Scoring Indicator

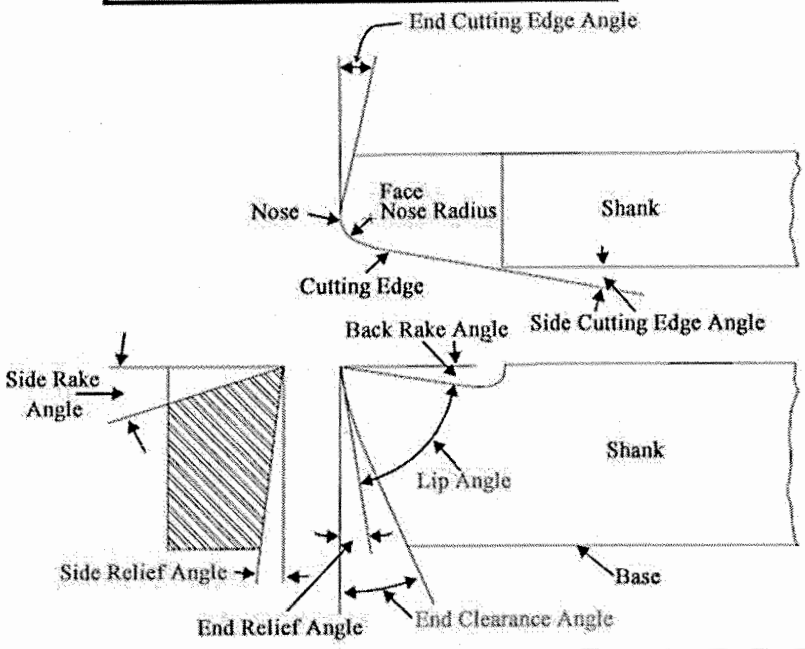
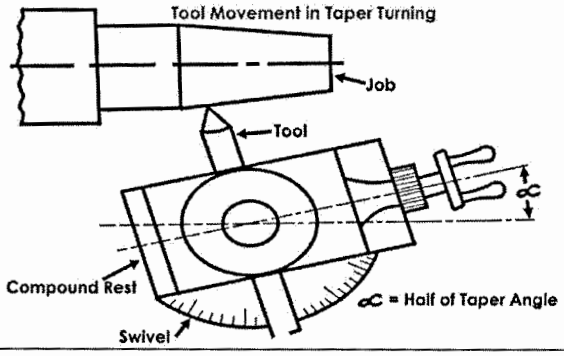
Course Name: **Machine Tools**

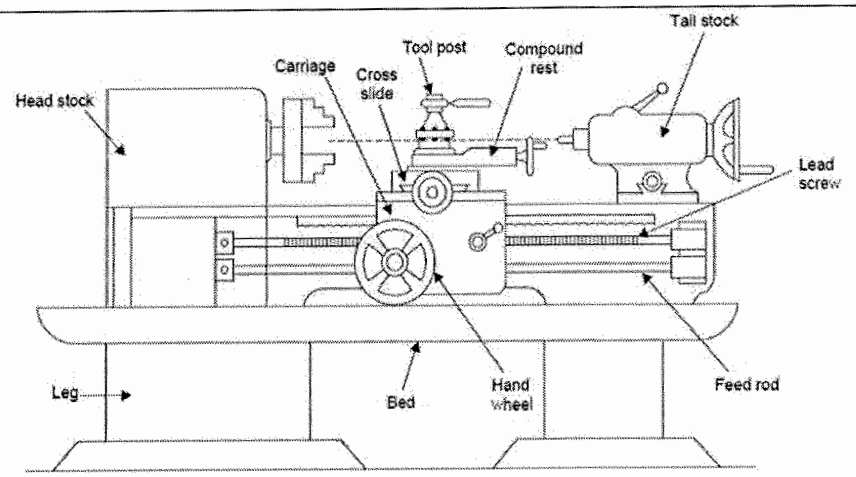
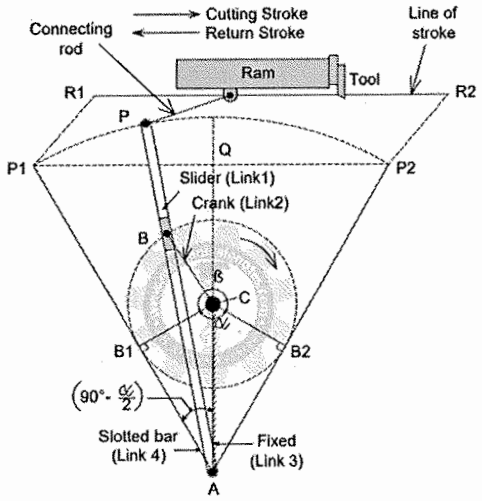
Course Code: **Rev (21)-3023** QID: 2110220185

