

# CBCS SCHEME

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## Third Semester B.E. Degree Examination, Jan./Feb. 2021 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 objective of Metrology. (08 Marks)  
b. What is the role of standard? Where are the Airy points located on 600 mm length bar. (06 Marks)  
c. With an example, explain the concepts of accuracy and precision in measurement system. (06 Marks)

OR

- 2 a. Describe with neat sketches,  
(i) Imperial standard yard. (10 Marks)  
(ii) Wringing phenomena. (06 Marks)  
b. Distinguish clearly between line standard and end standard.  
c. The slip gauge set M38 consist of the following:

Range (mm)	Steps (mm)	Pieces
1.005	-	1
1.01 – 1.09	0.01	9
1.1 – 1.9	0.1	9
1.0 – 9.0	1.0	9
10.0 – 100.0	10.0	10

List the slip gauge to be wrung together to produce the following dimensions:

- (i) 29.875 mm  
(ii) 15.09 mm (04 Marks)

### Module-2

- 3 a. What is comparator? Give a list of various types of comparator. With a neat sketch describe the working principle of sigma comparator. (10 Marks)  
b. Describe with a neat sketch, construction and working of LVDT. (10 Marks)

OR

- 4 a. Explain the working principle of SINE bar and highlights its applications. (08 Marks)  
b. Explain the sources of errors in sine bars. (06 Marks)  
c. Select the sizes of angle gauges required to build,  
(i)  $102^{\circ}8'42''$  (ii)  $37^{\circ}9'18''$  (06 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) Vacuum tube amplifier. (10 Marks)  
(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. What are the methods of force measurement? With a neat sketch explain the analytical balance. (10 Marks)
- b. With the help of a neat sketch, explain the working principles of prony brake dynamometer. (10 Marks)

OR

- 8 a. Write a short note on:
- (i) Mounting of strain gauge. (10 Marks)
- (ii) Strain measurement. (10 Marks)
- b. Discuss the problems associated with strain gauge installations. (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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