Reg. No. : | | | | | | | | | | |

M 2502

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fifth Semester

Mechanical Engineering

MF 331 — ENGINEERING METROLOGY

(Common to Mechatronics Engineering)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Distinguish between line standards and end standards.

2. Define Reliability.

3. Mention the chances of errors in using a sine bar for measuring angles.

4. State any four essential characteristics of a good comparator.

5. Define 'Lead angle' of a screw thread.

6. What are lays? Mention its types.

7. What are the characteristics of laser?

8. State the applications of laser interferometery.

9. Write notes on probes used in CMM.

10. What are the advantages of computer aided inspection?

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Distinguish between Precision and Accuracy (6)

(ii) Explain various methods of measurement in detail. (10)

Or

(b) (i) Write detailed notes on

(1) Reliability

(2) Redundancy. (6)

(ii) Distinguish between Systematic and random errors in measurements. (10)

12. (a) (i) Explain the working principle of a Zeiss Ultraoptmeter comparator with a neat sketch. State its advantages and disadvantages. (12)

(ii) What are the precautions to be taken before using slip gauges? (4)

Or

(b) (i) Describe the construction, working and applications of angle dekkor. (8)

(ii) Explain various types of sine bars and mention their applications. (8)

13. (a) (i) Describe the various methods of measuring major and minor diameters of external and internal screw threads. (12)

(ii) Write notes on:

(1) Periodic pitch errors

(2) Drunken errors. (4)

Or

(b) (i) Describe the method of inspecting the roughness of a component using Tomlinson's surface meter. (10)

(ii) What are the principle reasons for controlling the surface textures? (6)

14. (a) (i) What are the essential requirements for light wave interference to occur? (6)

(ii) Explain the construction and working of Twyman green interferometer. (10)

Or

(b) Explain the construction and working of Single frequency D.C. interferometer. (16)

15. (a) (i) Describe the construction and working of Gantry type CMMs. (8)

(ii) Compare various types of CMMs based on their configurations and capabilities. (4)

(iii) Mention the advantages of Bridge type CMM over Cantilever type CMMs. (4)

Or

(b) (i) Describe various phases of machine vision in detail. (12)

(ii) Write notes on the applications of Machine vision. (4)
