



MUTHAYAMMAL ENGINEERING COLLEGE  
(An Autonomous Institution)



(Approved by AICTE, New Delhi, Accredited by NAAC &  
Affiliated to Anna University)  
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

MKC

RA & MZ

Must Know Concepts (MKC)

2021-22

Subject		19RAC03/19MZC03-Manufacturing Technology		
UNIT-I THEORY OF METAL CUTTING				
S No	Term	Notation (Symbol)	Concept/Definition/Meaning/Units/Equation/Expression	Units
1.	Different types of cutting tool	---	Single point cutting tool, Multi point cutting tool.	---
2.	Parts of single point cutting tool	---	Shank,Face,Flank,Base,Nose,Cutting edge	---
3.	Angles of single point Cutting tool	---	Back rake angle, side rake angle, end relief angle,side cutting angle,end cutting angle.	---
4.	Tool signature	---	Tool angle given in definite pattern..	---
5.	Types of clearance angle	---	Side relief angle, Front clearance angle.	---
6.	Negative rake angle	---	When the face of the cutting tool slopes away from the cutting edge at outer side..	---
7.	Factors affecting surface finish	---	Cutting speed Depth of cut. Feed Material Removal rate	---
8.	Types of metal cutting process	---	Orthogonal cutting, oblique cutting.	---
9.	Orthogonal cutting	---	Cutting edge of the tool is perpendicular to the work piece axis.	---
10.	Examples of orthogonal cutting	---	Turning, facing, thread cutting, parting off.	---
11.	Oblique cutting	---	Cutting edge is inclined at acute angle.	---
12.	Shear plane	---	Material of work piece is stressed beyond its yield point under compressive force.	---
13.	Cutting force	---	Compressive force applied to form the chip.	---
14.	Chip	---	Sheared material begins to flow along the cutting tool face.	---
15.	Types of chip	---	Continuous, discontinuous, continuous with built up edge.	---
16.	Formation of continuous chip	---	Ductile material, high cutting speed, sharp cutting edge, smaller depth of cut.	---
17.	Factors for built-up edge in cutting tools	---	Low cutting speed, smallrake angle, coarsefeed.	---
18.	Chip thickness ratio	---	Ratio of chip thickness before cutting to after cutting.	---
19.	Chip reduction co-efficient	---	Reciprocal of chip thickness.	---

20.	Types of chip breaker.	---	Step, groove and clamp type.	---
21.	Machinability of metal	---	Machinability is the ease with which a metal can be cut permitting the removal of the material	---
22.	Material Removal Rate	MRR	Material removal rate is the amount of material removed per time unit	---
23.	Factors affecting Machinability	---	Chemical composition, microstructure, physical properties, mechanical properties.	---
24.	Tool variable affecting Machinability	---	Tool geometry, tool material and rigidity of tool.	---
25.	Various cutting fluid	---	Water based, straight or heat oil based.	---
<b>UNIT-II TURNING MACHINES</b>				
26.	Diamond	---	Diamond is a solid form of the element carbon with its atoms arranged in a crystal structure	---
27.	Advantage of diamond tools	---	Low co-efficient friction, extreme wear resistant ,high compressive strength.	---
28.	Factors for selection of tool materials	---	Volume of production, tool design, types of machining process.	---
29.	Factors for the selection of cutting speed	---	Tool life, depth of cut, rate of feed, tool geometry.	---
30.	Lathe	---	A lathe is a machine tool that rotates a work piece about an axis of rotation.	---
31.	Specifications of typical lathe	---	Length of bed, type of bed, feed, spindle speed.	---
32.	Various operations performed in lathe	---	Turning, facing, forming, knurling, drilling, boring etc.	---
33.	Parts of lathe	---	Bed, headstock, tailstock, carriage, cross-slide, tool post.	---
34.	Types of head stock	---	Back geared, all geared type.	---
35.	Live centre	---	It is constructed so that the 60° center runs in its own bearings and is used at tailstock.	---
36.	Dead centre	---	It used to support the work piece at either the fixed or rotating end of the machine..	---
37.	Parts mounted on carriage	---	Saddle, compound rest, cross slide, tool post.	---
38.	Function of feed rod	---	To guide the carriage in a straight line.	---
39.	Types of lathe	---	Engine lathe, Bench lathe, Tool room lathe, Semi-automatic lathe, Automatic lathe.	---
40.	Bench lathe purpose	---	A bench top model usually of low power used to make precision machine small work pieces	---
41.	Types of semi automatic lathe	---	Capstan lathe, turret lathe.	---
42.	Merits of semiautomatic lathe	---	Less production time, high accuracy, increases production rate.	---
43.	Feed	---	Movement of the tool relative to the work and work piece.	---
44.	Work holding devices	---	Chuck, centres, face plate, angle plate.	---
45.	Uses of chuck	---	It is a type of clamp used to hold an object with radial symmetry, especially a cylinder	---

