

Reg. No. :

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V 4653

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

Fifth Semester

(Regulation 2004)

Mechanical Engineering

ME 1304 — ENGINEERING METROLOGY AND MEASUREMENTS

(Common to Automobile 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. Define the term Repeatability.
2. What you mean by sensitivity of a measuring instrument?
3. Give the advantages of digital vernier caliper.
4. What is the use of Autocollimator in mechanical measurements?
5. How Taylor's principle is applied to screw thread gauges?
6. List the causes of out of roundness of shafts.
7. Define sine centre in sine bar.
8. What are the types of CMM according to its construction?
9. What is a pyrometer?
10. What are the differences between orifice and venturimeters?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the principles of High-precision measurements? (8)
(ii) Describe precision and accuracy with examples. (8)

Or

- (b) What are the various possible sources of errors in measurements? What do you understand by systematic errors and random errors? (16)
12. (a) Explain the following with neat sketches.
- (i) Differential screw micrometer. (8)
(ii) Micrometer depth gauge. (4)
(iii) Thread micrometer caliper. (4)

Or

- (b) (i) Describe the various components of Bevel protractor. (8)
(ii) Discuss the working principle of Angle Dekkor with a sketch. (8)
13. (a) (i) Explain kinematic accuracy in gear rotation. (6)
(ii) Briefly explain any one method of measuring the gear tooth thickness. (10)

Or

- (b) Briefly explain the step by step procedure for determining the flatness of a surface with sketch. (16)
14. (a) Explain the construction and working principle of laser interferometer with sketch. (16)

Or

- (b) (i) Briefly explain the calibration of three co-ordinate measuring machine with sketch. (12)
(ii) Discuss the use of computers in the field of metrology. (4)

15. (a) (i) Rotometer – Explain in detail with sketch. (10)
(ii) How to use the pitot tube for flow measurements? (6)

Or

- (b) (i) List out different types of thermocouples and the materials used. State and explain the laws governing thermocouples and explain the temperature measuring techniques with thermo couples. (10)
(ii) Briefly explain a torque meter. (6)
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