

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

**III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
METROLOGY AND QUALITY CONTROL
(PRODUCTION ENGINEERING)**

NOVEMBER 2005

TIME - 3 HOUR
MARK - 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 [10+6]
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. [10+6]
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. [9+7]
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 $P = 0.75$. 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? [10+6]