

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID-SEMESTER EXAMINATION SP/2025)

CLASS: B. TECH
BRANCH: PRODUCTION AND INDUSTRIAL ENGINEERING

SEMESTER: VI
SESSION: SP/2025

SUBJECT: PE336 TOOLING FOR MANUFACTURING

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 4 questions with a total of 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

		CO	BL
Q.1(a)	Summarize the various types of tooling essential for different manufacturing processes. Provide relevant examples to illustrate their applications.	[2] 1	1,2
Q.1(b)	Assess the essential material properties needed for designing precision gauges and explain their importance.	[3] 1	2,3,4
Q.2	<p>A fixture costs Rs. 400/-, and only one production run is made annually. Determine the number of pieces that must be manufactured annually for the fixture to recover its cost within two years.</p> <p>Additionally, if six production runs are conducted per year, calculate the number of components that need to be manufactured under the same cost-recovery condition.</p> <p>Furthermore, analyze the profit earned when the fixture design is improved, assuming the cost of the fixture (C) is reduced to Rs. 250 instead of Rs. 400 while maintaining the setup cost (S) at Rs. 10 and conducting six production runs per year.</p> <p>Given Assumptions:</p> <ul style="list-style-type: none">• t = Percentage of overhead applied on labor saved = 50%• S = Cost of each setup = Rs. 10/-• I = Annual allowance for interest on investment = 6%• T = Annual allowance for taxes = 4%• M = Annual allowance for repair = 10%• D = Annual allowance for depreciation = 100%	[5] 1	1,2,3,4
Q.3	Design a diamond pin locator for a workpiece with holes of 8 mm diameter, positioned at a center-to-center distance of 25 ± 0.3 mm. Assume the width of the diamond pin to 1.5 mm.	[5] 2	3,4
Q.5	What types of jigs are most suitable for this job? Suggest different methods for locating the workpiece, assuming its dimensions. Provide a justified explanation for your preferred method, supported by appropriate reasoning.	[10] 2	3,4,5

