

# CBCS SCHEME

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15AE36

## Third Semester B.E. Degree Examination, June/July 2018 Measurement and Metrology

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Define Metrology and state its objectives. (04 Marks)  
b. Discuss briefly Line standard and End standard. (06 Marks)  
c. Describe the phenomena of wringing of slip gauges, with neat sketch. (06 Marks)

OR

- 2 a. Describe with sketch, Imperial standard yard and International prototype meter. (08 Marks)  
b. Give the details of M112 set of slip gauges and build the following dimensions :  
i) 49.3115 mm ii) 78.3665 mm iii) 35.4875mm. Using 2 protector slip of 2.5mm each. (08 Marks)

### Module-2

- 3 a. Define Fit. Explain different types of Fits with sketches. (08 Marks)  
b. Calculate the dimensions of plug gauges and ring gauges to control the production of 50mm shaft and Hole pair  $H_7d_8$ . The following assumptions are made : 50mm lies in a diameter step of 30-50mm. The upper deviation for the shaft is given by  $-16D^{0.44}$ ,  $IT_6 = 10i$  and IT6 grade the tolerance magnitude is multiplied by 10 at each fifth step. (08 Marks)

OR

- 4 a. What are Limit gauges? Sketch and explain plain plug gauges. (06 Marks)  
b. Explain Hole basis system and Shaft basis system. Which is preferred and why? (06 Marks)  
c. Write a note on interchangeability and selective assembly. (04 Marks)

### Module-3

- 5 a. Define Comparators. Give the classification and characteristics of comparators. (08 Marks)  
b. Explain the principle of working of sine bar and sine centre, with sketches. (08 Marks)

OR

- 6 a. How do you find effective diameter of a screw thread using two – wire method? (08 Marks)  
b. With a neat sketch, explain the construction of working of LVDT. (08 Marks)

### Module-4

- 7 a. Discuss with block diagram of generalized measurement system. (08 Marks)  
b. Explain the following pressure sensitive elements with sketches :  
i) Bourdon tubes ii) Bellows iii) Diaphragms. (08 Marks)

OR

- 8 a. Explain the following :  
i) Accuracy and Precision ii) Repeatability and Reproducibility iii) Resolution and Threshold. (08 Marks)  
b. Define Error. Give the detailed classification of errors. (08 Marks)

15AE36

**Module-5**

- 9 a. Explain with sketch, Mechanical - Dynamometer. (08 Marks)  
b. What is Pyrometer? Explain the working of Optical Pyrometer. (08 Marks)

**OR**

- 10 a. State and explain laws of thermocouples. (08 Marks)  
b. Describe with sketch, McLeod gauge. (08 Marks)

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