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Question Paper Code	12484
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**B.E. / B.Tech - DEGREE EXAMINATIONS, NOV / DEC 2023**

Fourth Semester

**Mechanical Engineering**

**20MEPC402 - METROLOGY, MEASUREMENTS AND COMPUTER AIDED INSPECTION**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. What are the sources of error?   | 2,K1,CO1                      |
| 2. List four linear measuring instruments.                                    | 2,K1,CO1                      |
| 3. What are limit Gauges?   | 2,K1,CO2                      |
| 4. How is a sine bar used for setting a job at an angle in a milling machine? | 2,K2,CO2                      |
| 5. What is meant by "Best size wire" in screw thread measurement?             | 2,K1,CO3                      |
| 6. List the instruments used for measuring temperature.                       | 2,K1,CO3                      |
| 7. State the applications of CMM in reverse engineering.                      | 2,K1,CO4                      |
| 8. Why is laser metrology preferred in engineering metrology?                 | 2,K2,CO4                      |
| 9. What are the advantages of using solid-state cameras in machine vision?    | 2,K2,CO5                      |
| 10. Name any four applications of machine vision systems in industry.         | 2,K2,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Explain with neat sketches some common errors. How are these errors minimized or eliminated? 13,K2,CO1
- OR**
- b) What are the general characteristics and selection of measuring instruments? 13,K2,CO1
12. a) With neat sketch explain the working principle of Auto collimator. 13,K3,CO2
- OR**
- b) Explain the working principle of Angle Dekkor with a neat sketch. 13,K3,CO2
13. a) How to measure the pitch of the screw thread by using the Tool Makers Microscope? Discuss in detail. 13,K3,CO3

**OR**

b) Explain in detail with a neat sketch of gear tooth vernier method of measuring the involute gear tooth thickness. *13,K3,CO3*

14. a) What types of probes are used in a coordinate measuring machine? Give the specific application of each probe and explain the working principle of the touch trigger probe. *13,K4,CO4*

**OR**

b) With a neat sketch, explain the working principle of the AC LASER interferometer. *13,K4,CO4*

15. a) Explain the various steps of the machine vision system in metrology and its advantages and disadvantages. *13,K4,CO5*

**OR**

b) Explain in detail the design of a machine vision system. *13,K4,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) Explain the needs, types, and constructional features of the CMM used in the automation industry. *15,K3,CO6*

**OR**

b) Explain the concept of interchangeability as applied to industries. *15,K3,CO6*