

**Sixth Semester B.Tech. Degree Examination, June 2015  
(2008 Scheme)**

**08.601 : METROLOGY AND INSTRUMENTATION (MP)**

Time : 3 Hours

Max. Marks : 100

- Instructions:** i) Answer **all** questions from Part – A.  
ii) Answer **one complete** question from **each** Module of Part – B.

**PART – A**

- I. a) Write the technical meanings of 'sensitivity' and 'response time' in measurement.
- b) What are the elements that decide the cost of measurement ?
- c) List the requirements on sine bar.
- d) State Taylor's principles for limit gauge design. Write explanation for each statement.
- e) What are 'uni-lateral' and 'bi-lateral' tolerancing ? Write examples.
- f) Write the conditions for light interference.
- g) Bringout the working principle of autocollimator.
- h) How a Charge Coupled Device (CCD) camera works ?
- i) Differentiate between static and dynamic measurements.
- j) Describe seebeck effect. **(10×4=40 Marks)**



**PART – B**

**Module – I**

- II. a) Illustrate the arrangement of angle gauges in checking angles greater and less than 90°. **10**
- b) What are position gauges ? Describe any two applications of position gauges with sufficient sketches. **10**

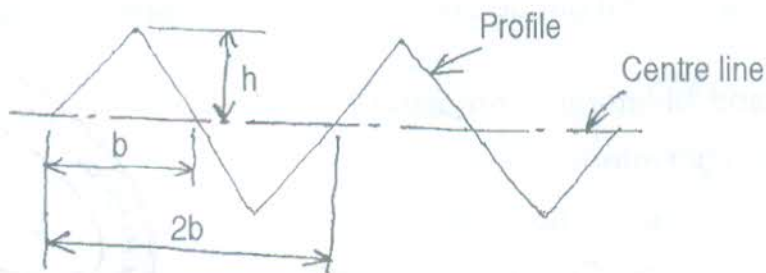
P.T.O.



- III. a) Describe the three basic types of fits in hole basis system. 10
- b) An engineer designated a bush and housing assembly as 25 H6/n7. Prepare a sketch and show the estimated tolerances for the assembly. Data given are :
- i) Fundamental tolerance unit,  $i = 0.45 \sqrt[3]{D} + 0.001 D \mu\text{m}$  where,  $D$  is in mm, lies in the diameter steps 18 mm and 30 mm.
  - ii) Fundamental deviation for 'n' shaft =  $+5 D^{0.34}$
  - iii)  $IT6 = 10i$ ,  $IT7 = 16i$ . 10

### Module – II

- IV. a) Sketch and detail the working of any one type of optical comparator. 10
- b) How laser interferometer can be used for straightness measurement? 10
- V. a) Sketch a bridge type Co-ordinate Measuring Machine (CMM) and mark the parts and axes. Write how CMM works in obtaining a measurement. 10
- b) Derive an expression for average roughness ( $R_a$ ) value, for an uniform, triangular profile having wavelength '2b' and amplitude 'h', as shown below : 10



### Module – III

- VI. Write short notes on **any three** of the following :
- a) Gaussian and normal error distribution
  - b) Variable inductance transducer
  - c) Active and passive transducers
  - d) Temperature compensation in strain gauges. 20
- VII. a) Illustrate the working of any two kinds of dynamometers. 10
- b) Write the working of LVDT. 10