R13

Code No: 115AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, May/June - 2019
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)	State the difference between tolerance and allowance	[2]
b)	With neat sketch, explain shaft basis system in brief.	[3]
c)	What are the considerations while manufacturing the slip gauges?	[2]
d)	With an example explain GO and NOGO gauges.	[3]
e)	How straight edge can be used to measure the straightness?	[2]
f)	Describe what are the care to be taken while using optical flat?	[3]
g)	What are the reasons for controlling the surface texture?	[2]
h)	What do you mean by R_a and R_z values? Explain	[3]
i)	How the mechanical comparator is used?	[2]
j)	Name the alignment tests to be performed on milling. Describe any one.	[3]

PART - B

(50 Marks)

2.a) Explain briefly the difference between the interchangeable manufacturing and selective assembly.
b) With neat sketch explain the tolerance system in detail. [5+5]

OR

3.a) In manufacturing system Hole basis or Shaft basis systems which process is preferable and explain why.
b) Draw the conventional diagram of limits and fits and explain all the terms in brief. [5+5]

4.a) Give complete classification of gauges with the help of neat diagram.
b) What are the essential considerations in selecting the materials for gauges? [5+5]

OR

5.a) Determine the tolerance on hole and shaft for a precision running fit designed by $40H_7/g_6$, 40 mm lies in the diameter step of 30-50 mm. $I = 0.45(D)^{1/3} + 0.001D$ Microns, fundamental deviation of the shaft = $-2.5\ D^{0.34}$. For hole (H), IT 7 = 16i and for shaft IT 6 = 10i. State the actual maximum and minimum size of the both hole and shaft and maximum and minimum clearance.
b) Explain the uses of limit gauges in mass production. [5+5]

6.a) Explain the construction and working principle of Tool makers microscope with neat sketch

b) By using optical flat and monochromic light, explain the procedure to determine whether the given surface is flat or curved. [5+5]

OR

7.a) Name the various types of interferometers. Why monochromatic light is used for interferometry?

b) With neat sketch, explain the construction and working of optical projector and state their applications. [5+5]

8.a) Explain the working of profilograph surface roughness instrument.

b) What are the inspection methods used for measurement of surface finish? [5+5]

OR

9.a) Explain what are the symbols used to indicate the direction of lay along with neat sketch.

b) The surface finish on the milled surface with 1.2 mm machining allowance having R_a value 6.3 micro meters with cut off length 2.5 mm and direction of lay parallel. How will you represent it? [5+5]

10.a) Describe the method of measurement of minor diameter of internal threads.

b) Write short notes on preparation of acceptance charts for machine tool alignment tests. [5+5]

OR

11.a) State different types of CMM and explain any one in detail.

b) Explain the construction and working of sigma comparator. [5+5]

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