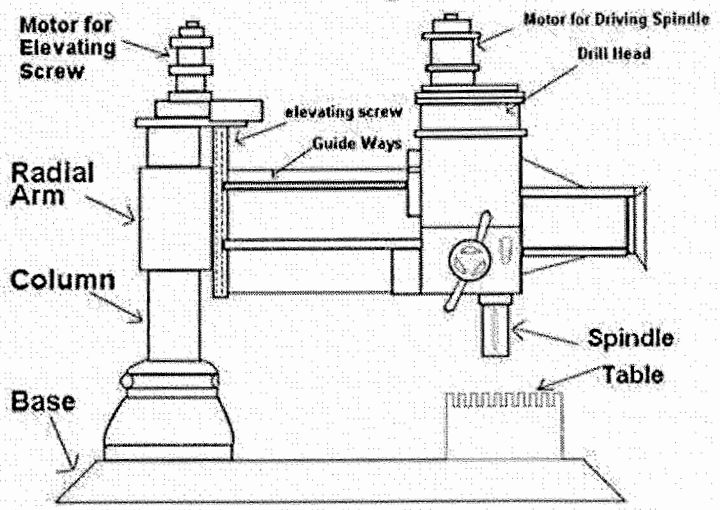
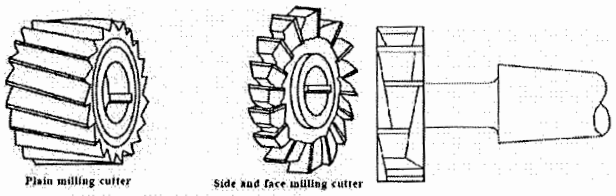
.

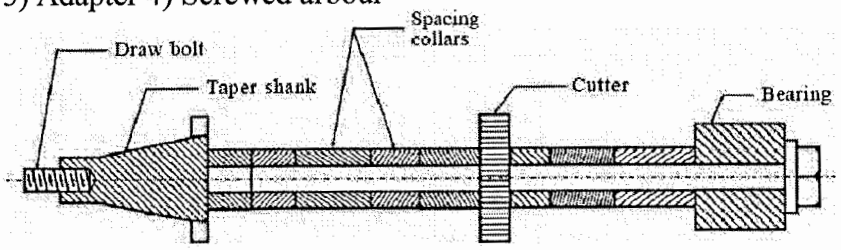
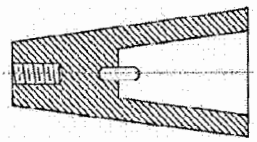
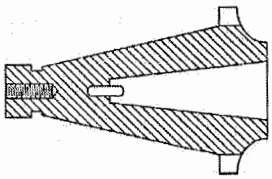
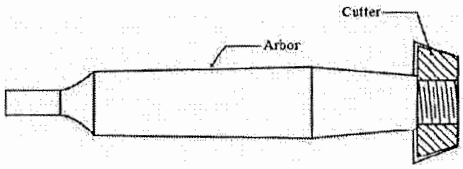
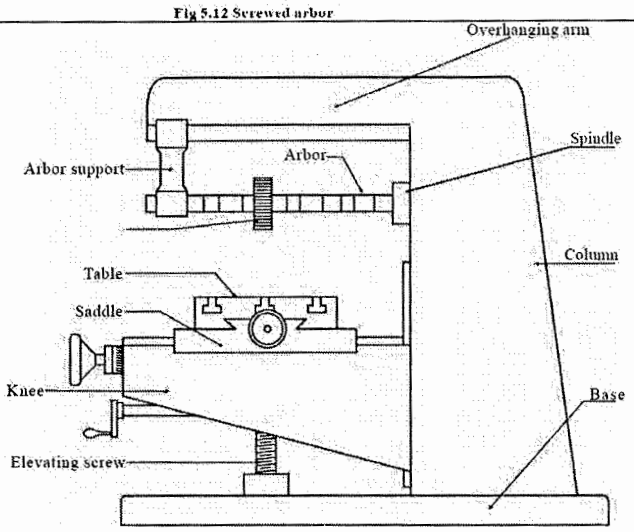
Q.No	Scoring Indicator	Split Score	Sub Total	Total Score
	PART - A			9
I.1	Back rake angle		1	
I.2	1. Bench lathe 5. Capstan and turret lathe 2. Speed lathes 6. Automatic lathe 3. Engine lathe 7. Special purpose lathes 4. Tool room lathe	Any Two	1	
I.3	Heavy Duty Vices , 'T' bolts and Clamps, Step Blocks , Angle Plates, Planner Jacks, Planner Centers, 'V' blocks	Any One	1	
I.4	Reamer		1	
I.5	1. Direct or rapid indexing 2. Plain or simple indexing 3. Compound indexing 4. Differential indexing 5. Angular indexing	Any Two	1	
I.6	(a) Sand stone or solid quartz, (b) Emery, (c) Corundum, (d) Diamonds, (e) Garnet	Any Two	1	
I.7	Program of Instructions		1	
I.8	Industrial Manufacturing, Automotive, Industrial Robot, Aerospace, Lathing & Milling	Any Two	1	
I.9	As a Coolant, As a Lubricant, To wash off chips, to get better surfaces finish.	Any Two	1	
	PART - B			24
II.1	**Orthogonal Cutting :** Orthogonal Cutting Is a Type of Cuttings in Which the Cutting Tool Is Perpendicular to the Direction of Motion. the Chip Flow in This Cutting Is State-Of-The-Art. This Type of Cutting Has a Lower Life Cutting Capacity in the Tool. **Oblique Cutting:** Oblique cutting is a type of cuttings in which the cutting tool is at an oblique angle in the direction of the tool's motion. The chip flow in this cutting is not cutting edge. The tool has a longer cutting life than orthogonal cutting.		3	
II.2	Cutting speed, V = 20 m/min, Taylors exponent, n =1 Taylors coefficient, C = 2000 Taylor's Equation, $VT^n = C$ » $20xT^1 = 2000$; T = 100 minutes		3	

