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

CLASS: BTech. **SEMESTER : IV**
BRANCH: PIE **SESSION : SP/2025**

SUBJECT: PE216 FOUNDRY, FORMING & WELDING TECHNOLOGIES

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 handbook/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	What is a casting *riser*? What are its function and types? How do you ensure metal in riser solidifies at the last?	[5]	1	2
Q.1(b)	A cylindrical riser is to be designed for a sand-casting mold. The length of the cylinder is to be 1.25 times its diameter. The casting is a square plate, each side length = 10 cm and thickness = 0.75 cm. If the metal is cast iron, and the mold constant = 16.0 min/cm2 in Chvorinov's rule, design the riser so that it will take 30% longer for the riser to solidify.	[5]	1	5
Q.2(a)	Compare and contrast *lost wax casting (investment casting)* process and *Lost foam casting* process.	[5]	2	4
Q.2(b)	With a neat diagram, explain the *cold chamber die casting process*. What are the advantages of this process?	[5]	2	2
Q.3(a)	Explain the modes of metal transfer in GMAW. For each mode, evaluate its advantages and disadvantages.	[5]	3	3
Q.3(b)	Explain the phenomenon of arc blow in arc welding processes. Discuss their effects on weld quality and suggest methods to eliminate arc blow during welding operations.	[5]	3	3
Q.4(a)	Explain the working principle of Thermit Welding. And the advantages and limitations of this process.	[5]	4	2
Q.4(b)	Compare and contrast destructive testing (DT) and non-destructive testing (NDT) methods. And describe the working principle of Ultrasonic Testing (UT) for weld inspection.	[5]	4	4
Q.5(a)	Define "draft" in the context of rolling processes. Rolling process with a mill operating at a speed of 10 m/s, and an initial material thickness of 25 mm being reduced to 15 mm, calculate the required draft. Also, estimate the percentage reduction in thickness.	[5]	5	3
Q.5(b)	Difference between blanking and piercing operations. A 4 mm thick steel sheet is to be drawn into a cup with a blank diameter of 200 mm and a final depth of 250 mm. Determine whether the operation is feasible and how many draws are needed.	[5]	5	5

::::::28/04/2025::::::M