

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR

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(Autonomous)

**QUESTION BANK (DESCRIPTIVE)****Subject with Code :** Metrology & Measurements(16ME326)**Course & Branch:** B.Tech - ME**Year & Sem:** IV-B.Tech & I-Sem**Regulation:** R16**UNIT –I**

1. What are the types of fits between mating parts and explain with neat sketch? L1 CO1 12M
2. Construct the conventional diagram of limits and fits and explain all terms. L6 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. L5 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. L6 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. L4 CO1 6M
6. a) Distinguish between 'Hole basis system' and 'Shaft basis system' of fits. L4 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. L6 CO1 6M
8. Describe briefly the principal features of the Indian standard System of limits and fits. L1 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 L4 CO1 6M

UNIT –II

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| 1. | Elaborate the construction and uses of a) Vernier bevel protractor b) Vernier height gauge | L6 | 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 | L6 | CO2 | 6M |
| 4. | Illustrate in detail the working of the Sine Bar to measure unknown angle. | L6 | CO2 | 12M |
| 5. a) | Explain the angle measuring method involved in Bevel protractors with a neat sketch. | L4 | CO2 | 6M |
| b) | State how surface finish is designed on drawings | L1 | CO2 | 6M |
| 6. | Express the following methods of qualifying surface roughness: (a) Ra value. (b) RMS value. (c) Rz value. | L2 | CO2 | 12M |
| 7. a) | Briefly describe the construction, principle and operation of Talysurf with a neat sketch.. | L1 | CO2 | 6M |
| b) | Define the terms (a) Primary texture (b) Secondary texture | L1 | CO2 | 6M |
| 8. a) | Explain BIS symbols for indication of surface finish | L2 | CO2 | 6M |
| b) | Name the two types of ideal indicators, draw a simple diagram of dial indicator | L1 | CO2 | 6M |
| 9. | Explain with the help of neat sketches the principle and construction of an auto collimator. | L2 | CO2 | 12M |
| 10. a) | Describe the principle involved in Michelson interferometer with a line diagram | L1 | CO2 | 6M |
| b) | Discuss about care of Snap Gauge, Screw Pitch Gauge, Feller Gauge | L6 | CO2 | 6M |

UNIT –III

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| 1. | 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 | 12M |
| 2. a) | Give details about three wire method of measuring effective diameter of screw threads. | L1 | CO3 | 6M |
| b) | What are the errors and its causes in screw threads? | L1 | CO3 | 6M |
| 3. a) | Evaluate (i) Outer diameter. (ii) Effective diameter. (iii) Core diameter. (iv) Pitch diameter | L5 | CO3 | 6M |
| b) | Describe measurement of effective diameter with two wire method with neat sketch | L1 | CO3 | 6M |
| 4. | With the help of a neat sketch explain the construction, working and application of tool maker's microscope. | L2 | CO3 | 12M |
| 5. a) | Explain the elements of gear tooth profile with neat sketch. | L2 | CO3 | 6M |
| b) | Classify the various sources of errors in manufacturing gears. | L4 | CO3 | 6M |
| 6. a) | Explain with neat sketch the gear tooth profile measurement. | L2 | CO3 | 6M |
| b) | Describe the parkinson's gear tester and state its limitations | L1 | CO3 | 6M |
| 7. a) | Describe measurement of pitch by base Tangent method. | L1 | CO3 | 6M |
| b) | Elaborate method of measuring the gear tooth thickness by Constant Chord method | L1 | CO3 | 6M |
| 8. a) | With the help of an illustration, explain any four alignment tests on lathe | L2 | CO3 | 8M |
| b) | Discuss the factors influenced working accuracy of the machine tool. | L6 | CO3 | 4M |
| 9. | With the help of an illustration, explain any four alignment tests on milling machine. | L2 | CO3 | 12M |
| 10. | With the help of an illustration, list out any four radial drilling machine test. | L1 | CO3 | 12M |

UNIT –IV

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|--------|--|----|-----|-----|
| 1. | Classify digital transducers? Elaborate piezoelectric effect and sketch with neat Piezo-electric transducer. | L6 | CO4 | 12M |
| 2. | List the displacement transducers? Express any one of displacement transducer with neat sketch. | L2 | CO4 | 12M |
| 3. a) | Define transducer? List and explain two important and closely related parts | L1 | CO4 | 6M |
| b) | Classify transducers? Discuss active and passive transducers with examples | L1 | CO4 | 6M |
| 4. | Prove variable Capacitance Transducer is the most common form of measurement of displacement? | L5 | CO4 | 12M |
| 5. a) | List out classification of tachometers? Elaborate DC tachometer generator with neat sketch. | L2 | CO4 | 6M |
| b) | Explain working of Photo-electric tachometer | L2 | CO4 | 6M |
| 6. 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 |
| 7. 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 |
| 8. | What is the principle of strain gauge? Explain the method of usage for measurement of strains. | L1 | CO4 | 12M |
| 9. | Explain working of Electrical Strain Gauge. | L2 | CO4 | 12M |
| 10. a) | The most popular is the vibration seismic accelerator justify with Principle of seismic instrument with neat sketch. | L5 | CO4 | 6M |
| b) | Explain working Principle of Accelerometer with neat sketch. | L2 | CO4 | 6M |

UNIT –V

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| 1. | List out thermal expansion methods and describe electrical resistance sensor of RTD with neat sketch | L1 | CO5 | 12M |
| 2. | Explain in detail about the principle and advantages of thermo couple | L6 | CO5 | 12M |
| 3. | Sketch a Mcleod gauge and explain working principles. Describe applications and limitations | L1 | CO5 | 12M |
| 4. a) | Define pyrometer? With neat sketch elaborate total radiation pyrometer | L1 | CO5 | 6M |
| b) | What is formula for dead weight tester? Discuss the Dead Weight gauge in detail. | L1 | CO5 | 6M |
| 5. a) | Define manometer? Elaborate the U- tube Manometer in detail. | L6 | CO5 | 6M |
| b) | List out common piezoelectric material? Sketch Piezoelectric pressure transducer with parts. | L1 | CO5 | 6M |
| 6. a) | Explain about Diaphragm gauge in detail. write advantages. | L4 | CO5 | 6M |
| b) | List the essential characteristics required for the backing material of a bonded strain gauge.. | L1 | CO5 | 6M |
| 7. a) | Discuss the U- tube Differential Manometer in detail. derive the expression for pressure difference. | L6 | CO5 | 6M |
| b) | List out very high pressure measuring instruments and draw with neat sketch C type Bourdon tube | L1 | CO5 | 6M |
| 8. | What are the methods employed for the measurement of torque? Sketch a strain gauge torque meter and elaborate it. | L1 | CO5 | 12M |
| 9. | What are the basic methods of force measurement? Elaborate elastic force devices with neat sketch | L1 | CO5 | 12M |
| 10. a) | Explain the principle and working of dynamometer with neat sketch. | L2 | CO5 | 6M |
| b) | List out the dynamometers classification and explain any one with neat sketch? | L1 | CO5 | 6M |