

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

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) With the help of sketches, discuss the constructional details of a dial gauge. Explain its working mechanism
- (b) How does dial gauge differs from a micrometer ? Outline the uses and application of a dial gauge ? What characteristics do you expect of a good dial gauge.
2. (a) Explain how
 - i. angle of a workpiece
 - ii. taper plug gauge is measured with the help of angle gauges ?
Discuss with sketches.
- (b) Calculate the angle of taper and minimum diameter of an internal taper from the following readings ?
 - i. Diameter of bigger ball = 10.25 mm
 - ii. Diameter of smaller ball = 6.07 mm
 - iii. Height of top of bigger ball from datum = 30.13 mm
 - iv. Height of top of smaller ball from datum = 10.08 mm
3. (a) How Tomlinson surface recorder and Talysurf machine works? Describe with a neat sketch ?
- (b) Calculate the R_a value of a surface for which the sampling length was 10mm, the graph was drawn to a vertical magnification of 1000 and areas above and below datum line were:

Above	180	90	155	$50mm^2$
Below	70	90	175	$145mm^2$
4. (a) Sketch a progressive type of GO and NOGO plug gauge suitable for 25H7 hole wear and manufacturing allowances need to be considered. For 25H hole fundamental deviation is zero and IT7 is 21 microns.
 - i. State one advantage and one disadvantage to this type of gauge when compared to double ended plug gauge.
 - ii. How can you identify the GO and NO GO ends of double ended plug gauges ?
- (b) Explain the following in connection with the “Gauge Design”
 - i. Gauge makers Tolerance
 - ii. Different types of wear allowance on limit gauges
Give examples of each

5. (a) Describe the working and uses of Visual gauging head
(b) What are multichannel comparators ? Name the various types of multi-check comparators and explain any of them in brief.
6. (a) Describe with a neat sketch, a two-wire method of measuring the effective diameter of a screw thread. Obtain mathematical expressions involved in it.
(b) What is meant by 'Lead' of a gear ? How is it measured ? Discuss the necessary equipment for measurement.
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. (a) Discuss the concept of Total Quality Management
(b) Construct the O.C. curve for the following single sampling plan:
N = 500
n = 150
C = 2
