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

CLASS: B.E **SEMESTER : IV**
BRANCH: MECH/PROD **SESSION : SP/17**

SUBJECT: PE4001-MANUFACTURING PROCESS-I

TIME: 03:00 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)	What are the two basic categories of cutting tools in machining? Give two examples of machining operations that use each of the tooling types.	[2]
Q.1(b)	With the help of neat sketches, indicate the different parts and angles of a single point tool.	[4]
Q.1(c)	The cutting force and thrust force in an orthogonal cutting operation are 1470 N and 1589 N, respectively. The rake angle = 5°, the width of the cut = 5.0 mm, the chip thickness before the cut = 0.6, and the chip thickness ratio = 0.38. Determine (a) the shear strength of the work material and (b) the coefficient of friction in the operation.	[6]
Q.2(a)	Name the three modes of tool failure in machining.	[2]
Q.2(b)	What is a cutting fluid? What are the important functions of a cutting fluid?	[4]
Q.2(c)	Tool life tests on a lathe have resulted in the following data: (1) at a cutting speed of 375 ft/min, the tool life was 5.5 min; (2) at a cutting speed of 275 ft/min, the tool life was 53 min. (a) Determine the parameters n and C in the Taylor tool life equation. (b) Based on the n and C values, what is the likely tool material used in this operation? (c) Using your equation, compute the tool life that corresponds to a cutting speed of 300 ft/min. (d) Compute the cutting speed that corresponds to a tool life T = 10 min.	[6]
Q.3(a)	Describe the turning process.	[2]
Q.3(b)	Name different taper turning methods for a center lathe. Explain any one of them with neat sketch.	[4]
Q.3(c)	Discuss in brief the various operations that can be carried out in a lathe machine.	[6]
Q.4(a)	Describe the difference between up milling and down milling?	[2]
Q.4(b)	What is a twist drill? Give a neat sketch of it illustrating its various parts.	[4]
Q.4(c)	Calculate the indexing and change gears required for 209 divisions. The change gears supplied with the dividing head are 24, 24, 28, 32, 40, 44, 48, 56, 64, 72, 86, 100. The available index plate hole circles are Plate 1: 15, 16, 17, 18, 19, 20; Plate 2: 21, 23, 27, 29, 31, 33; Plate 3: 37, 39, 41, 43, 47, 49.	[6]
Q.5(a)	Name some of the principal abrasive materials used in grinding wheels.	[2]
Q.5(b)	What is broaching? Discuss merits and demerits of broaching.	[4]
Q.5(c)	Discuss the working principles of cylindrical grinding process. In what way centreless process is more advantageous than cylindrical grinding process.	[6]
Q.6(a)	Why unconventional machining processes are used?	[2]
Q.6(b)	Calculate the tailstock offset required to turn a 1:30 taper X 60 mm long on a work piece 300 mm long. The small diameter of the tapered section is 20 mm.	[4]
Q.6(c)	Explain principle of Ultrasonic machining with neat sketch.	[6]
Q.7	Write short notes on following:	
Q.7(a)	Gear Hobbing	[4]
Q.7(b)	Gear Shaping	[4]
Q.7(b)	Milling machine operations	[4]

*******01/05/17******M**