Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

# Q 2413

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Fifth Semester

Mechanical Engineering

MF 331 — ENGINEERING METROLOGY

(Common to Mechatronics Engineering)

Time : Three hours
Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the fundamental methods of Measurements?

2. Define Reliability?

3. How does a Comparator differ from a Measuring Machine?

4. What are the different methods for Measuring Angles?

5. What is the 'Best Size' wire?

6. Define Surface Roughness.

7. State the essential conditions for obtaining sharp interference fringes.

8. What are the advantages of Laser Interferometry?

9. State any two important features of Co-ordinate measuring machine.

10. How the computers are used in the field of Metrology?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the following terms : Repeatability, Accuracy and Precision. And also draw a possible curve between the cost involvement and accuracy achieved for any instrument. (10)

    (ii) What is the need for measurement and the role of metrology in manufacturing? (6)

Or

(b) What are the various possible sources of errors in measurements? What is meant by Systematic and Random Errors? How the random errors are analyzed? (16)

12. (a) (i) Explain how the Pneumatic comparator works and briefly enumerate the advantages of Differential Pneumatic Comparator. (10)

(ii) Discuss the applications of pneumatic comparator. (6)

Or

(b) (i) With the neat sketch explain the working principle of an Autocollimator. (8)

(ii) State and explain the uses of Sine Bar and Sine Table with suitable sketches. (8)

13. (a) (i) Explain the method for measuring effective diameter of internal screw threads. (8)

(ii) How is the involute profile of gear tooth inspected? (8)

Or

(b) (i) Define straightness and how is it measured? (8)

(ii) Describe any one electronic type surface roughness measuring instrument. (8)

14. (a) Explain the working of A.C. laser interferometer and how it is used for length of travel and angular variation measurement? (16)

Or

(b) How are the pitch and roll errors in Z-axis of a VMC measured using laser interferometer? (16)

15. (a) (i) Briefly explain the constructional features of Co-ordinate Measuring Machine. (10)

(ii) Compare moving bridge and moving table CMM. (6)

Or

(b) (i) Explain the principle of Machine Vision system. (10)

(ii) Write a short note on Computer Aided Inspection. (6)

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