



VERSION-A

SCORING INDICATORS

Course Name: MACHINE TOOLS

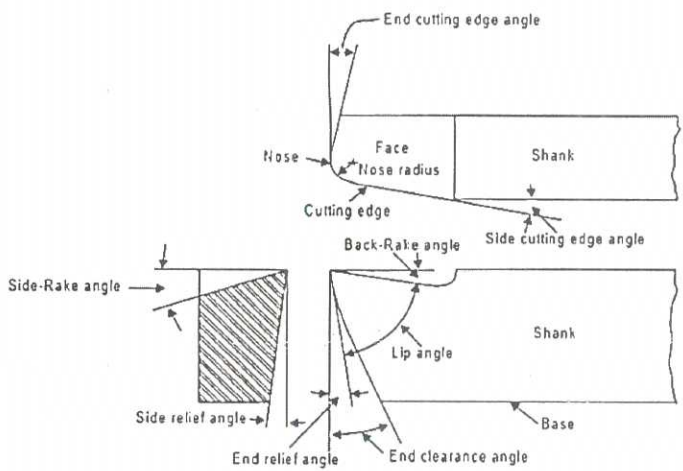
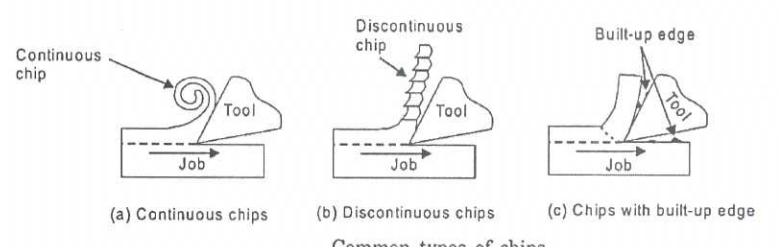
QID: 2110220184

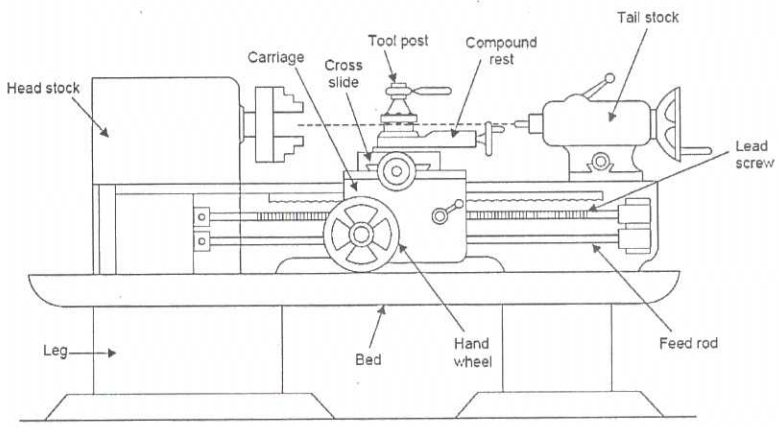
Course Code: 3023

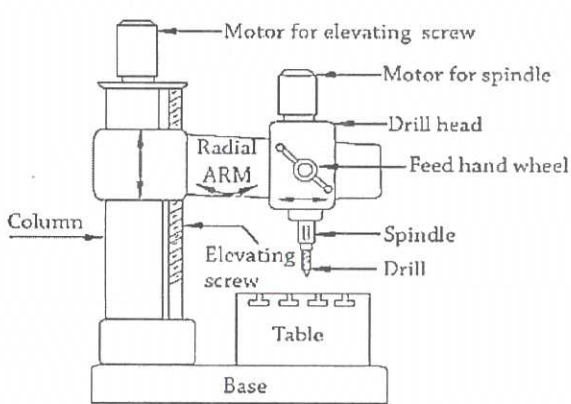
Q.No	Scoring Indicators	Split score	Sub Total	Total Score
	Part A			9
I.1	Continuous chips	1	1	
I.2	Red Hardness	1	1	
I.3	Facing	1	1	
I.4	Forward	1	1	
I.5	Counter boring	1	1	
I.6	Milling Machine	1	1	
I.7	Surface Grinder	1	1	
I.8	Machine Control Unit	1	1	
I.9	Cutting Fluids	1	1	
	Part B			24
II.1	Orthogonal Cutting 1. The cutting angle of the tool makes a right angle to the direction of motion. 2. The flow of the chip is perpendicular to the cutting edge. 3. There are only two components of force these components are mutually perpendicular. 4. High heat concentration at cutting region. 5. Tool life is less. Oblique Cutting 1. The cutting edge of the tool is inclined to the direction of feed motion. 2. The chip flow angle is more than zero. 3. There are three mutually perpendicular forces acting while the cutting process. 4. Less concentration of heat at the cutting region compared to orthogonal cutting. 5. more tool life. <i>Any 3 points , each carries one mark</i>	1X3	3	
II.2	1.Engine Lathe 2.Bench Lathe 3.Speed Lathe 4.Tool room Lathe 5.Special Purpose Lathe 6.Automatic lathe 7.Capstan Lathe 8.Turret Lathe <i>Answer any 6, each carries 1/2 mark</i>	1/2X6	3	
II.3	1. The maximum length of stroke or cut it can make. 2. Type of drive 3. Power input 4. Floor space required 5. weight of the machine 6. Cutting to return stroke ratio 7. Number and amount of feed <i>Answer any 3, each carries 1 mark</i>	1X3	3	

