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

J 3330

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2009.

Fifth Semester

Mechatronics Engineering

MH 1302 — DIMENSIONAL METROLOGY

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention any four applications of measurements.

2. State the importance of codification in measurement.

3. How is the least count of Vernier caliper found?

4. What are three elements of measurement?

5. What are the uses of dial indicators?

6. What are the disadvantages of electronic comparators?

7. What are optical flats? Mention its applications.

8. What the applications of optical polygons?

9. What is Center line average method used in surface roughness assessment?

10. What are the disadvantages of using stylus and skid type instruments used for measuring surface roughness?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Differentiate between accuracy and precision. (8)

(ii) Describe briefly the evolution of standards. (8)

Or

(b) Write notes on :

(i) Reliability.

(ii) Metric systems.

(iii) Rounding of numerical values.

(iv) Acceptance sampling. (16)

12. (a) (i) Explain the sources of errors and the methods of eliminating it in using various types of calipers. (10)

(ii) List various applications of scaled instruments. (6)

Or

(b) (i) With a neat sketch explain the working principle, construction and applications of Vernier Caliper. (10)

(ii) What are the applications and advantages of micrometers? (6)

13. (a) (i) Explain with a neat sketch the working principle and construction of electronic comparators. (8)

(ii) Explain the advantages of using multiple scales. (8)

Or

(b) (i) Explain with a schematic diagram the construction and working principle of a Differential pneumatic comparator. (12)

(ii) Explain the role of errors and the calibration procedures to be followed for pneumatic comparators. (4)

14. (a) (i) Explain with suitable sketches how the flatness of an optical flat is tested. (10)

(ii) Describe briefly on the care to be taken in the use of optical flats. (6)

Or

(b) (i) Explain the usage of various types of sine bars with neat sketches. (8)

(ii) Describe the construction and working principle of alignment telescope. (8)

15. (a) (i) Explain the construction and working of Taylor-Hobson Talysurf and describe how it is used for surface roughness measurement. (12)

(ii) Explain various types of roundness errors. (4)

Or

(b) (i) Describe various types of bridge type CMMs with neat diagrams. (12)

(ii) List various advantages of machine vision systems. (4)