


**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY :: PUTTUR**

(Approved by AICTE, New Delhi &amp; Affiliated to JNTUA, Ananthapuramu)

(Accredited by NBA &amp; Accredited by NAAC with 'A' Grade)

(An ISO 9001:2008 Certified Institution)

Siddharth Nagar, Narayavanam Road, PUTTUR-517 583

**QUESTION BANK**
**Subject with Code: MACHINE TOOLS (18ME0314)**
**Course & Branch: B. Tech – ME**
**Year/ Sem: III-B. Tech & I-Sem**
**Regulation: R18**
**UNIT I (CO1)**

1.	(a)	Define the term 'Metal cutting'.	L1	PO1	2M
	(b)	Define cutting ratio.	L1	PO1	2M
	(c)	What do you mean by tool signature?	L2	PO1	2M
	(d)	Explain briefly orthogonal cutting with neat sketch.	L2	PO1	2M
	(e)	What is the function of a chip breaker?	L1	PO1	2M
2.	(a)	Explain basic elements in metal cutting with a neat sketch.	L2	PO1	5M
	(b)	Discuss about machining of metals.	L2	PO2	5M
3.		Distinguish the cutting process with neat sketches.	L4	PO2	10M
4.	(a)	How can you classify cutting tools?	L1	PO2	5M
	(b)	Define the single point cutting tool elements.	L1	PO1	5M
5.		Explain the importance and functions of different tool angles associated with the geometry of a single point cutting tool with neat sketch.	L2	PO2	10M
6.		Give the short notes on ASA system and ORS system. Show the inter relationship equations between ASA and ORS system.	L2	PO2	10M
7.		Explain the formation of chip. Discuss the types of chips with neat sketches.	L2	PO1	10M
8.	(a)	Derive the equation for chip thickness ratio and shear plane angle.	L3	PO3	5M
	(b)	What factors influence the formation of the built up edge and give the factors to decrease the built up edge?	L2	PO3	5M
9.	(a)	Explain various types of chip breakers with neat sketches.	L2	PO2	5M
	(b)	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	PO3	5M
10.	(a)	What are the conditions for producing continuous chips?	L1	PO1	5M
	(b)	During orthogonal cutting a bar of 90mm diameter is reduced to 87.6mm. If the mean length of the cut is 88.2mm and rake angle is 15°, calculate: (i) Cutting ratio (ii) Shear angle.	L3	PO3	5M

**UNIT II (CO2)**

1.	(a)	List the various forces acting on a chip.	L2	PO2	2M						
	(b)	How are the cutting forces measured.	L3	PO3	2M						
	(c)	Define cutting speed.	L1	PO1	2M						
	(d)	Classify types of cutting fluids.	L2	PO2	2M						
	(e)	Define tool life.	L1	PO1	2M						
2.		Draw a Merchant's circle diagram and derive expressions to show relationships among the different forces acting on the cutting tool and coefficient of friction.	L2	PO1	10M						
3.	(a)	Discuss about Merchant theory and derive the equation for minimum cutting force.	L2	PO2	5M						
	(b)	In orthogonal turning of a 60 mm diameter MS bar on a lathe, the following data were obtained: Rake angle 10°, cutting speed 120 m/min, feed 0.3mm/rev, cutting force 170 kg, feed force 65kg. Calculate the shear plane angle, coefficient of friction, cutting power, chip flow velocity and shear force, if chip thickness is 0.4mm.	L3	PO3	5M						
4.	(a)	Explain the stress and strain acting on a chip.	L2	PO2	5M						
	(b)	In an orthogonal turning operation, cutting speed is 85mm/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	PO3	5M						
5.	(a)	Explain work done in metal cutting process.	L2	PO2	5M						
	(b)	Define cutting speed, feed, and depth of cut.	L1	PO1	5M						
6.		Describe the factors affecting tool life and give Taylor' tool life equation.	L2	PO2	10M						
7.	(a)	Give the broad classification of cutting fluids and explain them briefly.	L2	PO1	5M						
	(b)	The following equation for tool life is given for a turning operation $V T^{0.13} f^{0.77} d^{0.37} = C$ . 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 an increased by 20% individually and also taken together.	L3	PO3	5M						
8.	(a)	State the advantages and disadvantages of chemical fluids.	L2	PO1	5M						
	(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 $V T^n = C$ , when n and c are constants. The following V and T observations have been noted. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td><math>V_1</math> m/min</td> <td>25</td> <td>35</td> </tr> <tr> <td><math>T_1</math> min</td> <td>90</td> <td>20</td> </tr> </tbody> </table> Calculate (i) n and c (ii) hence recommended the cutting speed for a desired tool life of 60 min.	$V_1$ m/min	25	35	$T_1$ min	90	20	L3	PO3	5M
$V_1$ m/min	25	35									
$T_1$ min	90	20									
9.		Discuss tool failure and wear mechanism in cutting tool.	L2	PO2	10M						
10.	(a)	What are the characteristics of an ideal cutting tool material?	L1	PO2	5M						
	(b)	List out the types of cutting tool material and explain (i) Coronite (ii) Ucon.	L2	PO1	5M						

