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**Question Paper Code : 51857**

**B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016**

**Fifth Semester**

**Mechanical Engineering**

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

**(Common to Production Engineering)**

**(Regulations 2008/2010)**

**(Common to PTME 2304/10122 ME 505 – Engineering Metrology and  
Measurements for B.E. (Part-Time) Fourth Semester  
Mechanical Engineering – Regulations 2009/2010)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A (10 × 2 = 20 Marks)**

1. What is Primary Measurement ? Give an Example.
2. What are Seismic Instruments ?
3. Why Laser is preferred in Engineering Metrology ?
4. A 100 mm sine bar was used to measure the taper angle of the specimen and the gauge block was 5.055mm. What is the taper angle.
5. What is the chordal tooth thickness at the pitch line of gear of number of teeth 50 and module 4 mm ?

6. Define Out off Roundness.
7. What is crust and Trough ?
8. Define Grey Scale Analysis.
9. Give the basic principle of strain Gauge Load cell.
10. What is an anemometer ?

**PART - B (5 × 16 = 80 Marks)**

11. (a) (i) Describe the various elements and its function of a generalized Measurement System. (12)
- (ii) Give the difference between accuracy and precision with an example. (4)

**OR**

- (b) (i) Give an example of Zero order system. (4)
- (ii) Give one example for the first order system having electrical components. (4)
- (iii) What is meant by Interchangeable Manufacturing ? What are its advantages ? (8)

12. (a) (i) With a neat diagram explain the Construction and working principle of Depth Micrometer. (10)
- (ii) Explain mathematically why error in sine bar increases when the angle being measured exceeds 45°. (6)

**OR**

- (b) (i) Explain with the help of neat sketches, the construction and working of an Autocollimeter. (8)

(ii) With a neat sketch explain the construction and working Principle of Differential Pneumatic Comparator. (8)

13. (a) (i) Describe the method of measuring the pitch of the Screw thread using the Tool Makers Microscope ? Discuss in detail. (10)

(ii) Explain kinematic accuracy in Gear Rotation. (6)

**OR**

(b) (i) Explain the working Principle of Tomlinson surfacemeter with a neat sketch. (8)

(i) Define Straightness. Describe the method of measuring the straightness of a surface using Autocollimeter. (8)

14. (a) Explain the working principle of AC Laser Interferometer with a neat sketch. (16)

**OR**

(b) (i) Explain the procedure to be used in measurement of various dimensions of a typical component using a cantilever type CMM. (12)

(ii) What are the important features available in CMM software ? (4)

15. (a) (i) Describe the construction of a hydraulic Dynamometer and explain how it is used for Power Measurement. (12)

(ii) Briefly explain a Torque meter. (4)

**OR**

(b) Write short Notes on

(i) Thermocouple (8)

(ii) Optical Pyrometer. (8)