

USN

--	--	--	--	--	--	--	--	--	--

10ME32B/AU32B

**Third Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Mechanical Measurements and Metrology**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

- 1
  - a. What is Metrology? State any four objectives of metrology. (06 Marks)
  - b. Describe with a neat sketch, International Prototype meter. (06 Marks)
  - c. Discuss the important features of wavelength standard. (04 Marks)
  - d. Build 49.3115mm using M112 set of slip gauges. (04 Marks)
- 2
  - a. Define the following terms :  
 i) Limits ii) Fits iii) Tolerance iv) Deviation. (04 Marks)
  - b. Differentiate between interchangeability and selective assembly. (06 Marks)
  - c. Explain with a sketch, Taylor's principle for design of limit gauges. (06 Marks)
  - d. What is Wear allowance? How it is applied in design of gauges? (04 Marks)
- 3
  - a. What are the required characteristics of comparators? (04 Marks)
  - b. With neat sketch, describe the construction and principle of working of sigma comparator. (12 Marks)
  - c. Give the combination of angle gauges to obtain  $57^{\circ} 34' 9''$  angle. (04 Marks)
- 4
  - a. Illustrate the principle of Interferometry, with sketches. (06 Marks)
  - b. What is best wire size? Derive an expression for the same. (06 Marks)
  - c. With a sketch, explain the construction of a tool maker's microscope. What are its applications? (08 Marks)

**PART - B**

- 5
  - a. What is the significance of measurement system? (04 Marks)
  - b. Define the following terms used with reference to measurement :  
 i) Accuracy ii) Precision iii) Calibration iv) Threshold v) Sensitivity  
 vi) Hysteresis. (06 Marks)
  - c. Mention any four mechanical and four electrical transducers. (04 Marks)
  - d. Define an error. How errors are classified? Give reasons for each type of error during measurement. (06 Marks)
- 6
  - a. Describe in detail a ballast circuit. (08 Marks)
  - b. With a sketch, explain the construction and important parts of a cathode ray oscilloscope. (08 Marks)
  - c. What are the primary functions of a terminating device? (04 Marks)
- 7
  - a. Explain with a sketch, working of proving ring. (06 Marks)
  - b. Explain the working principle of hydraulic dynamometer used for torque measurement. (08 Marks)
  - c. Describe with a neat sketch, McLeod Vacuum gage. (06 Marks)
- 8
  - a. What is a Thermocouple? State the laws of thermocouple. (08 Marks)
  - b. Describe the construction and working of optical pyrometer. (08 Marks)
  - c. Write short note on gauge factor. (04 Marks)

\*\*\*\*\*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.