

III B.Tech I Semester Supplementary Examinations, November 2005
METROLOGY AND QUALITY CONTROL
(Production Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Using slip gauges, rollers and micrometers, explain the procedure for determination of :
 - i. Small end and big end diameters of a taper plug gauge
 - ii. The taper angle
- (b) With the help of sketches. Describe a vernier type micrometer. How do you calculate its least count ? [8+8]
2. (a) Draw and explain with sketches for each of the following :
 - i. Component on a Sine Bar
 - ii. Sine Bar on a component
- (b) Explain the method of angle measurement using precision level. In which situations, is this method suitable and unsuitable. [8+8]
3. (a) State the various components of the surface texture. Which component has a numerical assessment value? What is the measure of this value ?
- (b) Determine the R_a value of the surface texture with the following information:
Vertical magnification = 1000
Horizontal magnification = 100
Sum of areas above and below the mean line = $850mm^2$
Assume the sampling length [8+8]
4. (a) What is meant by limit gauging ? How Taylors principle helps in defining it. Do plug and ring gauges satisfy it ? If not how can they be modified to satisfy Taylors principle.
- (b) Sketch and explain four different types of plug gauges ? How the plug gauges are useful in maintaining gauge tolerance and wear allowances. [8+8]
5. (a) Explain the purpose of comparator as used in Engineering measurement. What are the advantages offered by the use of comparators when making precision linear checks ?
- (b) Give an account of one type of comparator with which you are familiar. What are the disadvantages of using a comparator of high sensitivity on work which has a wide tolerance. [8+8]
6. (a) Explain the different 'screw thread' errors commonly encountered during manufacturing. How can they be identified ? Give remedies for their elimination.

- (b) Explain the method of measurement of thread angle (or) flank angle by optical projection. [8+8]
7. (a) Discuss the reasons for using \bar{X} and R charts simultaneously. Explain with examples.
- (b) The average fraction rejected is $\bar{P} = 0.75$. Determine the 3 ' σ ' control limits for P-chart. [8+8]
8. (a) Define the following :
- i. Quality Policy
 - ii. Quality Management
 - iii. Quality Plan and Audit
 - iv. Quality System
- (b) What are the various standards for Quality Management ? Discuss the objectives of ISO 9000. Briefly explain the function of each relevant standard?

[8+8]
