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Question Paper Code : 50877

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fifth Semester

Mechanical Engineering

ME 8501 – METROLOGY AND MEASUREMENTS

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate between precision and accuracy.
2. List any four methods of measurement.
3. List out any four angular measuring instruments used in metrology.
4. Define clinometers.
5. Differentiate straightness and flatness of the surface plate.
6. List any four possible causes of errors in CMM.
7. Point out any four methods of measuring roundness of hollow shaft.
8. State the drunken error in screw threads.
9. Distinguish between force and torque.
10. Give the applications of a bimetallic strips

PART B — (5 × 13 = 65 marks)

11. (a) Explain the classification of various measuring methods and its merits.
Or
(b) Explain in details with a suitable examples of
(i) Repeatability (1.5)
(ii) Reproducibility (1.5)
(iii) Systematic and random error (5)
(iv) Static and dynamic Response. (5)
12. (a) Explain the working principle of an autocollimator with a neat sketch and its application.
Or
(b) Explain in detail with a neat sketch of any two bevel protractors.
13. (a) With a neat sketch describe the working of AC laser interferometer.
Or
(b) Explain the various steps of machine vision system in metrology and its advantages and disadvantages.
14. (a) Explain in detail with a neat sketch of gear tooth Vernier method of measuring the involute gear tooth thickness.
Or
(b) Explain how to measure the specifications of the buttress screw thread by using the tool makers microscope.
15. (a) Explain the working principle of an electrical resistance thermometer.
Or
(b) With neat sketch explain the working principle of ultrasonic flow meter.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the needs, types and constructional features of coordinated measuring machine used in Aerospace industry.
Or
(b) How laser is used in measurement in welding applications? Explain the basic principle involved in anyone applications.