R16

Code No: 135BE

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 Merchants 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]

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 118^0 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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