

R18

Code No: 155CE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, July/August - 2023

METROLOGY AND MACHINE TOOLS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) Define shear angle and Chip thickness ratio. [2]
- b) Classify different types of chips and write its favorable factors for chip formations. [3]
- c) Differentiate Counter boring and Counter sinking. [2]
- d) How do you specify a drilling machine? [3]
- e) Define Indexing and write its significance. [2]
- f) Enumerate different types of bonds used in grinding wheel. [3]
- g) Compare a unilateral and bilateral system of tolerances. [2]
- h) State Taylor's Principle. [3]
- i) Write the significance of coordinate measuring machine. [2]
- j) Write the different methods employed in measurement of surface finish. [3]

PART - B

(50 Marks)

- 2.a) Explain in detail the geometry and Nomenclature of a single point cutting tool.
- b) Classify different types of lathes and explain the construction and working of capstan lathe with a suitable diagram. [5+5]

OR

- 3.a) Explain Merchant's forces circle diagram and derive the expressions for different forces.
- b) Explain in detail the different cutting parameters in turning operation. [5+5]

- 4.a) Explain in detail the geometry and Nomenclature of a twist drill with a suitable sketch.
- b) Explain in mechanism of quick return in shaping machine with a suitable sketch. [5+5]

OR

- 5.a) With the help of a neat sketch, explain the construction of planer machine.
- b) Explain in detail the construction and working of radial drilling machine and write its specifications. [5+5]

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- 6.a) Classify different types of milling machines and explain any one in detail.
b) Compare and Contrast lapping and honing processes. [5+5]

OR

- 7.a) Determine the time that will be required to drill a blind hole of diameter 25 mm and depth 40 mm in a mild steel solid block by a HSS drill of 118° cone angle. Assuming the cutting velocity as 25 m/min, Feed as 0.16 mm/rev.

- b) Enumerate different methods of Indexing and explain any one in detail. [5+5]

- 8.a) Explain in detail the hole basis system and shaft basis system with suitable examples.
b) Explain in detail the working of auto collimator with a suitable sketch. [5+5]

OR

- 9.a) Explain the construction and working of Bevel protractor.
b) Explain the principle of Interchangeability and Selective assembly. [5+5]

- 10.a) Explain in detail the working of Talysurf in measuring surface roughness.
b) Explain in detail the alignment test performed on lathe machine. [5+5]

OR

- 11.a) Classify different types of coordinate measuring machines and explain any one in detail.

- b) Explain in detail the alignment test performed on drilling machine. [5+5]

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