


SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR

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Siddharth Nagar, Narayavanam Road, PUTTUR-517 583

QUESTION BANK (DESCRIPTIVE)
Subject with Code: MC&MT (20ME0316)
Course & Branch: B. Tech – ME
Year/ Sem: III-B. Tech & I-Sem
Regulation: R20
UNIT I

1	a)	Define the following terms a) 'Metal cutting' b) Cutting ratio.	[L1][CO1]	[6M]
	b)	Explain briefly orthogonal and oblique cutting with neat sketch.	[L2][CO1]	[6M]
2	a)	Describe the basic elements in metal cutting with a neat sketch.	[L2][CO1]	[6M]
	b)	Discuss about machining of metals.	[L2][CO1]	[6M]
3		Distinguish the cutting processes with neat sketches.	[L4][CO1]	[12M]
4	a)	How can you classify cutting tools?	[L1][CO1]	[6M]
	b)	Define the single point cutting tool elements.	[L1][CO1]	[6M]
5		Explain the importance and functions of different tool angles associated with the geometry of a single point cutting tool with neat sketch.	[L2][CO1]	[12M]
6		Write the short notes on ASA system and ORS system. Show the inter relationship equations between ASA and ORS system.	[L2][CO1]	[12M]
7		Illustrate the formation of chip. Discuss the types of chips with neat sketches.	[L2][CO1]	[12M]
8	a)	Derive an equation for chip thickness ratio and shear plane angle.	[L3][CO1]	[6M]
	b)	What factors influence the formation of the built up edge and list out the factors to decrease the built up edge?	[L1][CO1]	[6M]
9	a)	Explain various types of chip breakers with neat sketches.	[L2][CO1]	[6M]
	b)	In an orthogonal cutting operation on a lathe the cutting tool used had the tool designation of 0-10-8-8-8-6-70-1mm. Calculate (i) Back rake angle and (ii) Side rake angle.	[L3][CO1]	[6M]
10	a)	What are the conditions for producing continuous chips?	[L1][CO1]	[6M]
	b)	During orthogonal cutting a bar of 90mm diameter is reduced to 87.[6M]m. If the mean length of the cut is 88.2mm and rake angle is 15°. Calculate: (i) Cutting ratio (ii) Shear angle.	[L3][CO1]	[6M]

UNIT II

1	a)	List various forces acting on a chip.	[L1][CO2]	[6M]						
	b)	Define cutting speed, feed and depth of cut.	[L1][CO2]	[6M]						
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][CO2]	[12M]						
3	a)	Discuss about Merchant theory and derive the equation for minimum cutting force.	[L2][CO2]	[6M]						
	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][CO2]	[6M]						
4	a)	Explain the stress and strain acting on a chip.	[L2][CO2]	[6M]						
	b)	In an orthogonal turning operation, cutting speed is 8 m/min, cutting force 25 kgf, feed force 9kgf, rake angle 10° , feed 0.3mm/rev and chip thickness 0.3mm. Determine the shear angle and chip thickness ratio.	[L3][CO2]	[6M]						
5	a)	Explain work done in metal cutting process.	[L2][CO2]	[6M]						
	b)	Define cutting speed, feed, and depth of cut.	[L1][CO2]	[6M]						
6		Describe the factors affecting tool life and give Taylor's tool life equation.	[L2][CO2]	[12M]						
7	a)	Give the broad classification of cutting fluids and explain them briefly.	[L2][CO2]	[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 an increased by 20% individually and also taken together.	[L3][CO2]	[6M]						
8	a)	Define tool life and explain the impact of coolants on tool life.	[L2][CO2]	[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. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>V_1 m/min</td> <td>25</td> <td>35</td> </tr> <tr> <td>T_1 min</td> <td>90</td> <td>20</td> </tr> </table> Calculate (i) n and c (ii) Recommend the cutting speed for a desired tool life of 60 min.	V_1 m/min	25	35	T_1 min	90	20	[L3][CO2]	[6M]
V_1 m/min	25	35								
T_1 min	90	20								
9		Discuss tool failure and wear mechanism in cutting tool.	[L2][CO2]	[12M]						
10	a)	What are the characteristics of an ideal cutting tool material?	[L1][CO2]	[6M]						
	b)	List out the types of cutting tool material and explain (i) Coronite (ii) Ucon.	[L2][CO2]	[6M]						

