USN | | | | | | | | | | **18MR36**

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Mechanical Measurement and Metrology

Time: 3 hrs.   Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
     2. *Assumptions can be made for missing data.*

Module-1

1 a. Define Metrology. What are the objectives of Metrology?   **(09 Marks)**
   b. Explain Line standard, End standard, wavelength standard.   **(06 Marks)**
   c. Describe International Prototype Meter with a neat sketch.   **(05 Marks)**

OR

2 a. Explain the working principle of Autocollimator with a neat sketch.   **(08 Marks)**
   b. Explain how sine bar can be used to measure unknown angles.   **(07 Marks)**
   c. Explain the wringing phenomena of slip gauges with neat figure.   **(05 Marks)**

Module-2

3 a. Define the following terms :
      i)   Tolerance
      ii) Limits
      iii) Basic Size
      iv) Fits
      v)   Fundamental Deviation.   **(10 Marks)**
   b. Explain with a neat sketch:
      i)   Clearence fit
      ii) Interference fit
      iii) Transition fit.   **(10 Marks)**

OR

4 a. Explain with a neat sketch Sigma Comparator.   **(10 Marks)**
   b. Describe construction and working of LVDT with a neat sketch.   **(10 Marks)**

Module-3

5 a. Describe the 3-wire method of measuring effective diameter of threads.   **(08 Marks)**
   b. With a sketch, explain construction of a tool maker's microscope.   **(08 Marks)**
   c. Define precisely the following terms with respect to screw threads :
      i) Pitch   ii) Axis of the thread.   **(04 Marks)**

OR

6 a. Explain the measurement of tooth thickness by gear tooth vernier Caliper. Derive the
      expression for chordal thickness and chordal addendum.   **(10 Marks)**
   b. Sketch and explain Parkinson's gear tester.   **(08 Marks)**
   c. Define following terminologies of gear teeth
      i)   Module
      ii) Dedendum.   **(02 Marks)**

Module-4

7 a. Define Measurement. With a neat block diagram, explain the generalized measurement system. Give example. **(10 Marks)**
   b. Define hysteresis, accuracy, range. **(04 Marks)**
   c. Explain classification of errors. **(06 Marks)**

OR

8 a. Define Transducer. Explain Mechanical Transducers. **(10 Marks)**
   b. Explain with a circuit diagram
     i) Ballast circuit
     ii) Simple current sensitive circuit. **(10 Marks)**

Module-5

9 a. Sketch a proving ring. Explain how it is used for forced measurement. **(07 Marks)**
   b. Explain with neat sketch, McLead gauge used for pressure measurement. **(08 Marks)**
   c. What are dynamometers? Explain the types of dynamometers. **(05 Marks)**

OR

10 a. What is a thermocouple? State the laws of thermocouple. **(08 Marks)**
   b. Explain with sketch, optical pyrometer. **(08 Marks)**
   c. Write a note on electrical resistance strain gauge. **(04 Marks)**

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