Code No: 125AJ **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, November/December - 2017
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 is the need for tolerance? [2]
b) What are the limitations of interchangeable assembly? [3]
c) What characteristics are obtained on slip gauges during their manufacture? [2]
d) Comment about the corollaries for Taylor's principles of gauge design. [3]
e) Differentiate between flat and smooth surface. [2]
f) Give the symbolic representation of flatness of surface. [3]
g) Write a note on the adverse effects of poor surface finish. [2]
h) Describe with the help of sketches the types of surface imperfections found in turned, cylindrical nulled, face milled, ground and honed surfaces. [3]
i) Give the classification of CMMs. [2]
j) What is a drunken thread? Explain. [3]

PART - B

(50 Marks)

2. Describe principal features of the Indian standard system of limits and fits for plain work. [10]

OR

3.a) In a limit system, the following limits are specified to give clearance between a shaft and hole.

$$shaft\ 30^{-0.005}_{-0.018}\ mm\ \phi$$

$$Hole\ 30^{+0.020}_{-0.000}\ mm\ \phi$$

Determine:
i) Shaft and hole tolerance
ii) The shaft and hole limits
iii) The maximum and minimum clearance.
b) Explain unilateral system and bilateral system of tolerances. [5+5]

4.a) Explain the construction and working of a bevel protractor.
b) What are the advantages and limitations of gauges? [5+5]

OR

5.a) Explain the constructional features of an inside micrometer.
b) Explain how the inside taper can be measured using spheres. [5+5]

6.a) Sketch and explain an optical projector. How do you change the magnification of the image?

b) Bring out the importance and utility of straight edge and surface plate in laboratories. [5+5]

OR

7.a) Discuss the method of testing the straightness by spirit level and auto collimator.

b) What is the difficulty in using the optical flat alone? How do you overcome this difficulty in the interferometer? [5+5]

8.a) State the possible causes of each of the various types of irregularities found in surface texture. Show how surfaces having the same numerical assessment may have different properties and texture.

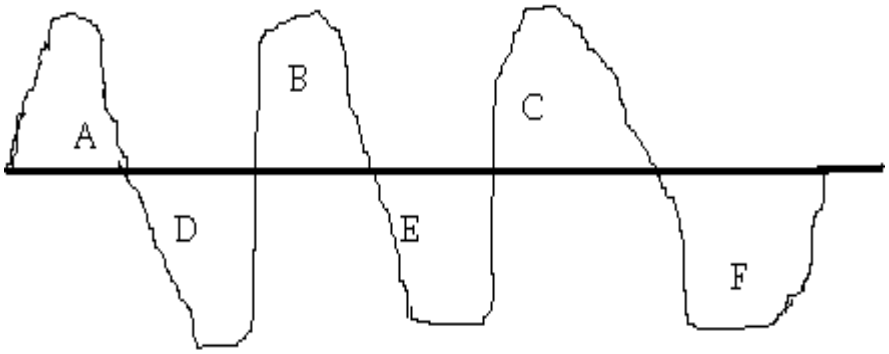
b) Explain the principle, the function and operation of a stylus type surface texture measuring instrument. [5+5]

OR

9.a) With the help of a neat sketch explain the construction and working of a profilograph.

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?

A	B	C	D	E	F	
60	115	96	92	109	70	mm^2



Calculate the Ra. [5+5]

10.a) Explain the working principle of pneumatic comparator.

b) Describe an experiment to determine the pitch error of a lead screw. [5+5]

OR

11.a) Describe various alignment tests to be conducted on drilling machines.

b) Discuss the role of CMMs in industry. [5+5]

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