

C 3303

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fifth Semester

(Regulation 2004)

Automobile Engineering

ME 1304 — ENGINEERING METROLOGY AND MEASUREMENTS

(Common to Mechanical Engineering)

(Common to B.E. (Part-Time) Fourth Semester Regulation-2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the need for measurement?
2. Distinguish between repeatability and reproducibility.
3. What is Taylor's principle as applied to the design of limit gauges?
4. List the advantages of electrical type comparators.
5. Write notes on 'Drunken errors' in screw threads.
6. What are 'Lays' in surface measurements?
7. What are cube corners? State its purpose.
8. List any four possible causes of errors in CMM.
9. Define : Power.
10. List any four major disadvantages of using bimetallic strips for temperature measurements.

PART B — (5 × 16 = 80 marks)

11. (a) Describe in detail the various types of errors that may arise in measurements. (16)

Or

- (b) Write detailed notes on :
- (i) Sensitivity. (4)
 - (ii) Calibration. (4)
 - (iii) Precision. (4)
 - (iv) Interchangeability. (4)

12. (a) (i) Explain the precautionary measures one shall follow at various stages of using slip gauges. (12)
- (ii) Explain the process of 'Wringing' in slip gauges. (4)

Or

- (b) (i) Explain with a schematic sketch the working principle of Solex pneumatic comparator (12)
- (ii) Explain why sine bars are not suitable for measuring angles above 45 degrees. (4)

13. (a) (i) Describe the two wire method of finding the effective diameter of screw threads. (8)
- (ii) Describe the chordal thickness method using gear tooth vernier caliper. (8)

Or

- (b) (i) Explain one method of assessing the straightness of a straight-edge. (12)
- (ii) Write notes on the types of irregularities of a circular part and mention its causes. (4)

(a) (i) Describe the working principle of a dual frequency laser interferometer and state its application. (12)

(ii) Mention any five important characteristics of laser. (4)

Or

(b) (i) Explain the construction details of column type CMMs. (12)

(ii) What are the advantages of bridge type CMMs? (4)

15. (a) (i) Explain with a neat diagram the purpose and operating principle of a Venturimeter. (12)

(ii) What are rotameters? State its applications. (4)

Or

(b) (i) Explain the working principle of an electrical resistance thermometer. (12)

(ii) What are thermo couples? State its applications. (4)