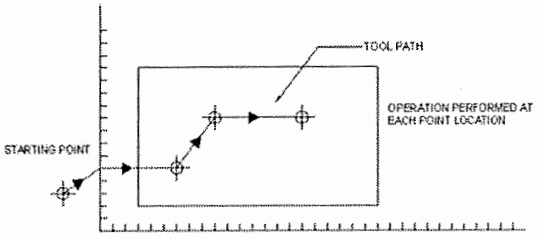
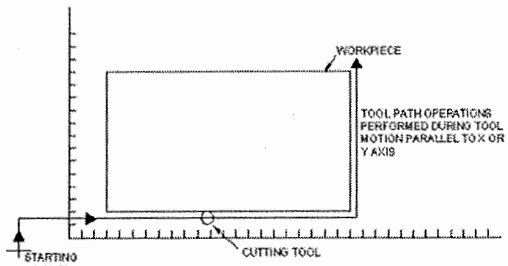
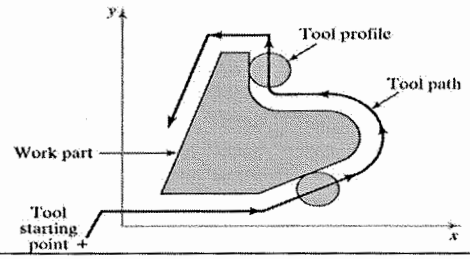
II.3	The work is held on a slotter table by a vise, T-bolts and clamps or by special fixtures. T-bolts and clamps are used for holding most of the work on the table. Fixtures are used for holding repetitive work.		3	
II.4	The job is rigidly fixed on the machine table. The single point cutting tool held properly in the tool post is mounted on a reciprocating ram. The reciprocating motion of the ram is obtained by a quick return motion mechanism. As the ram reciprocates, the tool cuts the material during its forward stroke. During return, there is no cutting action and this stroke is called the idle stroke. The forward and return strokes constitute one operating cycle of the shaper.		3	
II.5	• Maximum drill size (diameter) that can be used. • Size and taper of the hole in the spindle. • Range of spindle speeds. • Range of feeds. • Power of the main drive. • Range of the axial travel of the spindle / bed. • Floor space occupied by the machine.	Any 3	3	
II.6	Centre less grinding is an alternative process for grinding external and internal cylindrical surfaces. In this method the workpiece is not held between centres. This results in a reduction in work handling time; hence, centre less grinding is often used for high-production work.		3	
II.7	This process uses a **lapping** plate. The abrasive particles placed between work piece and lapping plate in form of oil mixed slurry or gel. The lapping plate remains stationary in hand lapping and rotates at a speed of 10 – 150 rpm in machine lapping. The work piece is allowed to do reciprocating motion over lapping plate which removes the material in form of microchips. It can achieve dimensional tolerance on the order of 0.0004 mm.		3	
II.8	A closed loop system uses position sensors attached to the machine tool table to measure its position relative to the input value for the axis. Any difference between the input value and the measured value is used to drive the system toward a zero difference. The function of the feedback loop in a numerical control system is to assure that the table and work part have been properly located with respect to the tool. Closed-loop NC systems generally use dc servomotors or hydraulic actuators.		3	
II.9	Numerical control technology has application in a wide variety of production operation such as metal cutting, automatic drafting, spot welding, press working, assembly, inspection, etc. However, NC finds its principal application in metal machining operations.		3	
II.10	Straight Oil, Soluble oil, mineral oil, synthetic liquids, semi-synthetic fluids, cutting oil and solid and paste lubricants		3	
	PART - C			42

