

**T 8253**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Fifth Semester

Mechanical Engineering

ME 1304 — ENGINEERING METROLOGY AND MEASUREMENTS

(Common to Automobile Engineering and common to B.E. (Part time)

Fourth Semester – Regulation 2005)

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between line standard and end standard.
2. What is repeatability?
3. Define – Metrology.
4. What is comparator?
5. Define – Lead.
6. What is gear runout?
7. What do you mean by alignment test on machine tools?
8. What are the benefits of using CMM?
9. Differentiate between force and torque.
10. What is the working principle of thermocouple?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the various systematic and random errors in measurements. (12)  
(ii) What is the need of calibration? Explain. (4)

Or

- (b) (i) Explain the classification of various measuring methods. (12)  
(ii) Distinguish between accuracy and precision. (4)

12. (a) (i) With neat sketch explain the construction and working principle of differential pneumatic comparator. (10)  
(ii) With neat diagram explain the construction and working principle of depth micrometer? (6)

Or

- (b) (i) What is auto collimator? With neat sketch explain the working principle of microoptic auto collimator? (10)  
(ii) Write the advantages and disadvantages of the mechanical comparator. (6)

13. (a) (i) How to measure the pitch of the screw thread by using the tool makers microscope? Discuss in detail. (8)  
(ii) Describe the method of inspecting the profile of the spur gear by using involute measuring machine. (8)

Or

- (b) (i) How to check the composite errors of the gear by using Parkinson gear testing machine? Explain it in detail. (10)  
(ii) What do you mean by major, minor and effective diameter of a thread? (6)

14. (a) (i) With neat sketch explain the various types of CMM based on its construction. (12)  
(ii) Write the advantages of computer aided inspection. (4)

Or

- (b) (i) Explain the construction and working principle of laser interferometer with neat diagram. (10)  
(ii) Explain the various geometrical tests that are to be done to get a better accuracy in the machine tool? (6)

15. (a) (i) How to measure the power by using rope brake dynamometer?  
Explain with neat diagram. (8)
- (ii) Explain how cup and vane type anemometers are used to measure  
air movement. (8)

Or

- (b) (i) With neat sketch explain the construction and working principle of  
vapour pressure thermometer. (10)
- (ii) List the advantages of temperature measurement by using the  
resistance thermometer. (6)
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