

III B.Tech I Semester Supplementary Examinations, November 2006  
METROLOGY AND QUALITY CONTROL  
(Production Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

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1. (a) Explain the different grades of slip gauges according to Indian Standards  
(b) Explain the term 'Magnification' of a Dial Indicator. Illustrate with example.  
(c) Obtain the possible sources of error in Micrometer. State briefly the two usual methods of testing the accuracy of a micrometer. [6+4+6]
2. (a) Name the various factors affecting the accuracy of a Sine Bar? How will you specify Sine Bar? why holes are provided in body of Sine Bar?  
(b) Explain the use of a Sine plate by means of a sketch. What are its application, advantages and limitations.  
(c) What are angle gauges? Explain the use of Angle gauges by means of a neat sketch. How do you set  $32^{\circ} 51' 24''$  [6+5+5]
3. (a) Show by means of simple diagram how the following are indicated on an engineering drawing
  - i. Surface roughness not to exceed  $16\mu\text{m}$
  - ii. Surface roughness to lie between 8 and  $16\mu\text{m}$
  - iii. Direction of layExplain what is meant by lay of a machined surface. How it can be classified.  
(b) Given the following information, determine the arithmetical mean deviation ( $R_a$ ) for a given surface  
Sampling length 120 mm  
 $\sum$  Area above centre line  $533\text{mm}^2$   
 $\sum$  Areas below centre line  $447\text{mm}^2$   
Optical magnification  $\times 50$   
Mechanical magnification  $\times 100$  [8+8]
4. (a) Explain the concept of 'Limit gauging' by taking the example of gauging of holes and shafts. Bring out the advantages and disadvantages of using limit gauges  
(b) Discuss about the tolerance and wear allowances on limit gauges. Give examples. [8+8]
5. (a) What are the requirements of a good comparator? Explain with the help of a neat sketch how these features are achievable in the "Sigma comparator".

- (b) Differentiate between a comparator and measuring machine. Discuss the fundamental requirements of a comparator. [8+8]
6. (a) Explain the method of measuring in screw threads
- i. Pitch
  - ii. Effective diameter
  - iii. Thread angle
- (b) What are the possible errors in the geometry of screw thread from their ideal profile?  
Briefly explain their significance. [8+8]
7. (a) Define Grand average and average range. How statistical control limits and tolerance limits are differed ?
- (b) Determine the probability of accepting a lot whose incoming quality is 4% defective. Sample size is 30 and acceptance number is 1.  
List out the steps for preparing control charts. [8+8]
8. (a) What is meant by Quality assurance ? List out the functions of Quality assurance. Name the types of Quality characteristics and explain them.
- (b) Describe the various sampling techniques. Write briefly note on Quality circles. [8+8]

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