BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

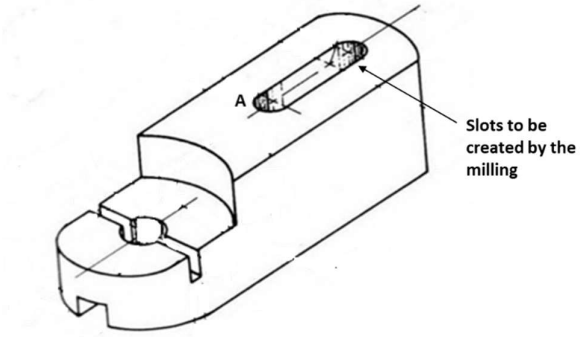
CLASS: BTECH **SEMESTER: VI**
BRANCH: PRODUCTION AND INDUSTRIAL ENGINEERING **SESSION: SP/2025**

SUBJECT: PE336 TOOLING FOR MANUFACTURING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL
Q.1	i.	What are the essential requirements for tooling in manufacturing processes, and how do the economics of tooling affect production scalability and cost efficiency?	[6+4]	1	1,3,4
	ii.	Provide an example that illustrates the cost-benefit analysis of tooling investments.			
Q.2	i.	Design an appropriate milling fixture for machining slot A on the component, as illustrated in the diagram.	[5+3+2]	2	1,3,4,5
	ii.	Justify your choice of locating and clamping methods in the fixture design.			
	iii.	Make a neat and well-labelled diagram to support your explanation			

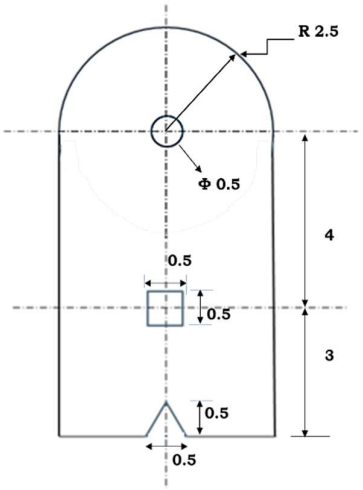


Q.3 Analyze the given workpiece and design a two-stage progressive die suitable for its manufacturing. Evaluate and determine the following parameters: [7+3] 3 1,3,4,5

i. The center of pressure to accurately position the ram.
ii. The punching force, stripping force, and the required press capacity.

Assume shear strength (τ) = 390 N/mm² and sheet thickness (t) = 2 mm.

All dimensions in the provided figure are in centimeters.



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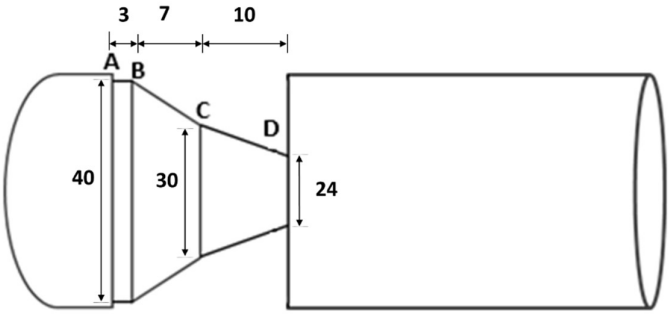
Q.4	i. Design a suitable circular form tool to machine the profile ABCD on the given workpiece using the graphical method. Provide a detailed graphical construction of your design and explain each step involved in the process. (All dimensions in the provided figure are in millimeters.) ii. Make a neat and well-labelled diagram to support your explanation	[8+2]	4	1,3,4,5

$Assume\ \gamma = 15^o;\ \propto = 10^o;\ k = 10mm;\ m = 10mm$



Q.5(a)	Critically analyze Taylor's Principle used in limit gauging. Evaluate its significance and synthesize its applications in manufacturing practices.	[5]	5	1,2,3
Q.5(b)	Evaluate the importance of wear management in measuring equipment. Propose techniques used for effective wear management in manufacturing environments	[5]	5	1,2,3

::::::30/04/2025::::::M