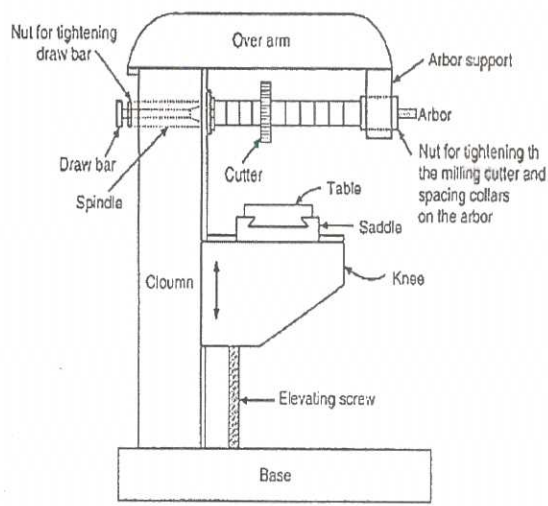
Version A

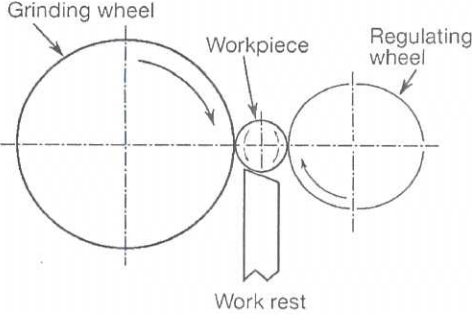
II.4	<ol style="list-style-type: none"> 1. Drill press vice 2. Angle vice 3. V Block 4. T-Bo It 5. Step block 6. Parallels <p><i>Answer any 3 , each carries one mark</i></p>	1X3	3	
II.5	<ol style="list-style-type: none"> 1. Machining Flat surface 2. Machining cylindrical surface 3. Machining irregular surface and cam machining 4. Machining slots, keyways and grooves <p><i>Answer any 3 points, each carries one mark</i></p>	1X 3	3	
II.6	<p><u>Direct Indexing</u></p> <p>It is accomplished by using the index plate directly attached to the work spindle. The index plate has 24 divisions and can be divided into 2,3,4,6,8 and 12 equal parts directly. It is engaged by a plunger pin on the head and can be turned manually by the required amount. It is a quick method of indexing and is used when only a few cuts are required in a revolution</p> <p>No. of holes to be moved = $24/N$ where N = no. of divisions required.</p> <p><i>Explanation : 3 marks</i></p>	3	3	
II.7	<p>The factors affecting selection of grinding wheel are</p> <ol style="list-style-type: none"> 1. Material to be ground 2. Amount of stock to be removed 3. Area of contact 4. Type of grinding machine used <p><i>Answer any 3 , each carries one mark</i></p>	1X3	3	
II.8	<ol style="list-style-type: none"> 1. Program of instruction 2. Machine control unit 3. Machine tool <p><i>Each point carries one mark</i></p>	1X3	3	
II.9	<ol style="list-style-type: none"> 1. Program is fed to the machine through a computer. 2. The program can be easily modified with the computer. 3. It has memory storage ability in which part program can be stored. 4. System can import CAD files and convert it into part program 5. The system is software driven 6. The system can use feed back system <p><i>Answer any 3 points, each carries one mark</i></p>	1X3	3	
II.10	<ol style="list-style-type: none"> 1. To cool the tool 2. To cool the workpiece 3. To lubricate and reduce friction 4. To improve the surface finish 5. To protect the finished surface from corrosion 6. To wash the chips away from the tool <p><i>Answer any 3, each carries one mark</i></p>	1X3	3	

	Part C			42
III.1	 <p>Figure : 4 marks Marking: 3 marks</p>	4+3	7	
III.2	 <p>Figure: 3 marks Explanation: 4 marks</p> <p><u>1. Continuous chips</u> Continuous chips consist of elements bonded firmly without being fractured. Mostly obtained while machining with ductile materials.</p> <p><u>2. Discontinuous chips</u> Consists of elements fractured into fairly small pieces ahead of the cutting tool. This type of chips are obtained in machining brittle materials like CI and Bronze</p> <p><u>3. Chips with BUE</u> The term BUE implies the building up of a ridge of metal on the top surface of the tool and above the cutting edge. Machining with ductile materials causes the formation of a pile of compressed and highly stressed metal forms at the extreme edge of the tool. Owing to the high heat and pressure there this piled-up metal is welded to the cutting tip and forms a false cutting edge to the tool referred to as a BUE.</p>	3+4	7	

