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

CLASS: BE **SEMESTER : IV/ADD**
BRANCH: MECHANICAL/PRODUCTION **SESSION : SP/19**

SUBJECT: PE4001 MANUFACTURING PROCESSES I

TIME: 3 Hours **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
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.

Q.1(a)	Differentiate between orthogonal cutting and oblique cutting	[2]
Q.1(b)	Derive the relationship of shear velocity, cutting velocity and chip velocity	[4]
Q.1(c)	An orthogonal cutting operation is performed using a rake angle 15° chip thickness before cut was found to be 0.012-inch width of cut was kept 0.1 inch. The chip thickness ratio for this operation was found to 0.55. Find shear angle, shear force, cutting force and coefficient of friction. (Assume shear strength of material to be 40000 lb/in^2).	[6]
Q.2(a)	Define machinability.	[2]
Q.2(b)	Explain different types of mechanism for tool wear.	[4]
Q.2(c)	Tool life tests in turning yield the following data: (1) when cutting speed is 100 m/min, tool life is 10 min; (2) when cutting speed is 80 m/min, tool life is 30 min. (a) Determine the *n and C values in* the Taylor tool life equation. Based on your equation, compute (b) the tool life for a speed of 110 m/min, and (c) the speed corresponding to a tool life of 15 min.	[6]
Q.3(a)	Differentiate between the shaper and planner.	[2]
Q.3(b)	Write a short note on (i). Three jaw chuck (ii) Four jaw chuck (iii) lead screw and (iv) feed rod	[4]
Q.3(c)	With the help of neat sketch explain any one quick return mechanism used in shaper.	[6]
Q.4(a)	What are the various types of drills?	[2]
Q.4(b)	Differentiate between horizontal & vertical milling machines	[4]
Q.4(c)	Write a short note on (i) up milling (ii)down milling (iii) indexing (iv) face milling	[6]
Q.5(a)	Compare lapping and honing process	[2]
Q.5(b)	What do you understand by term truing and dressing of wheel? How they are carried out on grinding wheel?	[4]
Q.5(c)	How grinding wheel is specified? Explain each parameter of grinding wheel?	[6]
Q.6(a)	Explain term gear shaping and gear shaving process	[2]
Q.6(b)	Short note on (with neat sketch). (i) gear hobing (ii) rake and pinion	[4]
Q.6(c)	Gear having 63 numbers of teeth is to be manufactured on milling machine. What will be the indexing action for the same (Assume compound indexing is used)	[6]
Q.7(a)	Is it possible to machine brittle material through USM process? Give proper reason in support of your answer	[2]
Q.7(b)	Describe working principle of AJM with neat sketch? Compare it with sand blasting? What are the process parameters influencing the machining rate in AJM	[4]
Q.7(c)	What is WJM? Which type of jet is used in machining of soft material? Describe its principle? Identify its process parameter and limitations?	[6]

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