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

B.Tech III Year I Semester Supplementary Examinations July-2022

MACHINE TOOLS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 a** In an orthogonal cutting operation on a lathe the cutting tool used had the tool designation of 0-10-8-8-6-70-1mm. Calculate the values of (i) Back rake angle and (ii) side rake angle. **L3 6M**
- b** Explain briefly orthogonal and oblique cutting with neat sketch. **L2 6M**

OR

- 2 a** Derive the equation for chip thickness ratio and shear plane angle. **L3 6M**
- b** Give the short notes on ASA system and ORS system. Show the inter relationship equations between ASA and ORS system. **L2 6M**

UNIT-II

- 3 a** Discuss about Merchant theory and derive the equation for minimum cutting force. **L2 6M**
- b** The Taylor's tool life equation for machining C-40 steel with an 18-4-1 HSS. Cutting tool at a feed of 0.2mm/min and a depth of cut of 2mm is given by $VT^n = C$, when n and c are constants. The following V and T observations have been noted. **L3 6M**

| | | |
|----------|----|----|
| V1 m/min | 25 | 35 |
| T1 min | 90 | 20 |

Calculate (i) n and c (ii) hence recommended the cutting speed for a desired tool life of 60 min

OR

- 4 a** Discuss tool failure and wear mechanism in cutting tool. **L2 6M**
- b** In an orthogonal turning operation, cutting speed is 86Mm/min, cutting force 25kg, feed force 9kg, rake angle 10° , feed 0.3mm/rev and chip thickness 0.3mm. Determine the shear angle and chip thickness ratio. **L3 6M**

UNIT-III

- 5 a Name the different types of lathe operations? Explain about facing and knurling with neat sketches. L1 6M
- b What are the different types of tapers turning methods? Discuss any one method with suitable diagram. L2 6M

OR

- 6 a List the Turret lathe operations and explain any one operation with neat sketch. L1 6M
- b Explain lathe machine accessories with neat sketches. L2 6M

UNIT-IV

- 7 a Name the types of cutters, work holding and tool holding devices used in drilling machine. L1 6M
- b Discuss briefly with neat sketch, a horizontal boring machine. L2 6M

OR

- 8 a Write short notes on (i) Face milling (ii) Straddle milling and (iii) End milling. L2 6M
- b What is a shaper? What is the working principle and specification of a shaper? L1 6M

UNIT-V

- 9 a What is a 'bond'? Name and explain principal bonds. L1 6M
- b Explain plain cylindrical grinding machine with neat sketch. L2 6M

OR

- 10 a What are the advantages, limitations, and applications of broaching? L1 6M
- b Explain with neat sketch about tool and cutter grinding machine. L2 6M

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