46.	Purpose of mandrel	---	The work piece clamp on a lathe, and a post or shaft.	---
47.	Types of mandrel	---	Plain, collar, cone, special, step, gang mandrel.	---
48.	Grooving	---	Reducing the diameter of the work piece.	---
49.	Conicity	---	Ratio of difference in diameters of taper to its length.	---
50.	Mechanism used in turret head	---	Geneva or indexing mechanism	---
<b>UNIT-III SHAPER MILLING AND GEAR CUTTING MACHINES</b>				
51.	Bar stop	---	It is a work stop to setting the required length of the work piece.	---
52.	copying lathe purpose	---	It is a template that enables one to duplicate a lathe turned part as many times as desired	---
53.	Copying lathe machine	---	It is a semi automatic machine which produces components in large quantities	---
54.	Work holding devices in semiautomatic lathe	---	Collets, chucks, fixtures, powerchucks.	---
55.	Milling operation	---	Removing metal by using rotating cutter.	---
56.	Taper turning methods	---	To produce a conical surface by gradual reduction.	---
57.	Thread cutting operation	---	The lathe is a process that produces a helical ridge of uniform section on the work piece.	---
58.	Filing operation	---	Process of removing bars, sharp corners and feed marks.	---
59.	Steady rest	---	It is fixed on bed ways of the lathe clamping the bolt.	---
60.	Shaper machine	---	It is a reciprocating type of machine basically used for producing the horizontal, vertical or flat surfaces	---
61.	Size of a shaper	---	Maximum travel of cutting tool	---
62.	In a shaper, the length of stroke is increased by	---	Increasing the centre distance of bull gear and crank pin	---
63.	Single point cutting tool	---	The type of tool used on lathe, shaper and planer	---
64.	Up milling	---	The process of removing metal by a cutter which is rotated against the direction of travel of work piece	---
65.	Climb milling	---	Work moves in same direction as rotation of the cutter	---
66.	Undercutting	---	An operation of cutting a groove next to a shoulder on a piece of work	---
67.	Mandrel	---	A tapered gauge used for inspection of tapered holes	---
68.	Drilling operation	---	It is an example of Oblique cutting	---
69.	Drilling speed in aluminum	---	35 to 50 m/min	---

70.	Lapping	---	Sizing and finishing a small diameter hole	---
71.	Purpose of Helical groove	---	To remove chips	---
72.	Tungsten carbide tipped drill bits	---	Used for drilling on glasses, ceramics, etc.	---
73.	Helix or rake angle	---	The angle formed by the leading edge of the land with a plane having the axis of the drill	---
74.	Twist drills	---	These are made of Either high speed steel or carbon steel	---
75.	Gang drilling machine	---	The type of drilling machine is used for mass production	---
<b>UNIT-IV ABRASIVE PROCESS AND BROACHING</b>				
76.	Surface Grinder		Grinding irregular, curved, tapered, convex and concave surface	---
77.	Glazing of grinding wheels	---	It is easily identified by Shiny appearance on the face of the wheel	m/min
78.	External cylindrical grinding	---	The method of grinding used to produce a straight or tapered surface on a work piece,	
79.	Internal cylindrical grinding		The method of grinding used to produce internal cylindrical holes and tapers	
80.	The grade of grinding wheel	---	It depends upon Hardness of the material being ground, speed of wheel and work, condition of grinding machine	---
81.	The most common bond used in grinding wheels	---	Vitrified bond	---
82.	In rubber bond for grinding wheels,	---	Sulphur is added to act as vulcanizing agent	---
83.	Silicon carbide		The abrasive recommended for grinding materials of low tensile strength	
84.	Cobalt		The binding material used in cemented carbide tool	
85.	The efficiency of abrasive particles	---	Purity, uniformity in composition, hardness	---
86.	Aluminum oxide	---	The abrasive recommended for grinding materials of high tensile strength	---
87.	Hardest abrasive material	---	Diamond	---
88.	Part off grinding	---	The peripheral speed of the grinding wheel will be highest	---
89.	The hardness of a grinding wheel	---	It is is specified by Letter of alphabet	---
90.	Surface grinder	---	For machining irregular, curved, tapered, convex and concave surfaces	---
91.	Which grinding wheel is used to grind soft materials	---	Coarse grained wheel	---
92.	Grind soft material	---	Coarse grained grinding wheel	---
93.	Form grinding		Grinding splined shafts	---
94.	The performance of grinding wheel		The ratio of the volume of material required to the volume of wheel wear	---

