

Code No: 155CE/135BE

R18/R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, March - 2021

METROLOGY AND MACHINE TOOLS

(R18-Mechanical Engineering; R16-Mechanical Engineering)

Time: 3 Hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

1. In an orthogonal cutting test with a tool of rake angle 10° , the following observations were made:
Chip thickness ratio : 0.3
Horizontal component of the cutting force = 1290 N
Vertical component of the cutting force = 1650 N
From Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at then chip tool interface. [15]
2. What are the various types of lathe? How are they classified? Explain any one type with a neat sketch. [15]
3. Discuss in detail the following with neat sketches:-
a) Gang drilling machine
b) Turret drilling machine. [7+8]
4. Explain briefly with neat sketches: a) Planetary milling machines b) knee-column milling machines. [7+8]
5. A 35 mm diameter shaft and bearing are to be assembled with a clearance fit. The tolerance and allowances are as under Allowances = 0.003 mm Tolerance on hole = 0.007 mm Tolerance on shaft = 0.002 mm Find the limits of size for the hole and shaft if Hole basis system is used. [15]
6. What are the differences between compound indexing and differential indexing? Explain the relative merits. [15]
7. What are the various instruments used for measuring flatness of a surface plate? Describe the test procedure by using one of such instrument. [15]
- 8.a) Discuss the term interchangeability.
b) Explain the principle of autocollimator. [7+8]

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