

Code No: 115AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year I Semester Examinations, February/March - 2016

ENGINEERING METROLOGY

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

Part-A

(25 Marks)

- 1.a) What are the advantages of selective assembly? [2]
- b) Differentiate between tolerance and allowance. [3]
- c) Give the classification of sine bars. [2]
- d) Differentiate between end standards and line standards. [3]
- e) Why cast iron is a preferred material for surface plates and tables? [2]
- f) What are the uses and specific applications of tool maker's microscope? [3]
- g) What is the difference between primary texture and secondary texture? [2]
- h) State the possible causes of each of the various types of irregularities found in surface texture. [3]
- i) What instruments are generally used for alignment tests? [2]
- j) What are the various types of errors observed in threads? [3]

Part-B

(50 Marks)

2. Give the complete classification of clearance fit. Explain them with the help of suitable examples. [10]
- OR
3. Describe the principal features of International standard system of limits and fits for screwed work. [10]
 4. Design the general type GO and NOGO gauge for a component having $25 H 7 / f 8$ fit. Fundamental deviation of 'f' shaft = $-5.5 D^{0.41}$ $25mm$ falls in the diameter step of 18 and 30. Take wear allowance as 8% of the gauge tolerance and determine: (a) type of fit (b) allowance. [5+5]
- OR
- 5.a) Describe briefly the spirit level. What are the factors that determine the accuracy or sensitivity of a spirit level? Give typical uses of spirit level.
 - b) What are the advantages of bench micrometer over a hand micrometer? [5+5]
 - 6.a) Discuss the principles of NPL flatness interferometer
 - b) What is optical flat and what are its uses? [5+5]
- OR
- 7.a) Sketch and explain the use of auto collimator for straightness measurement?
 - b) Sketch and explain the working of tool maker's microscope? [5+5]

8.a) Explain the construction and working of a Profilograph for surface roughness measurement?

b) Calculate the Ra value of a surface for which sampling length is 8 mm, the graph was drawn to a vertical magnification of 1000 and the areas above and below the datum line were: [5+5]

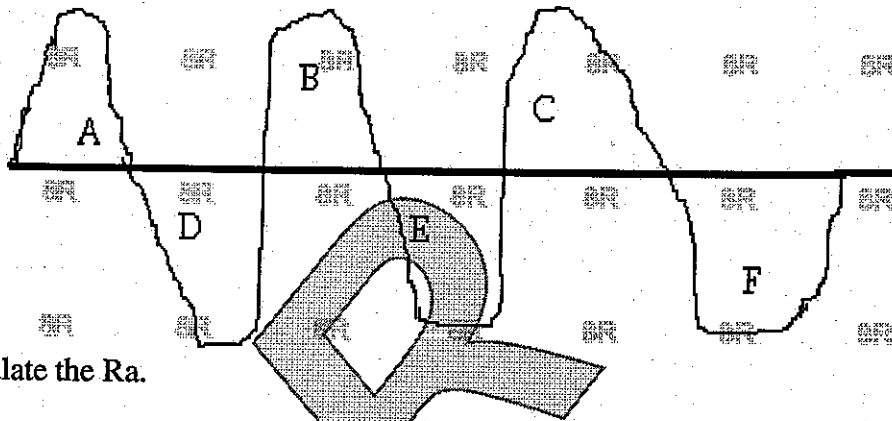
Above: 170 80 165 55 mm²
Below: 80 100 170 140 mm²

OR

9.a) What are different orders of surface irregularities? Explain.

b) A rectilinear pen recording of a diamond turned surface is shown in figure. The sampling length used was 0.8mm and the V / H magnification ratio was 5000 / 100. [5+5]

A B C D E F mm²
60 115 96 92 109 70



Calculate the Ra.

10.a) Sketch and explain the working principle of optical comparator.

b) Explain the pitch errors and angle errors in connection with screw thread measurement. [5+5]

OR

11.a) List out and explain the alignment tests to be conducted on lathe.

b) Give the applications of coordinate measuring machines. [5+5]

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