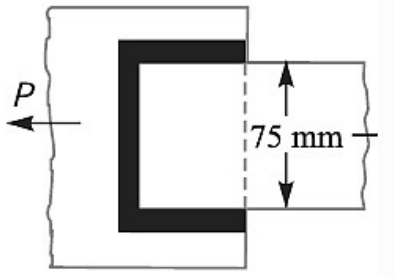
BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: B. Tech **SEMESTER : V**
BRANCH: PIE **SESSION : MO/2025**

SUBJECT: PE317 ADVANCED WELDING TECHNOLOGY

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)	Describe the working principle of explosive welding? Write its principle, process parameters, and major applications.	[5]	1	1
Q.1(b)	Compare Electron Beam Welding (EBW) and Laser Beam Welding (LBW) based on principle, equipment, weld quality, and applications.	[5]	1	2
Q.2(a)	Explain the metal surfacing techniques such as cladding, hard-facing, build-up and buttering.	[5]	2	2
Q.2(b)	Explain the thermal cutting processes of oxygen cutting and arc cutting. Describe their principles, advantages, limitations, and industrial applications.	[5]	2	2
Q.3(a)	Discuss the challenges of welding in windy conditions and explain the methods adopted to prevent weld defects when welding outdoors.	[5]	3	1
Q.3(b)	Describe underwater welding processes and compare wet vs dry underwater welding.	[5]	3	1
Q.4(a)	Explain the principle of residual stress formation in welded joints. Discuss the types of residual stresses, and various stress-relieving techniques used in welding.	[5]	4	2
Q.4(b)	A plate 120 mm wide and 15 mm thick is joined with another plate by a single transverse fillet weld and a double parallel fillet weld as shown in fig. The stress-concentration factors for the transverse and parallel fillet welds are 1.5 and 2.7 respectively. Determine the required length of weld run for each case if the joint is subjected to both static and fatigue loading. The maximum tensile and shear stress are 70 MPa and 56 MPa respectively. 	[5]	4	3
Q.5(a)	Explain the role of welding in the automobile industry. Discuss the major welding processes used, their applications in vehicle manufacturing.	[5]	5	2
Q.5(b)	Define welding automation. Describe different levels of automation, benefits, limitations, and examples of automated welding systems used in modern manufacturing.	[5]	5	2

:::::24/11/2025:::::M