Third Semester B.E. Degree Examination, Dec.2013 / Jan. 2014
Mechanical Measurements and Metrology

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART - A

1　a. What are the advantages of wave length standard as basic unit to define primary standard of length? **(04 Marks)**

　b. i) What are the characteristics of End standards? **(06 Marks)**
　　ii) Write the slip gauge combinations for 58.975mm and 32.45mm using M112 set of gauges. **(04 Marks)**

　c. Briefly explain i) Line standard　ii) Airy points　iii) Wringing phenomena. **(06 Marks)**

2　a. Briefly explain : i) Tolerance　ii) Inter changeability　iii) Plug gauges. **(06 Marks)**

　b. Explain with sketches i) Hole Basis system　ii) Shaft Basis system. **(08 Marks)**

　c. Determine the dimensions of the shaft and hole for a fit H_8/d_{10} and sketch the fit. Given the following data :
　　i) Diameter 30 falls in the dia range 18 - 30. Upper deviation for "d" shaft is $- 16D^{0.44}$.
　　ii) $i = 0.45D^{1/3} + 0.001D$. Tolerance for IT8 $= 25i$, Tolerance for IT10 $= 64i$. **(06 Marks)**

3　a. What are the characteristics of a comparator? **(04 Marks)**

　b. Explain with a neat sketch, the construction and working of sigma comparator. **(08 Marks)**

　c. Explain with neat sketch, the construction and working of an LVDT. **(08 Marks)**

4　a. With a sketch, explain the principle of auto collimator. **(06 Marks)**

　b. What is best size wire? Derive an expression for best size wire in terms of pitch and angle of the thread. **(08 Marks)**

　c. Explain how tooth thickness is measured using Gear Tooth Vernier Calliper. **(06 Marks)**

PART - B

5　a. Define i) Leniarity　ii) Repeatability　iii) Hysterisis. **(06 Marks)**

　b. What are the advantages of Electrical transducer elements? **(06 Marks)**

　c. Explain the three stages of generalized measuring system, with a block diagram. **(08 Marks)**

6　a. Explain the concept of telemetry with block diagram. **(06 Marks)**

　b. Explain with a sketch, direct writing stylus type oscillograph. **(06 Marks)**

　c. Explain with a neat sketch, the working principle of a CRO. **(08 Marks)**

7　a. Explain with a sketch, Pirani gauge and explain the arrangement to compensate for ambient temperature changes. **(08 Marks)**

　b. With a neat sketch, explain Prony Brake. **(06 Marks)**

　c. Explain with a neat sketch, the working principle of Proving ring. **(06 Marks)**

8　a. With a schematic diagram, explain the working principle of optical pyrometer. **(08 Marks)**

　b. Explain : i) Thermo couple　ii) Resistance Thermometer　iii) Gauge factor. **(06 Marks)**

　c. Write notes on : i) Binding materials　ii) Resistance strain gauges. **(06 Marks)**

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