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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2012

Fourth Semester

Manufacturing Engineering

MF 9252 –ENGINEERING METROLOGY

(Regulation 2008)

Time: Three hours

Maximum: 100 Marks

Answer ALL questions

PART A – (10 x 2 = 20 marks)

1. What are the factors influencing measurement?
2. Explain the environmental conditions suitable for engineering measurements.
3. What are the essential characteristics of a good comparator?
4. List any 4 applications of alignment telescope.
5. Define 'Backlash'.
6. Distinguish between roundness and cylindricity.
7. What is Goniometric head in tool makers microscope?
8. What is the purpose of retroreflectors in interferometry?
9. Mention any 4 disadvantages of Cantilever type CMMs.
10. Write short notes on nanometrology.

PART B – (5 x 16 = 80 marks)

11. a. Explain various types and causes of errors in engineering measurement. (16)
12. a.i. Describe the principle, construction and working of a Sigma mechanical comparator with a neat sketch. (12)
- ii. Describe few methods applying precision rollers for measurement. (4)
- (OR)
- b.i. Describe the construction and working of an alignment telescope with a neat diagram. (8)
- ii. Explain with neat sketches the variants of sine bars and their applications. (8)
13. a.i. How is a pitch measuring machine used for checking the pitch of internal and external screw threads. (10)
- ii. Explain any 5 visual inspection techniques for the assessment of roughness. (6)
- (OR)

b. With a schematic diagram, explain the construction working and application of a microptic autocollimator. (16)

14.a. Explain the application of laser interferometry in linear and angular measurements. (16)

(OR)

b. Explain the construction and working of an NPL interferometer with a neat sketch. (16)

15.a. Describe the design features of various configurations of CMMs. (16)

(OR)

b.i. Elucidate the applications of machine vision system. (10)

ii. Write detailed notes on measuring elements at nanoscale. (6)