BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2023)

CLASS: B.TECH	SEMESTER: VII
BRANCH: PRODUCTION	SESSION : MO/2023

SUBJECT: PE406 NON-CONVENTIONAL MACHINING PROCESSES

TIME: 02 Hours	FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 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)	Under what manufacturing conditions you will prefer to use non-conventional machining processes than the conventional manufacturing processes?	[2]	2	4
Q.1(b)	Compare and contrast Water Jet Machining (WJM) and Abrasive Water Jet Machining (AWJM), emphasizing operational principles, applications, and advantages.	[3]	1	4
Q.2(a)	Why is ultrasonic machining sometimes referred to as ultrasonic grinding or impact grinding, and what justifies these alternative names.	[2]	2	2
Q.2(b)	How do variations in abrasive flow rate, mixing ratio, and stand-off distance individually impact the Material Removal Rate (MRR) in Water Jet Machining (WJM) processes, and what are the underlying mechanisms behind these effects?	[3]	3	3
Q.3(a)	How does electrochemical polishing work?	[2]	1	2
Q.3(b)	Describe photochemical machining's operation and applications, considering solutions for machining complex shapes and achieving precision.	[3]	2	2
Q.4	Using Faraday's classical law of electrolysis, analyze and derive expressions for the Metal Removal Rate (MRR) in the Electrochemical Machining (ECM) process, considering both pure metals and alloys.	[5]	1	3
Q.5	By establishing a mathematical correlation between Material Removal Rate (MRR) and variables such as voltage, current, pulse on time, and pulse off time, while accounting for hemispherical crater volume in a single spark during EDM, analyze how these parameters influence MRR.	[5]	3	4

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