

Code No: 117EZ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2016

METROLOGY AND SURFACE ENGINEERING

(Automobile 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 difference between tolerance and allowance? [2]
- b) Explain the Condition of Interference fit with neat sketch. [3]
- c) Write any two precautions to be followed when using gauge blocks. [2]
- d) What is wear allowance? How it is applied for design of gauges? [3]
- e) Explain drunken error in screw thread. [2]
- f) What are the required characteristics of a comparator? [3]
- g) What are the main spindle errors? [2]
- h) What is meant by alignment test on machine tools? [3]
- i) What is surface coating? [2]
- j) Why it is necessary to clean the surface before providing coating on it? [3]

PART-B

(50 Marks)

- 2.a) What are the end standards? Explain with examples the characteristics of line standard.
- b) Differentiate between interchangeable assembly and selective assembly with suitable examples. [5+5]

OR

- 3.a) What are the different grades of slip gauges? Explain.
- b) Hole and mating shaft are to have a nominal assembly size with a minimum assembly size of 75 mm. The assembly is to have a maximum clearance of 0.25mm and a minimum clearance of 0.15mm. The hole tolerance is 1.2 times the shaft tolerance. Determine the limits for both hole and shaft by using: [5+5]
 - i) Hole basis system
 - ii) Shaft basis system.

4. A hole and shaft system had the following dimensions: $95 H 9 / e 14$ The multiplier of grade 9 and 14 is 40 and 400. The fundamental deviation for 'e' shaft is $-11D^{0.41}$. The diameter step is 80 – 120. Design the suitable 'GO' and 'NO-GO' gauges for shaft and hole. Gauge tolerance is 10% of work tolerance. Wear allowance is 10% of gauge tolerance. [10]

OR

- 5.a) Sketch and explain the optical projector. How do you change the magnification of image.
- b) Explain the use of Angle gauges and sine bars for measurement of angle. [5+5]

- 6.a) Describe the measurement of gear tooth thickness by gear tooth caliper. [5+5] 26 26
b) Explain with a neat sketch the working of Tomlinson surface meter for surface finish measurement. [5+5]

OR

- 7.a) What is the best size wire? Derive the expression for the same in terms of the pitch and angle of thread. 26 26
b) Explain the basic principles of:
i) pneumatic comparator and ii) Electric comparator. [5+5] 26 26

- 8.a) Differentiate between geometrical tests and practical tests on machine tools. 26 26
b) Name the various alignment tests to be performed on milling. Describe any two of them in detail. [5+5] 26 26

OR

- 9.a) What are the various machine tool tests common to most machine tools? 26 26
b) Describe how you would perform the following tests on a lathe.
i) True running taper socket in main spindle
ii) True running of locating cylinder of main spindle. [5+5] 26 26

- 10.a) Explain the overlay coatings process for turbine blades in detail. 26 26
b) Name the different mechanical and chemical cleaning processes in detail. [5+5]

OR

- 11.a) Distinguish between organic coating and diamond coating in detail. 26 26
b) Explain various principles of corrosion and its remedial measures in detail. [5+5]

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