<p>III.3</p>	$n = 0.5, C = 100$ $VT^n = C \quad \left. \begin{array}{l} \\ \end{array} \right\} 2 \text{ mark.}$ $V_1 T_1^n = \frac{1}{2} T_2^n \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} 1 \text{ mark}$ $V_2 = 0.5 V_1$ $V_1 T_1^n = 0.5 V_1 T_2^n$ $V_1 T_1^{0.5} = 0.5 V_1 T_2^{0.5}$ $\frac{T_1}{T_2} = (0.5)^2 = 0.25 \quad \therefore \frac{T_2}{T_1} = 4.$ $\% \text{ increase in tool life} = \frac{T_2 - T_1}{T_1} \times 100$ $= \left(\frac{T_2}{T_1} - 1 \right) \times 100$ $= (4 - 1) \times 100$ $= \underline{\underline{300\%}}$ <p style="text-align: right;">4 marks.</p>	<p>2+1+4</p>	<p>7</p>	
<p>III.4</p>	 <p style="text-align: center;">Figure: 4 marks Marking: 3 marks</p>	<p>4+3</p>	<p>7</p>	

<p>III.5</p>	<p><u>Shaper</u></p> <ol style="list-style-type: none"> 1. These are light in construction 2.Requires less floor space 3.Tool reciprocates and workpiece stationary 4.only one tool use 5.Adopted for small work 6.used for batch or job production 7.cost of machine is less <p><u>Planer</u></p> <ol style="list-style-type: none"> 1. Large and heavy 2.More floor area 3.Tool stationary and workpiece on the table reciprocates 4.Massive 5.More than one tool can be used 6.adopted for large work 7.used for mass production 8.cost of the machine is high <p><i>Any 7 points,each carries one mark</i></p>	<p>1X7</p>	<p>7</p>	
<p>III.6</p>	 <p style="text-align: center;">Radial Drilling Machine</p> <p style="text-align: center;">Figure: 4 marks Marking: 3 marks</p>	<p>4+3</p>	<p>7</p>	

<p>III.7</p>	 <p style="text-align: center;">HORIZONTAL MILLING MACHINE</p> <p style="text-align: center;">Figure: 4 marks Marking: 3 marks</p>	<p>4+3</p>	<p>7</p>	
<p>III.8</p>	<p><u>Work holding devices</u></p> <ol style="list-style-type: none"> 1. T bolts and clamps 2. Angle plates 3. V-blocks 4. Vices 5. V-blocks <p><u>Tool holding devices</u></p> <ol style="list-style-type: none"> 1. Arbors 2. Collets 3. Adapter 4. Spring collets 5. Bolted cutters 6. Screwed on cutters <p>Any four work holding devices (4 marks) and any three (3 marks) tool holding devices</p>	<p>4+3</p>	<p>7</p>	

<p>III.9</p>	 <p style="text-align: center;">CENTRELESS GRINDING</p> <p>Centreless grinding is a method of grinding exterior, cylindrical, tapered and formed surfaces on workpieces that are not held and rotated on centres. The principal elements are the grinding wheel, regulating or backup wheel, and the work rest. Both wheels are rotated in the same direction. The work rest is located between the wheels. The work is placed upon the work rest, and the latter, together with the regulating wheel, is fed forward, forcing the work against the grinding wheel.</p> <p style="text-align: center;">Figure: 4 marks Explanation: 3marks</p>	<p>4+3</p>	<p>7</p>	
<p>III.10</p>	<p>Application of Lapping are</p> <ol style="list-style-type: none"> 1. Fine finishing of gears 2. Dies and moulds 3. Valve cocks 4. Tappet valves and valve seats 5. Diesel engine injectors 6. Gauges 7. Bearings and journals 8. Ball and roller bearing surfaces etc. <p style="text-align: right;">Answer any 4 - 1 mark each</p> <p>Applications of Honing are</p> <ol style="list-style-type: none"> 1. Automobile cylinders 2. Hydraulic press cylinders 3. Roller-bearing races 4. Guide bushes 5. Bores of cannons 6. Bearing boxes etc. <p style="text-align: right;">Answer any 3 - 1 mark each</p>	<p>4+3</p>	<p>7</p>	

III.11	<p><u>NC Machines</u></p> <ol style="list-style-type: none"> 1. The part program is fed to the machine through the tapes or other such media 2. In order to modify the program, the tapes have to be changed. 3. Tape reader is a part of MCU 4. No memory storage 5. Cannot import CAD files 6. They are not software driven 7. It cannot use a feedback system <p><u>CNC Machines</u></p> <ol style="list-style-type: none"> 1. The program is fed to the machine through the computer 2. Programs can be easily modified with the help of a computer 3. The microcomputer or mini computer forms the machine control unit. <p>CNC machine does not need a tape reader</p> <ol style="list-style-type: none"> 4. Part program can be stored in memory 5. System can import CAD files and convert it to part program 6. The system can use feed back system 7. The system is software driven <p><i>Answer any seven points,each carries one mark</i></p>	1X7	7	
III.12	<ol style="list-style-type: none"> 1. High heat absorption 2. Good lubricating qualities 3. High flash point 4. Stability 5. Neutral 6. Odorless 7. Harmless to the skin of operators 8. Harmless to the bearings 9. Non corrosive 10 Transparency 11.Low viscosity <p>Any 7 points - 1 mark each</p>	1X7	7	