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

CLASS: MTECH. **SEMESTER : I**
BRANCH: PIE **SESSION : MO/2025**

SUBJECT: PE524 ADVANCED MANUFACTURING 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 hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Compare and contrast Lost foam casting and investment casting process	[5]	1	4
Q.1(b)	Differentiate between squeeze casting and die casting	[5]	1	4
Q.2(a)	Why surface treatment is essential for various engineering components?	[2]	2	2
Q.2(b)	Discuss any of the surface modification techniques without changing the composition of the component to be treated.	[3]	2	2
Q.2(c)	Distinguish between physical vapour deposition (PVD) and chemical vapour deposition method for thin film coating.	[5]	2	4
Q.3(a)	With a neat diagram, explain the explosive forming process	[5]	3	2
Q.3(b)	What is incremental forming? What are the advantages and limitations of this process.	[5]	3	2
Q.4(a)	Describe the diffusion welding process with the help of a neat sketch. Explain how temperature, pressure, and time influence the bond formation.	[5]	4	2
Q.4(b)	Differentiate between wet and dry underwater welding processes. Analyse the challenges associated with hydrogen embrittlement, arc stability, and cooling rate under underwater conditions.	[5]	4	4
Q.5(a)	Describe the principle of hot machining. Explain how preheating the workpiece improves machinability of hard-to-cut materials and discuss its limitations on tool life and dimensional accuracy.	[5]	5	2
Q.5(b)	Discuss the hybrid working mechanism of MRAFF combining AFM and MRF. Explain its advantages in finishing complex geometries and hard materials compared to conventional finishing processes.	[5]	5	4

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