Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 70831

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2021.

Fourth / Fifth Semester

Mechanical Engineering

ME 6504 – METROLOGY AND MEASUREMENTS

(Common to: Material Science and Engineering / Mechatronics Engineering)

(Regulations 2013)

(Also common to : PTME 6504 – Metrology and measurements for B.E.
(Part-Time) – Mechanical Engineering / Fourth Semester (Regulations 2014))

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Brief on sensitivity in measurement.

2.   Differentiate between accuracy and precision.

3.   What is the use of Feeler gauges?

4.   A vernier scale consists of 25 divisions on 12mm spacing and the main scale
      has 24 divisions on 12 mm. What is the least count?

5.   What are the different types of geometrical tests conducted on machine tools?

6.   Write the advantages of machine vision system.

7.   Calculate the "best size wire" for checking the effective diameter of a M10 × 2.5
      thread.

8.   Is assessment length greater/lesser than traverse length in surface finish
      measurement? Why?

9.   Why are measuring instruments calibrated?

10.   What is the working principle behind strain gauges?

PART B — (5 × 13 = 65 marks)

11. (a) With a suitable example explain the various elements of generalised measurement system.

Or

     (b) Describe the different types of errors and its causes.

12. (a) Explain the construction and working principle of an autocollimator with a neat diagram.

Or

     (b) Explain the construction, working principle and applications of Sine Bar.

13. (a) (i)   What is a Coordinate Measuring Machine? What are its basic elements?   (6)

          (ii) Explain the working principle of a DC laser interferometer with a neat diagram.   (7)

Or

     (b) Write briefly about the various stages involved in machine vision.

14. (a) Define various terminologies of screw thread with suitable diagrams.

Or

     (b) Derive the expression for finding the effective diameter by three wire method.

15. (a) Explain the construction and working principle of any two instruments used for measuring temperature.

Or

     (b) Explain the construction and working of Venturimeter and Rotameter.

PART C — (1 × 15 = 15 marks)

16. (a) (i)   How slip gauges are manufactured?   (5)

          (ii) Explain the construction and working principle of angle dekkor with a neat diagram.   (10)

Or

     (b) Explain with the a neat sketches, the principle and working of an autocollimators and also list its applications.

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