

Reg. No:

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations March-2023

METAL CUTTING AND MACHINE TOOLS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- | | | | | |
|-----|--|-----|----|----|
| 1 a | Describe the basic elements in metal cutting with a neat sketch. | CO1 | L2 | 6M |
| b | Discuss about machining of metals. | CO1 | L2 | 6M |

OR

- | | | | | |
|-----|---|-----|----|----|
| 2 a | Derive an equation for chip thickness ratio and shear plane angle. | CO1 | L3 | 6M |
| b | What factors influence the formation of the built up edge and list out the factors to decrease the built up edge? | CO1 | L1 | 6M |

UNIT-II

- | | | | | |
|-----|---|-----|----|----|
| 3 a | Explain work done in metal cutting process. | CO2 | L2 | 6M |
| b | Define cutting speed, feed, and depth of cut. | CO2 | L1 | 6M |

OR

- | | | | | |
|-----|---|-----|----|----|
| 4 a | Give the broad classification of cutting fluids and explain them briefly. | CO2 | L2 | 6M |
| b | The following equation for tool life is given for a turning operation $VT^{0.13} f^{0.77} d^{0.37} = C$. A 60 minute tool life was obtained while cutting at $V=30$ m/min, feed = 0.3 mm/rev and depth of cut = 2.5 mm. Determine the change in tool life if the cutting speed, feed and depth of cut are increased by 20% individually and also taken together. | CO2 | L3 | 6M |

UNIT-III

- | | | | | |
|---|--|-----|----|-----|
| 5 | Draw the engine lathe and label the parts. Discuss the functions of the lathe parts. | CO3 | L2 | 12M |
|---|--|-----|----|-----|
- OR
- | | | | | |
|---|---|-----|----|-----|
| 6 | Discuss about the lathe attachments with neat sketches. | CO3 | L2 | 12M |
|---|---|-----|----|-----|

UNIT-IV

- | | | | | |
|-----|--|-----|----|----|
| 7 a | What do you understand by the term "Boring"? How are boring machines classified? | CO5 | L2 | 6M |
| b | Discuss briefly with neat sketch, a horizontal boring machine. | CO5 | L2 | 6M |

OR

- | | | | | |
|-----|---|-----|----|----|
| 8 a | Distinguish between planer, shaper and slotter machines | CO5 | L4 | 6M |
| b | What are the advantages of planer? | CO5 | L1 | 6M |

UNIT-V

- | | | | | |
|---|--|-----|----|-----|
| 9 | How grinding machines are classified? Explain plain cylindrical grinding machine with neat sketch. | CO6 | L2 | 12M |
|---|--|-----|----|-----|

OR

- | | | | | |
|------|--|-----|----|----|
| 10 a | What is an abrasive? How are abrasive classified? | CO6 | L1 | 6M |
| b | Write short notes on: | CO6 | L2 | 6M |
| | i) Silicon carbide ii) Aluminium oxide iii) Abrasive size. | | | |

*** END ***

INDIAN INSTITUTE OF ENGINEERING & TECHNOLOGY - PUTTUR

(AUTONOMOUS)

5-Year B.Tech III Semester Regular Examinations March-2023

METAL CUTTING AND MACHINE TOOLS

(Mechanical Engineering)

Max. Marks: 60

Time: 1 hour

136

(Answer all five parts 5 x 12 = 60 marks)

UNIT-I

- 1 a) Describe the basic elements in metal cutting with a neat sketch. (12)
 - b) Discuss metal deformation of metals. (12)
- OR
- 2 a) Define the expression for chip thickness ratio and shear plane angle. (12)
 - b) What factors mitigate the formation of the built up edge and list out the factors to minimize the built up edge. (12)

UNIT-II

- 3 a) Explain tool angle in metal cutting process. (12)
 - b) Define cutting speed, feed, and depth of cut. (12)
- OR
- 4 a) Give the broad classification of cutting fluids and explain their benefits. (12)
 - b) The following equation for tool life is given for a turning operation $V T^{0.18} f^{0.76} S^{0.63} = K$. A 60 minutes tool life was obtained while cutting at $V=30$ m/min, feed $f=0.2$ mm/rev and depth of cut $S=1.5$ mm. Determine the change in tool life if the cutting speed, feed and depth of cut are increased by 20% individually and also state the equation. (12)

UNIT-III

- 5 Draw the edge label and label the parts. Discuss the functions of the label parts. (12)
 - 6 Discuss about the label mechanisms with neat sketches. (12)
- OR
- 7 a) What do you understand by the term 'bearing'? How are bearing machines classified? (12)
 - b) Compare briefly with neat sketches a portable bearing machine. (12)

UNIT-IV

- 8 a) Distinguish between planer, shaper and slotter machines. (12)
- b) What are the advantages of planer? (12)

UNIT-V

- 9 How grinding machines are classified? Explain plain cylindrical grinding machine with neat sketch. (12)
- OR
- 10 a) What is an abrasive? How are abrasive classified? (12)
 - b) Write short notes on: (12)

(To be done in Aluminium (code 10) Abrasive size)