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

CLASS: BTECH **SEMESTER : V/ADD**
BRANCH: PIE **SESSION : MO/2025**

SUBJECT: PE329 MACHINING SCIENCE AND MACHINE TOOLS

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)	State any two assumptions of orthogonal metal cutting theory.	[1]	CO1	1
Q.1(b)	An orthogonal turning operation is being carried out under the following conditions: t_o = 0.1 mm, t_c = 0.2 mm, width of cut = 5 mm, V = 2 m/s, rake angle =10° , Fc = 500 N, and Ft = 200 N. Calculate the friction angle and the shear force.	[4]	CO1	4
Q.2(a)	State and prove Merchant's theory of orthogonal metal cutting.	[4]	CO1	3
Q.2(b)	For ASA single point tool designation given below, identify the side cutting edge angle and end relief angle. 10-12-6-7-4-14-1	[1]	CO1	4
Q.3(a)	Discuss the important properties required of a good cutting tool material. (at least 4)	[2]	CO2	1
Q.3(b)	Turning tests have resulted in 1-min tool life at a cutting speed = 5.0 m/s and a 30-min tool life at a speed = 2.0 m/s. (i) Find the ***n*** and ***C*** values in the Taylor tool life equation. (ii) Project how long the tool would last at a speed of 2.0 m/s.	[3]	CO2	4
Q.4(a)	Discuss the mechanism of discontinuous chip formation. What are conditions suitable for discontinuous chip formation?	[2]	CO2	2
Q.4(b)	What are functions of cutting fluids in metal cutting? (at least four)	[2]	CO2	1
Q.5(a)	How do you specify a lathe machine? (at least four)	[2]	CO3	1
Q.5(b)	Draw a block diagram of a lathe machine and label the major components.	[3]	CO3	2

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