U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

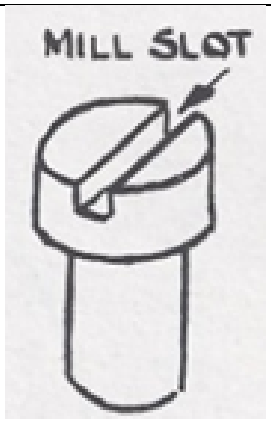
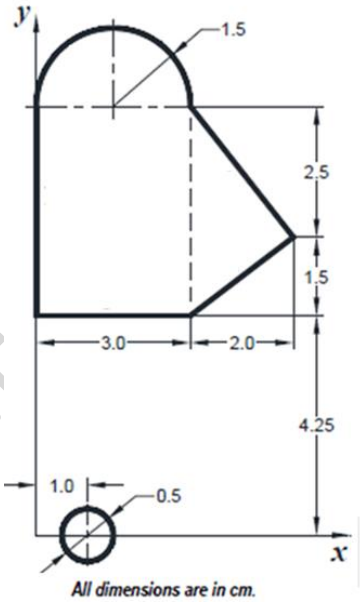
January 2024 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 20ME7DETED **Max Marks: 100**
Course: Tool Engineering Design

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Usage of Tool Design Data Handbook is permitted in the examination.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	List the different types of single point tools.	CO3	PO1	**04**
	b)	Discuss the influence of positive and negative rake angles on machining.	CO3	PO1	**06**
	c)	The following data is given to design rectangular shank tool. Check the tool for rigidity. Draw the tool arrangement and sketch the geometry as per ASA. Tangential force = 4250N, Overhang length = 60mm, Tool materials = HSS, Operation = roughing, work piece = MS and Bending strength = 200N/mm^2	CO1 CO3	PO1	**10**
		UNIT - II			
2	a)	The following data is given to design a drill. Drill diameter = 14mm, work material = steel, tool material = tool steel. Show the shape of the flute cross section.	CO1 CO3	PO2	**12**
	b)	Design the elements of the plain milling cutter for an arbour diameter of 20mm. Data: solid cutter, fine teeth, HSS tool material, MS workpiece	CO1 CO3	PO2	**08**
		OR			
3	a)	Discuss the principle of gauges.	CO3	PO2	**07**
	b)	Mention work piece quality criteria and explain them.	CO3	PO2	**07**
	c)	Mention any six fixed gauges with application.	CO3	PO2	**06**
		UNIT - III			
4	a)	Discuss five fundamental principles of Jigs and Fixtures design.	CO3	PO3	**10**
	b)	A slot is to be cut in five cylindrical components as shown in Figure Q. 4b. Draw a milling fixture's sectional front view and simple top view.	CO1 CO3	PO3	**10**

			 Figure Q. 4b			
			UNIT - IV			
	5	a)	Differentiate blanking, punching and piercing.	*CO3*	*PO3*	**06**
		b)	Sketch and explain the working principle of progressive die.	*CO3*	*PO3*	**10**
		c)	Explain the shear action in die cutting.	*CO3*	*PO3*	**04**
			UNIT - V			
	6	a)	Explain the importance of center of pressure. Determine the center of pressure for the component shown in Figure Q. 6a.  Figure Q. 6a	*CO1* *CO3*	*PO4*	**10**
		b)	Estimate the blanking force required to punch 20mm*25mm rectangular blank from 1.5mm thick sheet if the shear strength of the sheet is 450N/mm^2. Calculate the work done and power if the percentage penetration is 20% and each blanking is produced in 0.25sec.	*CO1* *CO3*	*PO4*	**05**
		c)	A steel component 20 mm * 60 mm is to be made from 2 mm thick sheet. Sketch the scrap strip layout and determine the percentage stock used.	*CO1* *CO3*	*PO4*	**05**
			OR			

	7	a)	A symmetrical cup of 50 mm diameter and 50 mm height is to be drawn from a cold-rolled steel of 0.8 mm thick sheet metal. Find drawing force, press capacity, number of draws and diameters after each draw, if corner radius = 1.6 mm and $\sigma_y = 250 N/mm^2$.	*CO1* *CO3*	*PO4*	**08**
		b)	Discuss the defects in drawing.	*CO3*	*PO4*	**08**
		c)	What is spring back? Explain.	*CO3*	*PO4*	**04**

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