)	what is mean by wringing process of slip gauge	L1	CO2	2M
	e)	Draw the BIS symbol for surface roughness.	L1	CO2	2M
2.	a)	Elaborate the construction of Vernier height gauge	L6	CO2	5M
	b)	Name the two types of dial indicators, Explain dial indicator with neat sketch.	L1	CO2	5M
3.	a)	What is mean by wringing process? Describe briefly grades of slip gauges.	L1	CO2	5M
	b)	What is procedure for buildup slip gauge blocks for required dimension	L1	CO2	5M
4.		State the principle of a micrometer. Explain with neat Sketch an outside micrometer.	L2	CO2	10M
5.		Construct in detail the working of the Sine Bar to measure unknown angle	L6	CO2	10M
6.	a)	Simplify the angle measuring method involved in Bevel protractors with a neat sketch.	L4	CO2	6M
	b)	Explain about angle gauges.	L2	CO2	4M
7.		Express the following methods of qualifying surface roughness: (a) Ra value. (b) RMS value. (c) Rz value.	L2	CO2	10M
8.		Briefly describe the construction, principle and operation of Talysurf with a neat sketch.	L1	CO2	10M
9.	a)	Explain BIS symbols for indication of surface finish.	L2	CO2	5M
	b)	Name the different terms used in surface roughness.	L1	CO2	5M
10.		Explain with the help of neat sketches the principle and construction of an auto collimator	L2	CO2	10M

UNIT –III

1.	a)	List out elements of screw thread	L1	CO3	2M
	b)	What are errors in threads	L1	CO3	2M
	c)	What is the best size wire	L1	CO3	2M
	d)	Name the various types of errors in gears	L2	CO3	2M
	e)	List out tools required for machine alignment	L1	CO3	2M
2.		List out the various elements that you would measure in a screw thread? Also list the instruments that are required for measuring these elements	L1	CO3	10M
3.		Explain three wire method of measuring effective diameter of screw threads.	L1	CO3	5M
		What are the errors and its causes in screw threads?	L1	CO3	5M
4.		Evaluate (i) Outer diameter. (ii) Effective diameter. (iii) Core diameter. (iv) Pitch diameter	L5	CO3	5M
		Describe measurement of effective diameter with two wire method with neat sketch	L1	CO3	5M
5.		Sketch and explain working and application of versatile instrument of toolmakers microscope	L2	CO3	10M
6.	a)	Explain the elements of gear tooth profile with neat sketch.	L2	CO3	5M
	b)	Classify the various sources of errors in manufacturing gears.	L4	CO3	5M
7.	a)	Explain with neat sketch the gear tooth profile measurement.	L2	CO3	5M
	b)	Describe the parkinson's gear tester and state its limitations	L1	CO3	5M

8.	a)	Describe measurement of pitch by base Tangent method.	L1	CO3	5M
	b)	Elaborate method of measuring the gear tooth thickness by Constant Chord method	L1	CO3	5M
9.	a)	With the help of an illustration, explain any four alignment tests on lathe	L2	CO3	7M
	b)	Discuss the factors influenced working accuracy of the machine tool.	L6	CO3	3M
10.		With the help of an illustration, explain any four alignment tests on milling machine.	L2	CO3	10M

UNIT –IV

1.	a)	What is transducer? List out active and passive transducers	L1	CO4	2M
	b)	What is a piezoelectric sensor?	L1	CO4	2M
	c)	List out contact and non contact tachometers?	L2	CO4	2M
	d)	How the resistance strain gauge is functioning?	L1	CO4	2M
	e)	Derive the expression for gauge factor in a strain gauge.	L2	CO4	2M
2.		Classify digital transducers? Elaborate piezoelectric effect and sketch with neat Piezo-electric transducer.	L6	CO4	12M
3.		List out Displacement transducers? Explain inductive transducer with suitable sketch.	L2	CO4	12M
4.	a)	Define transducer? List and explain two important and closely related parts	L1	CO4	5M
	b)	Classify transducers? Discuss active and passive transducers with examples	L1	CO4	5M
5.		Prove variable Capacitance Transducer is the most common form of measurement of displacement?	L5	CO4	12M
6.		Classify digital transducers? Elaborate piezoelectric effect and sketch with neat Piezo-electric transducer.	L6	CO4	12M
7.	a)	Classify measurement of angular speed tachometers and list out tachometers.	L2	CO4	6M
	b)	Explain working of Photo-electric tachometer	L2	CO4	6M
8.	a)	Describe the principle of bonded and un bonded strain gauges?.	L1	CO4	6M
	b)	List the essential characteristics required for the backing material of a bonded strain gauge..	L1	CO4	6M
9.	a)	Define strain rosette? Depending on the arrangement of strain gauges, list out strain rosettes	L1	CO4	6M
	b)	Elaborate Rectangular strain gauge rosette	L6	CO4	6M
10.	a)	What is the principle of strain gauge? Explain the method of usage for measurement of strains.	L1	CO4	12M
	b)	Explain working of Electrical Strain Gauge.	L2	CO4	12M

UNIT –V

1.	a)	What is meant by calibration?	L1	CO5	2M
	b)	Define seebeck effect and peltier effect	L1	CO5	2M
	c)	Discuss limitations of elastic diaphragm gauge.	L2	CO5	2M
	d)	What is measurement of principle of load cell?	L1	CO5	2M
	e)	How does a torque meter work?	L2	CO5	2M
2.		List out thermal expansion methods and describe electrical resistance	L1	CO5	10M

		sensor of RTD with neat sketch			
3.		Discuss in detail about the principle and working of thermo couple with neat sketch	L6	CO5	10M
4.		Sketch a Mcleod gauge and explain working principles. Describe applications and limitations	L1	CO5	10M
5.	a)	Define pyrometer? With neat sketch elaborate total radiation pyrometer	L1	CO5	5M
	b)	What is formula for dead weight tester? Discuss the Dead Weight gauge in detail.	L1	CO5	5M
6.	a)	Define manometer? Elaborate the U- tube Manometer in detail.	L6	CO5	5M
	b)	List out common piezoelectric material? Sketch Piezoelectric pressure transducer with parts.	L1	CO5	5M
7.	a)	Explain about Diaphragm gauge in detail. write advantages.	L4	CO5	5M
	b)	List the essential characteristics required for the backing material of a bonded strain gauge..	L1	CO5	5M
8.	a)	Discuss the U- tube Differential Manometer in detail. derive the expression for pressure difference.	L6	CO5	5M
	b)	List out very high pressure measuring instruments and draw with neat sketch C type Bourdon tube	L1	CO5	5M
9.		What are the methods employed for the measurement of torque? Sketch a strain gauge torque meter and elaborate it.	L1	CO5	10M
10.		What are the basic methods of force measurement? Elaborate elastic force devices with neat sketch	L1	CO5	10M