**UNIT III (CO3)**

1.	(a)	Define the working principle of lathe.	L1	PO1	2M
	(b)	How the lathe is specified?	L2	PO2	2M
	(c)	Draw the split nut.	L3	PO3	2M
	(d)	Name at least five work holding devices.	L2	PO2	2M
	(e)	List the different types of lathe.	L2	PO2	2M
2.		Draw the engine lathe and label the parts. Discuss the functions of the lathe parts.	L2	PO2	10M
3.		Name the different types of the lathes? Discuss the importance of the each lathe.	L2	PO2	10M
4.	(a)	Name the different types of lathe operations? Explain about facing and knurling with neat sketches.	L1	PO1	5M
	(b)	What are the different types of taper turning methods? Discuss any one method with suitable diagram.	L2	PO2	5M
5.		Explain lathe machine accessories with neat sketches.	L2	PO2	10M
6.		Discuss about the lathe attachments with neat sketches.	L2	PO2	10M
7.		What are the differences between a Turret and a Capstan lathe?	L4	PO3	10M
8.	(a)	Explain the advantages and disadvantages of a turret lathe.	L2	PO2	5M
	(b)	What is meant by tool layout of a turret lathe?	L1	PO1	5M
9.		Briefly explain the Single spindle and multi spindle automatic lathes.	L2	PO2	10M
10.	(a)	List the common tools and attachments used on Turret and Capstan lathes.	L1	PO1	5M
	(b)	List the Turret lathe operations and explain any one operation with neat sketch.	L1	PO1	5M

**UNIT IV (CO4)**

1.	(a)	Define the terms "Drilling".	L1	PO1	2M
	(b)	Name the different types of the drilling machines?	L1	PO1	2M
	(c)	How are boring machine specified?	L1	PO1	2M
	(d)	What is the principle of working of a shaper?	L2	PO2	2M
	(e)	What is a "milling machine"?	L2	PO2	2M
2.		Explain with neat sketches any one of the following i) Radial drilling machine ii) Sensitive drilling machine iii) Gang drilling machine.	L2	PO2	10M
3.	(a)	Name the types of cutters, work holding and tool holding devices used in drilling machine.	L1	PO1	5M
	(b)	Explain briefly with sketches any four of the drilling operations.	L2	PO2	5M
4.	(a)	What do you understand by the term "Boring"? How are boring machines classified?	L1	PO1	5M

	(b)	Discuss briefly, with a neat sketch, a horizontal boring machine.	L2	PO2	5M
5.	(a)	What is a shaper? What is the working principle and specification of a shaper?	L1	PO1	5M
	(b)	How are shapers classified? State the advantages, limitations and applications of shaper.	L1	PO1	5M
6.		Draw the block diagram of a shaper machine and explain briefly its various parts and operations performed.	L2	PO2	10M
7.	(a)	Give the comparison between planer, shaper and slotter.	L4	PO3	5M
	(b)	What are the advantages of planer?	L1	PO1	5M
8.	(a)	Explain briefly Up-milling process and Down milling process.	L2	PO2	5M
	(b)	How milling machines are broadly classified?	L1	PO1	5M
9.		Draw the block diagram of a horizontal milling machine and explain its various parts.	L2	PO2	10M
10.	(a)	Write short notes on (i) Face milling (ii) Straddle milling and (iii) End milling.	L2	PO2	5M
	(b)	Explain briefly plain indexing and differential indexing with suitable example.	L2	PO2	5M

### UNIT V(CO5)

1.	(a)	Define the term Grinding.	L1	PO1	2M
	(b)	What is broach? Name the types.	L2	PO2	2M
	(c)	Name the lap materials generally used.	L2	PO2	2M
	(d)	What is the purpose of honing?	L2	PO2	2M
	(e)	What are the differences between jigs and fixture?	L2	PO2	2M
2.		How grinding machines are classified? Explain plain cylindrical grinding machine with neat sketch.	L2	PO2	10M
3.		With a neat sketch, explain construction and working of tool and cutter grinding machine.	L2	PO2	10M
4.	(a)	What is a 'grinding wheel'? What are the grinding wheel parameters that influence the grinding performance?	L1	PO1	5M
	(b)	What is a 'bond'? Name and explain principal bonds.	L1	PO1	5M
5.	(a)	What is an abrasive? How are abrasive classified?	L1	PO1	5M
	(b)	Write short notes on: i) Silicon carbide ii) Aluminium oxide iii) Abrasive size.	L2	PO2	5M
6.		Give the comparison among Grinding, lapping and honing.	L2	PO2	10M
7.	(a)	How are broaching machines classified?	L2	PO2	5M
	(b)	What are the advantages, limitations and applications of broaching?	L1	PO1	5M
8.		Explain with the help of neat sketch 3-2-1 principle of location.	L2	PO2	10M

9.	(a)	Define and explain the terms i) Jig and ii) Fixture with its uses.	L1	PO1	5M
	(b)	Describe briefly “Principles of jig and fixture design”.	L2	PO2	5M
10.		Explain briefly the principles of jig and fixture design.	L2	PO3	10M

