CBCS SCHEME

USN | | | | | | | | | | |

18AE36

Third Semester B.E. Degree Examination, July/August 2022
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 Standard. **(04 Marks)**

b. Describe with neat sketch :
i) Imperial standard
ii) Wavelength standard. **(10 Marks)**

c. Distinguish between:
i) Line and End standard
ii) Primary standard and secondary standard. **(06 Marks)**

OR

2 a. Discuss the procedure the calibration of End bar. **(08 Marks)**

b. Explain Wringing phenomenon, using a slip gauge set M112, buildup the following dimensions i) 78.3665 ii) 49.3115. **(12 Marks)**

Module-2

3 a. Define following :
i) Limit ii) Fits iii) Tolerance iv) Fundamental deviation. **(08 Marks)**

b. Explain, what is meant by
i) Interchange able part ii) Universal interchange ability iii) Local interchangeability. **(12 Marks)**

OR

4 a. Derive GO and NOGO gauges. How the Taylor's principle is used in designing them. **(08 Marks)**

b. Determine the type of the fit after deciding the fundamental deviations and tolerances in the following :
Fit ϕ 70 H_9e_7 Diameter step (50 – 80)
fundamental deviation for e shaft = $-11D^{0.41}$
IT7 = 16i IT9 = 40i, $i = 0.45\sqrt[3]{D} + 0.001D$ **(12 Marks)**

Module-3

5 a. Define comparator, write difference between comparator and measuring instrument. **(08 Marks)**

b. Explain with neat sketch the construction and working of mechanical of optical comparator. **(12 Marks)**

OR

6 a. Define Angle? Explain with neat sketch bevel protractor. **(10 Marks)**

b. Give the combination of angle gauges to obtain the following angles also sketch the arrangement of gauges.
i) 57°34′9″ ii) 102°8′42″ **(10 Marks)**

Module-4

7 a. Explain with neat sketches :
i) Hysteresis ii) Threshold iii) Sensitivity iv) Calibration. (12 Marks)
b. Describe the three stages of measurement with a suitable example. (08 Marks)

OR

8 a. Define an error. How are error classified? (06 Marks)
b. Discuss in detail various types of elastic members used in mechanical transducers. (10 Marks)
c. List the advantages of electronic transducers. (04 Marks)

Module-5

9 a. With the help of neat sketch, explain the working principle of prony brake dynamometer. (10 Marks)
b. Discuss briefly with sketch elastic pressure transducers. (10 Marks)

OR

10 a. Write a short note on the electrical resistance thermometer. (05 Marks)
b. Explain with neat sketch bonded type resistance strain gauge. (10 Marks)
c. Write a short note on thermocouples. (05 Marks)

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