CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   **17ME46B/17MEB406**

Fourth Semester B.E. Degree Examination, Aug./Sept.2020
Mechanical Measurements 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. Define Metrology. What are the objectives of Metrology from Industrial point of view?
        (08 Marks)
    b. Explain the necessary sketch the imperial standard yard and highlight the significance of Airy points.   **(06 Marks)**
    c. What care should be taken for the Metrological Instruments in the laboratory?   **(06 Marks)**

OR

2   a. Three 100mm end bars are measured on a level comparator by first wiring them together and comparing with 300mm bar. There was error of 0.03 mm and three bars together have total error of 0.064mm less than the standard bar. Bar A is 0.02mm longer than bar B and 0.025mm longer than bar C. Determine actual dimensions of all end bars.   **(08 Marks)**
    b. Explain with an example for optical Instrument for angular measurements.   **(08 Marks)**
    c. Describe with a neat sketch wringing phenomenon of slip gauge.   **(04 Marks)**

Module-2

3   a. Define a fit. Explain the types of the fits.   **(06 Marks)**
    b. Explain the hole basis system and shaft basis system.   **(08 Marks)**
    c. Write a short notes on Geometric Dimensional Tolerances (GD and T)   **(06 Marks)**

OR

4   a. With a neat sketch, explain Johansson Mikrokator.   **(08 Marks)**
    b. What are comparators? How do they differ from measuring Instruments?   **(06 Marks)**
    c. Differentiate measuring instruments, gauges and comparators.   **(06 Marks)**

Module-3

5   a. Explain the two wire method of measuring the effective diameter of the screw.thread.
        (08 Marks)
    b. Derive an expression for the Chordal thickness is measured by using gear tooth vernier caliper.   **(08 Marks)**
    c. With a sketch show the terminology of spur gear.   **(04 Marks)**

OR

6   a. Illustrate the principles of Interferometry with sketch.   **(08 Marks)**
    b. Explain the latest Trends in Metrology.   **(06 Marks)**
    c. State the advantages and applications of co-ordinate measuring machine.   **(06 Marks)**

Module-4

7 a. Define Measurement. With block diagram explain the working principle of Generalized measurement system with example. **(08 Marks)**
   b. Define an Error. How the errors in measurements classified? Give the reasons for each type of Errors. **(06 Marks)**
   c. What are transducers? List out advantages and disadvantages of Mechanical transducer. **(06 Marks)**

OR

8 a. Explain the inherent problems observed in mechanical type intermediate modifying device. **(06 Marks)**
   b. With a sketch explain the construction and important parts of a cathode ray oscilloscope. **(08 Marks)**
   c. With a block diagram explain the general telemetry system. **(06 Marks)**

Module-5

9 a. Explain the working principles of hydraulic dynometer for torque measurements. **(08 Marks)**
   b. Sketch and explain the working of a pirani gauge. **(06 Marks)**
   c. Explain with sketches working of Proving ring. **(06 Marks)**

OR

10 a. State the laws of thermocouples. **(04 Marks)**
   b. Explain the construction and working of optical pyrometer. **(08 Marks)**
   c. Define gauge factor. Explain the Wheatstone bridge arrangement for strain measurements. **(08 Marks)**

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