III.1	**Single Point Cutting tool Diagram**  		7	7
III.2	1. Turning Operation Plain or Straight Turning, Rough Turning, Shoulder Turning, Taper Turning, Eccentric Turning 2. Facing Operation 3. Chamfering Operation 4. Knurling Operation 5. Thread cutting Operation 6. Filing Operation 7. Polishing Operation 8. Grooving Operation 9. Spinning Operation 10. Forming		7	7
III.3	This method is typically used to produce short and steep cones. In this method, the compound rest is rotated at the required angle and held in position. The compound rest can be rotated up to 45 degrees. The workpiece is held in the chuck & will be rotated in the lathe axis.  		7	7

III.4			7	7
III.5	 In this mechanism, the link AC is fixed and form a turning pair with a crank and slotted lever as shown in the figure. A sliding block B is attached at point B and slides on the slotted lever AP. A connecting rod is pivoted at the end of AP and the Ram.The ram carries a single-point cutting tool that moves forward and backward on the line of stroke R1R2 and the AC is perpendicular to the line of stroke. As shown in the figure, AP1 and AP2 are tangential to the circle. When the crank rotates from CB1 to CB2 through an angle β in a clockwise direction indicates that the tool is reciprocating in the forward direction for the Cutting stroke. Similarly, when the crank rotates from CB2 to CB1 through an angle α in the Anti-clockwise direction, it indicates that the tool is under a reciprocating motion for the return stroke or the IDLE stroke.	4 3	7	7

III.6	**Radial Drilling Machine**  		7	7
III.7	1. Plain milling cutter 2. Side milling cutter 3. Metal slitting saw 4. Angle milling cutter 5. End milling cutter 6. 'T' – Slot milling cutter 7. Fly cutter 8. Formed cutter  Fig 5.13 Pictorial views of milling cutters Fig 5.18 'T' slot milling cutter		7	7
III.8	**Vitrified bond**: Vitrified bond material is comprised of finely ground clay and fluxes with which the abrasive is thoroughly mixed. The mixture of bonding agent and abrasive in the form of a wheel is then heated to 2,400°F to fuse the materials. **Resinoid bond:** Phenolic resin in powdered or liquid form is mixed with the abrasive grains in a form and cured at about 360F. Their main use is in rough grinding and cut-off operations. **Silicate bond:** This bonding material is used when heat generated by grinding must be kept to a minimum. Silicate bonding material releases the abrasive grains more readily than other types of bonding agents. **Shellac bond:** It's an organic bond used for grinding wheels that produce very smooth finishes on parts such as rolls, cutlery, camshafts and crankpins. **Rubber bond:** Rubber-bonded wheels are extremely tough and strong. Their principal uses are as thin cut-off wheels and driving wheels in centerless grinding machines. **Metal bond:** Metal bonds are used primarily as binding agents for diamond abrasives.		7	7

III.9	1) Arbour 2) Collet 3) Adapter 4) Screwed arbour  Fig 5.9 Arbor  Fig 5.10 Collet  Fig 5.11 Adapter  Fig 5.12 Screwed arbor		7	7
III.10	 Fig 5.2 Horizontal milling machine		7	7

III.11	There are three types of motion control used in Numerical control 1. Point to point 2. Straight cut 3. Contouring  POINT-TO-POINT (POSITIONING) CONTROL IN NC  STRAIGHT-CUT CONTROL IN NC  		7	7
III.12	1. A cutting fluid should have a low viscosity so that it can easily flow above the workpiece. 2. It should have a high flash point so that it can be used at high temperatures. 3. It should stable at high temperatures. 4. It should have a non-foaming tendency. 5. It should have a high heat absorption rate so that during cutting operation it can easily absorb the generated heat. 6. It should have a good lubricating property to reduce the friction between tool and workpiece and chips can easily get out from the workpiece. 7. Coolant should not react chemically; it has to be chemically active in nature. 8. It should have odourless to avoid any bad smell even at higher temperatures. 9. It should be transparent in a property so that the operator can easily see the cutting area. 10. It should be harmless to the operator.	Any 7	7	7