UNIT III

1	a)	Define the working principle of lathe. How the lathe is specified?	[L1][CO3]	[6M]
	b)	Name five work holding devices and explain them in brief.	[L2][CO3]	[6M]
2		Draw the engine lathe and label the parts. Discuss the functions of the lathe parts.	[L2][CO3]	[12M]
3		Name the different types of the lathes? Discuss the importance of the each lathe.	[L2][CO3]	[12M]
4	a)	Name the different types of lathe operations? Explain about facing and knurling with neat sketches.	[L1][CO3]	[6M]
	b)	List out various types of taper turning methods? Discuss any one method with suitable diagram.	[L2][CO3]	[6M]
5		Explain lathe machine accessories with neat sketches.	[L2][CO3]	[12M]
6		Discuss about the lathe attachments with neat sketches.	[L2][CO3]	[12M]
7		Distinguish between Capstan and Turret lathe.	[L4][CO4]	[12M]
8	a)	Explain the advantages and disadvantages of a turret lathe.	[L2][CO4]	[6M]
	b)	What is meant by tool layout of a turret lathe?	[L1][CO4]	[6M]
9		Describe the Single spindle and multi spindle automatic lathes.	[L2][CO4]	[12M]
10	a)	Identify the common tools and attachments used on Turret and Capstan lathes.	[L1][CO4]	[6M]
	b)	List the Turret lathe operations and explain any one operation with neat sketch.	[L1][CO4]	[6M]

UNIT IV

1	a)	Define the terms "Drilling" and 'Drill'	[L1][CO5]	[6M]
	b)	Name the different types of the drilling machines. How the drilling machine specified?	[L1][CO5]	[6M]
2		Explain the working of any one drilling machine with neat sketch.	[L2][CO5]	[12M]
3	a)	List out various types of cutters, work holding and tool holding devices used in drilling machine.	[L1][CO5]	[6M]
	b)	Discuss about any four of the drilling operations with neat sketches.	[L2][CO5]	[6M]
4	a)	What do you understand by the term "Boring"? How are boring machines classified?	[L2][CO5]	[6M]
	b)	Discuss briefly with neat sketch, a horizontal boring machine.	[L2][CO5]	[6M]
5	a)	What is a shaper? Write the working principle and specification of a shaper?	[L1][CO5]	[6M]
	b)	How are the shapers classified? State the merits, demerits and applications of a shaper.	[L1][CO5]	[6M]
6		Draw the block diagram of a shaper machine and explain briefly the functions of various parts and operations performed on it.	[L2][CO5]	[12M]
7	a)	Distinguish between planer, shaper and slotter machines.	[L4][CO5]	[6M]

	b)	What are the advantages of planer?	[L1][CO5]	[6M]
8	a)	Explain briefly Up-milling process and Down milling process.	[L2][CO5]	[6M]
	b)	How milling machines are broadly classified?	[L1][CO5]	[6M]
9		Draw the block diagram of a horizontal milling machine and explain various parts of it.	[L2][CO5]	[12M]
10	a)	Write short notes on (i) Face milling (ii) Straddle milling and (iii) End milling operations.	[L2][CO5]	[6M]
	b)	Explain briefly plain indexing and differential indexing with suitable example.	[L2][CO5]	[6M]

UNIT V

1	a)	Define the terms i) Grinding ii) Rough grinding and iii) Precision grinding.	[L1][CO6]	[6M]
	b)	What is grinding and types of grinding?	[L1][CO6]	[6M]
2		How grinding machines are classified? Explain plain cylindrical grinding machine with neat sketch.	[L2][CO6]	[12M]
3		With a neat sketch, explain construction and working of tool and cutter grinding machine.	[L2][CO6]	[12M]
4	a)	What is a 'grinding wheel'? List out the grinding wheel parameters that influence the grinding performance.	[L1][CO6]	[6M]
	b)	What is a 'bond'? Name and explain principle bonds.	[L1][CO6]	[6M]
5	a)	What is an abrasive? How are abrasive classified?	[L1][CO6]	[6M]
	b)	Write short notes on: i) Silicon carbide ii) Aluminium oxide iii) Abrasive size.	[L2][CO6]	[6M]
6		Distinguish between Grinding, lapping and honing.	[L4][CO6]	[12M]
7	a)	How are broaching machines classified?	[L2][CO6]	[6M]
	b)	What are the advantages, limitations and applications of broaching?	[L1][CO6]	[6M]
8		With neat sketch, explain the construction of surface grinding machine.	[L2][CO6]	[12M]
9		Compare the center and center-less grinding machine.	[L1][CO6]	[6M]
10		Explain specification of grinding wheel	[L2][CO6]	[12M]

Prepared by: Dr. F Anand Raju