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College of Engineering, Pune – 5.
(An Autonomous Institute of Government of Maharashtra)
End Semester Examination
(PE-302) – Metrology & Quality Control

Programme : T. Y. B. Tech.(Production-Sandwich)
Year : 2012 –13
Duration : 180 min.

date : 05/05/2013
Semester : II (Spring)
Max. Marks : 50

Instructions:-

1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat sketches wherever required.
4. Assume necessary data if required.
5. Use of non programmable calculator is allowed.

- Q.1 Attempt any **five**:
- a. Enumerate the advantages of wavelength standard. 2
 - b. What is Statistical Quality Control? Explain its benefits. 2
 - c. Explain the limitation of sine bar? 2
 - d. What is Drunken error and periodic error in Screw thread. 2
 - e. State the advantages of optical comparator. 2
 - f. State the applications of spirit level. 2
 - g. Define the following terms
 - i) Squareness
 - ii) Concentricity
- Q.2
- a. Derive the magnification ratios for lever type and plunger type dial indicators. 5
 - b. State the outstanding features of ISO: 9000 series standard. Also state its benefits and disadvantages. 5
- OR
- c. Write short notes on: 5
 - a) Co-ordinate Measuring Machines (CMM)
 - b) Profile Projector
- Q.3
- a. Explain the principle of interferometry? Discuss working of N.P.L. flatness interferometer. 5
 - b. Draw the neat sketch of Gear Tooth Vernier Caliper and explain the method to measure the gear tooth thickness. 5
- OR
- c. Write short notes on: 5
 - a) Cause and effect diagram
 - b) Parato Analysis

- Q.4 a. Explain the two wire method for measurement of effective diameter of screw thread with neat labelled sketch. What is best wire size? Derive the relation for best wire size. 5
- b. Explain the following with respect to surface texture: 5
- a) Ra Value
 - b) Sampling length
 - c) Lay

OR

- c. Differentiate between hole basis system and shaft basis system. Which one is preferred in industry? Justify. 5

- Q.5 a. Determine the actual dimensions to be provided for shaft and hole of 90 mm size for H₈d₉ type clearance fit. Size 90 mm falls in diameter steps of 80 and 100. Fundamental deviation for e type of shaft is $= -11D^{0.41}$ Microns, Take $i = 0.45\sqrt[3]{D} + 0.001D$ Microns., IT₈ = 25*i*, IT₉ = 40*i*. Design the GO and NO GO gauges considering gauge and wear allowances. 5
- b. What are control charts? Explain different types of control charts with its importance. 5

OR

- c. Draw a neat sketch of OC curve. Show different regions and explain the term LTPD. 5

