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18AU35

Third Semester B.E. Degree Examination, Dec.2024/Jan.2025
Mechanical Measurement and Metrology

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. What is Metrology? State and explain the objectives of metrology.   **(10 Marks)**
   b. Define the following terms used with reference to measurement:
      i) Accuracy
      ii) Hysteresis
      iii) Repeatability
      iv) Threshold.   **(10 Marks)**

OR

2 a. Discuss the following standards of measurements:
      i)   Line standard   **(03 Marks)**
      ii) Wave length standard   **(03 Marks)**
      iii) End standard   **(04 Marks)**
   b. What is Error? Explain the error in measuring instruments.   **(10 Marks)**

Module-2

3 a. Describe the construction and working of LVDT. With a neat sketch.   **(10 Marks)**
   b. Explain with a neat sketch, Zeiss ultra optimiter. List out the advantages and disadvantages of optical comparator.   **(10 Marks)**

OR

4 a. Give the combination of angle gauges to obtain the following angles :
      i) 37°16'42"
      ii) 102°8'36".   **(06 Marks)**
   b. With a neat sketch, explain the method of measuring taper angles using sine center.
                                                                                  (06 Marks)
   c. Illustrate the principle of interferrometry with neat sketches.   **(08 Marks)**

Module-3

5 a. What are intermediate modifying devices? List out some of the problems inherent in any mechanical intermediate modifying system and explain in brief any two inherent problems.
                                                                                  (10 Marks)
   b. With a block diagram, explain a telemetering transmitting system and mention its advantages and disadvantages of system.   **(10 Marks)**

OR

6 a. Write a short note on:
      (i)   Vaccum tube amplifier.
      (ii)   Electronic amplifier.   **(10 Marks)**
   b. What are X-Y plotter? With a block diagram, explain X-Y working principles.   **(10 Marks)**

Module-4

7 a. Explain with a sketch working of proving ring.   **(10 Marks)**
   b. Explain hydraulic dynamometr with a neat sketch.   **(10 Marks)**

OR

8 a. What are the steps to be token in the preparation of the specimen and mounting of strain gauges?   **(10 Marks)**
   b. Explain the following terms:
      i)   Force
      ii) Torque
      iii) Strain
      iv) Gauge factor   **(10 Marks)**

Module-5

9 a. What are the various types of fits used for the assembly of machine parts?   **(04 Marks)**
   b. Differentiate between hole basis system and shaft basis system with sketches.   **(08 Marks)**
   c. Discuss in brief, what are the different types of materials used for making gauges? **(08 Marks)**

OR

10 a. With a neat sketch, explain pirani thermal conductivity gauge.   **(10 Marks)**
   b. Write a short note on use of elastic members in pressure measuring devices.   **(10 Marks)**

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