Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, April / May 2025

Manufacturing

III Semester

MF5301 – MACHINING TECHNOLOGY

(Regulation 2019)

Time: 3 hrs | Max. Marks: 100

CO 1	Understand the basics of metal cutting theory and its importance in the manufacturing.
CO 2	Understand the different types of machine tools and the operations that can be carried out by them and their applications in machining of components.
CO 3	Distinguish abrasive processes from tool based metal removal processes and apply them to improve the surface roughness and dimensional accuracy.
CO 4	Design and develop suitable Jigs and Fixtures for different machining operations and apply their principles taking few example case studies.
CO 5	Test the machine tools for evaluating their machining performance and understand the semi-automated machine tools to apply for mass production.

BL – Bloom's Taxonomy Levels

(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analyzing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	What are the causes of cutting temperature during machining?	2	CO 1	L2
2	What is the significance of Merchant's Circle Diagram?	2	CO 1	L2
3	How is a drilling machine specified?	2	CO 2	L2
4	Give the comparison between planer, shaper and slotter machines.	2	CO 2	L1
5	Define precision grinding.	2	CO 3	L1
6	What are the grinding wheel parameters that influence the grinding performance?	2	CO 3	L1
7	Define 3-2-1 principle of location.	2	CO 4	L1
8	What is the role of a Drill bush in Jig?	2	CO 4	L2
9	Define chatter in machining.	2	CO 5	L1
10	Mention any two advantages of a capstan lathe.	2	CO 5	L2

PART- B (5 x 13 = 65 Marks)

Q. No.	Questions	Marks	CO	BL
11 (a)	Examine the properties and different types of cutting fluids used in machining process.	13	CO1	L3
	OR			

11 (b)	Explain the geometry of a single point cutting tool of ORS system and describe the significance of each tool angle.	13	CO1	L3
12 (a)	Draw the block diagram of a horizontal milling machine and explain its various parts.	13	CO2	L2
	OR			
12 (b)	Illustrate taper turning operation in a lathe by a taper turning attachment.	13	CO2	L2
13 (a)	Analyze and compare the working principles and applications of honing, lapping, and superfinishing.	13	CO3	L3
	OR			
13 (b)	Evaluate the selection criteria for grinding wheels in terms of work material, desired surface finish, and productivity.	13	CO3	L3
14 a)	What are the essential factors to be considered while designing the clamping system in jigs and fixtures? Explain them in detail with neat diagrams.	13	CO4	L3
	OR			
14 (b)	Detail the sequential approach for developing a fixture attachment for a vertical milling machine.	13	CO4	L3
15 (a)	Design a process layout for a multi-spindle automatic machine to manufacture a stepped shaft with operations like facing, turning, grooving, and drilling. Explain the spindle and feeding mechanism selection.	13	CO5	L4
	OR			
15 (b)	Discuss the role of machine tool structures in controlling deflection and vibration. How do material selection, and damping techniques influence the dynamic stiffness of a machine tool?	13	CO5	L4

PART- C (1 x 15 = 15 Marks)
(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	Design a jig for a component requiring five equally spaced holes on a circular flange. Include considerations for location, clamping, bushing selection, and ease of loading/unloading. Justify your design decisions.	15	CO4	L5