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**Question Paper Code : 51644**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fifth Semester

Mechanical Engineering

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

(Common to Production Engineering)

(Regulation 2008/2010)

(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 is Legal Metrology?
2. Differentiate between sensitivity and range with suitable example.
3. State the working principle of an electronic comparator.
4. What are the advantages of electrical and electronic comparator?
5. What are the various methods used for measuring the gear tooth thickness?
6. Define: Straightness of a line in two planes.
7. List the various geometrical checks made on machine tools.
8. Define machine vision.
9. What is the principle involved in fluid expansion thermometer?
10. Give the principle of hot wire anemometer.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Define calibration and interchangeability. (6)
- (ii) Explain the purpose of calibrating an instrument and discuss the various calibrating systems. (10)

Or

- (b) Define “errors” and explain the causes of those errors with suitable examples. (16)
12. (a) (i) Explain with a schematic sketch the working principle of solex pneumatic comparator. (8)
- (ii) Describe the working principle, advantages and disadvantages of optical comparators. (8)

Or

- (b) Shafts of  $75 \pm 0.02$  mm diameter are to be checked by the help of a Go, No-Go snap gauges. Design the gauge, sketch it and show its Go size and Not Go size dimensions. Assume normal wear allowance and gauge maker’s tolerance. (16)
13. (a) (i) Describe the two wire method of finding the effective diameter of screw threads. (10)
- (ii) What is the ‘best wire size’? Derive an expression for the same in terms of the pitch and angle of the thread. (6)

Or

- (b) (i) Explain with a neat sketch the working of Talysurf instrument for surface finish measurement. (8)
- (ii) What is the symbol for fully defining surface roughness and explain each term? (8)
14. (a) (i) Mention the advantages and disadvantages of CMM. (8)
- (ii) Explain the construction details of column type CMM. (8)

Or

- (b) Explain in detail the various methods of testing accuracy of horizontal milling machine and lathe using laser interferometer. (16)

15. (a) (i) Explain the method of measuring force using a strain gauge load cell. (8)
- (ii) Explain how an Eddy current dynamometer works. (8)

Or

- (b) (i) Explain the working principle of an electrical resistance thermometer. (10)
- (ii) What are thermo couples? State its applications. (6)
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