95.	Broaching	---	A process of removing metal by pushing or pulling a cutting tool	---
96.	The rear teeth of a broach	---	Remove maximum metal	---
97.	Specification of Broaching Machine	---	Maximum length of stroke Maximum force developed by the slide	---
98.	Continuous broaching	---	The broaching operation in which the work moves past the stationary tool	---
99.	Types of Continuous broaching	---	Horizontal, Vertical, Rotary type	
100.	Broaching tool material	---	HSS, Tin coated carbides, Aluminum, Brass	---
<b>UNIT-V METAL FINISHING PROCESSES</b>				
101.	Important metal finishing processes	---	Heat Treating, Welding, Braze & Solder, Metal Plating	---
102.	Types of Metal Finishing	---	Metal Plating, Brushed Metal, Buff Polishing, Metal Grinding	
103.	Stamping	---	The process of cutting thin gears from metal sheets	---
104.	Ultrasonic machining	---	It is a subtraction manufacturing process that removes material from the surface of a part through high frequency,	
105.	Electrical discharge machining	---	Hard, tough, fragile and heat sensitive metals can be processed	
106.	Burnishing	---	It is the plastic deformation of a surface due to sliding contact with another object.	
107.	Purpose of metal finishing	---	To protect against tarnishing or corrosion	---
108.	Anodizing	---	It is the by which natural film on aluminum is greatly increased in thickness.	---
109.	Lapping	---	It is a surface finishing operation used to give better surface finish and have very small material removal rate.	---
110.	Material removal ranges of lapping processes	---	0.003 to 0.3mm	mm
111.	Honing	---	It is one of the finishing processes in which tool called hone carries combined rotary or reciprocating motion	---
112.	Buffing processes	---	Remove scratches from the surface	---
113.	Polishing	---	Push high points over into the low places to smooth out the surface.	
114.	The reason of surface finishing operation	---	Protection. Durability Appearance	
115.	Types of surface grinding machine	---	Horizontal grinding machine. Vertical grinding machine.	---
116.	Purpose of cylindrical grinding machine	---	This machine is used to produce external cylindrical surface the surface may be straight or tapered.	---

117.	Types of metal finishing	---	Metal Plating. Brushed Metal. Buff Polishing. Metal Grinding. Metal Vibratory Finishing. . Sand Blasting. .	---
118.	Metal plating	---	Machines use a chemical bath to coat or alter the surface	---
119.	Choosing a Metal Finishing Process	---	Production speed. Cost-effectiveness. Metal hardness	---
120.	Spraying	---	Spraying is a painting technique that employs a spraying device, usually coupled with compressed air, to air-spray a work piece	---
121.	Powder coating	---	Powder coating uses a free-flowing, dry powder to coat work pieces.	---
122.	Plating	---	Plating is a finishing process that deposits metal onto a conductive surface to achieve decorative, resistance,	---
123.	Electro less plating	---	Electro less plating, also known as autocatalytic plating, is a purely chemical process that makes a component tougher,	---
124.	Waviness	---	The component of the surface texture upon which the roughness is superimposed	---
125.	The dip coating process involves	---	Immersion. Start-up. • Deposition. Drainage Evaporation,	---

### QUESTIONS FOR PLACEMENT & TRAINING

126.	What are Non metal cutting or chip less operation.	---	i)Forging ii)Blanking iii)Rolling iv)Pressing	---
127.	What are metal cutting or chip operation.	---	i)Turning ii)Drilling iii)Milling iv)Shaping	---
128.	Surface finish of any product depend on	---	i)Cutting speed ii)Feed iii)Depth of cut	---
129.	Main types of cutting fluids	---	i)Water based cutting fluid ii)Heat oil based cutting fluid	---
130.	Heat treated Manufacturing cutting tools	---	i)Carbon tool steel ii)High speed steel iii)Cemented carbides iv)Ceramics v)Diamonds	---
131.	Lathe machine operation	---	i)Turning ii)Taper turning iii)chamfering iv)grooving	---
132.	Three types feed can be given to lathe tool	---	i)Longitudinal ii)cross iii)angular	---
133.	Taper turning formula	---	Conicity, $K = \frac{D - d}{l}$	---
134.	Eccentric definition	---	The axis of one cylinder is off-set with axis of other cylinder	---
135.	How can the number of teeth on various change gears be calculated	---	<u>Driver tooth</u> <u>Driven tooth</u>	---
136.	Single point cutting tool which type machines using	---	Shaper. Planer. Slotter. lathe etc	---

137.	Multipoint point cutting tool which type machines using	---	Drilling. Grinding. Boring. Milling and Broaching etc	---
138.	All machine having main important specification	---	i)Power input of the machine is in HP ii)Net weight of the machine is in Tonne	---
139.	Gear ratio	---	<u>Driving gear</u> = <u>Driven gear</u>	---
140.	Uses of tapping tool	---	Making internal threads of machine component	---
141.	Specification of grinding wheel	---	i)Grit number and grain size ii)Grade iii)Structure of wheels	
142.	Which surfaces centreless grinding performing	---	Both external and internal cylindrical surface.	---
143.	What is tool post grinder	---	It used for miscellaneous and small grinding work on lathe	---
144.	State the uses of abrasives in manufacturing grinding wheel	---	i)Natural abrasive a. Corundum b.Diamond ii)Artificial abrasive a.Aluminium oxide b.Silicon carbide	---
145.	Different shape of grinding wheel	---	a. Straight b.Cylindrical c.Tapered	---
146.	Which one of the finishing processes Removing scratches from the surface	---	Buffing processes	---
147.	What are the surface finishing processes	---	Lapping. Honing. Polishing and buffing	---
148.	Which one processes used for super finishing	---	Lathe attachment operation processes	---
149.	Dressing process	---	To be loading and breaking away the glazed surfaces	---
150.	Truing process	---	To be trimming the cutting surface of axis	---
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**HoD**