



Reg. No. :

Name :

**Sixth Semester B.Tech. Degree Examination, June 2018
(2008 Scheme)**

08.601 : METROLOGY AND INSTRUMENTATION (MP)

Time : 3 Hours

Max. Marks : 100

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

PART – A

- I. a) What is meant by 'Calibration' of an instrument ?
b) With appropriate examples, differentiate the terms 'precision' and 'accuracy' in metrology.
c) What is sine bar ? Write its principle of measurement.
d) Define 'sensitivity' for a spirit level. How various parameters influence its sensitivity ?
e) What is fundamental deviation ? Write its importance in fits.
f) Write few applications of interferometry in metrology.
g) Illustrate any one use of optical flat.
h) Distinguish between surface texture and surface roughness.
i) How a piezoelectric transducer works ?
j) Write a note on temperature compensation in strain gauges.

(10×4=40 Marks)

PART – B

Module – I

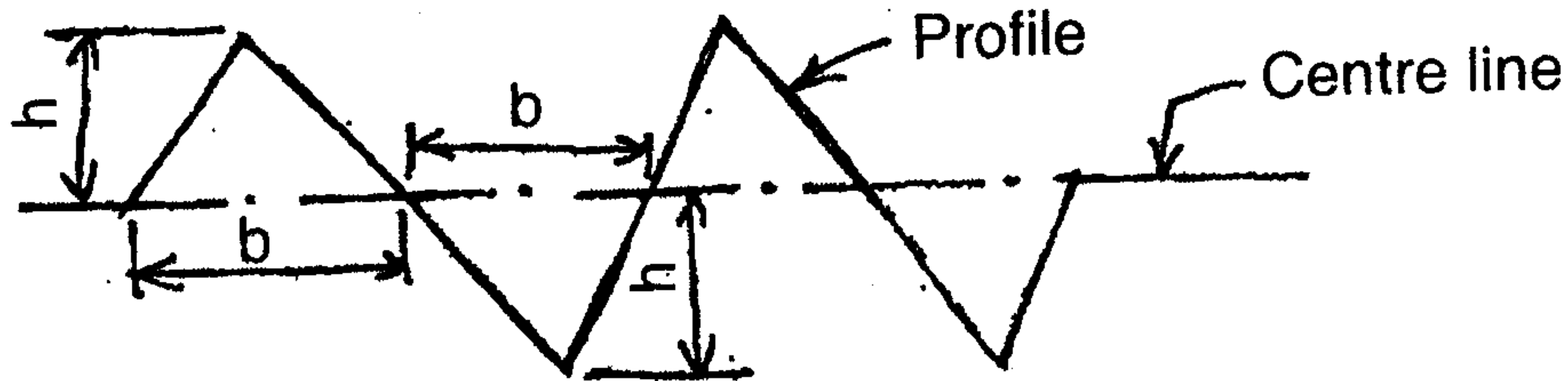
- II. a) What are the requirements of sine bar, to use it for angular measurements ?
Sketch a sine centre and write the features. **10**
b) Sketch and describe the configurations of adjustable and progressive types of snap gauges. **10**



- III. a) Write explanations to 'interchangeable' and 'selective' assembly concepts with suitable examples. 8
- b) A gear is to be mounted on a shaft by hot pressing . A designer designated the fit as 25H7s6. Estimate the tolerance zones for the shaft and hole and mark it on a diagram. Available data are :
- i) Fundamental tolerance unit, $i = 0.45 \sqrt[3]{D} + 0.001$ D microns where D is in mm. falls in the diameter steps 18 mm and 30 mm.
 - ii) Fundamental deviation for 'S' shaft = $1T 8+1$ 12
 - iii) $IT 6 = 10i$, $IT7 = 16i$, $IT8 = 25i$.

Module – II

- IV. a) Illustrate the working of sigma comparator. 10
- b) Write the working of a machine vision system. 10
- V. a) Roughness profile of a turned surface is approximately as shown below. Estimate the centre line average roughness (R_a) value for this uniform surface having triangular profile. 10



- b) Write briefly about the working of co-ordinate measuring Machine (CMM). 10

Module – III

- VI. a) Explain the static and dynamic characteristics of measuring instruments. 10
- b) Derive an expression for gauge factor of a resistance strain gauge. 10
- VII. Illustrate the working of any two of the following :
- a) Thermocouple
 - b) Optical strain gauge
 - c) LVDT. 20