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Question Paper Code : 11530

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Fifth Semester

Mechanical Engineering

ME 2304/ME 54/ME 1304/10122 ME 505/080120044 — ENGINEERING
METROLOGY AND MEASUREMENTS

(Common to Production Engineering)

(Regulation 2008)

(Common to PTME 2304 – Engineering Metrology and Measurements for B.E.
(Part-Time) Fourth Semester – Mechanical Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What do you mean by sensitivity of a measuring instrument?
2. Define Readability.
3. A 250 mm sine bar is to be set to an angle of $35^{\circ}5'6''$. Find the height of the gauge blocks required using any appropriate set of gauge blocks.
4. State the Principle of Interferometry.
5. What is gear runout?
6. What is progressive error in screw threads?
7. List any four possible causes of error in CMM.
8. Write the application of Laser Interferometry.
9. What is the working principle of thermocouple?
10. Name any four methods employed for measuring torque.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the block diagram of generalized measurement system and explain the different stages with examples. (12)
- (ii) Define accuracy. Explain how the accuracy of an instrument can be specified. (4)

Or

- (b) (i) Explain the purpose of calibrating the instrument and discuss the primary and secondary calibration. (8)
- (ii) Briefly explain the various types of input signal. (8)

12. (a) Explain the following with neat sketches.

- (i) Differential screw micrometer (4)
- (ii) Thread Micrometer (4)
- (iii) Blade type micrometer (4)
- (iv) Micrometer thread Gauge (4)

Or

- (b) Explain the working principle of Angle Dekkar with a neat sketch. Also write the applications of Angle Dekkar. (16)

13. (a) Explain the following tooth thickness measurement.

- (i) Constant Chord method (8)
- (ii) Chordal Thickness method. (8)

Or

- (b) (i) Briefly explain the step by step procedure for determining the flatness of a surface with a neat sketch. (8)
- (ii) Explain with a neat diagram the measurement of straightness using autocollimator. (8)

14. (a) Explain the construction and working of a laser Telemetric system with a neat sketch. (16)

Or

- (b) Explain the construction and working of various bridge type Co-ordinate Measuring Machines. (16)

15. (a) (i) Explain the construction and working of a Venturimeter. (8)
(ii) Explain the construction and working of a Rotometer. (8)

Or

- (b) (i) With a neat sketch explain how bimetallic strips are used for temperature measurements. (8)
(ii) Explain the working and purpose of electrical resistance thermistors. (8)