Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Manufacturing Processes **Semester : IV**

Program: B.Tech- Mechanical Engineering **Time : 03 hrs.**

Course Code: MECH2046 **Max. Marks: 100**

Instructions: i. Non-programmable scientific calculator is allowed.
ii. Clearly mention the assumption/standard data used.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Differentiate between conventional and unconventional machining processes.	4	CO1
Q 2	Give a brief classification of welding/joining processes.	4	CO1
Q 3	Explain the different cutting tool materials in detail.	4	CO1
Q 4	Draw and discuss the additive manufacturing process chain.	4	CO2
Q 5	Discuss the water jet machining process.	4	CO1
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Classify permanent mould casting processes. Make a sketch and explain in detail the cold chamber die-casting process.	10	CO1
Q 7	Sketch and explain the different zones of the welding ARC column in detail.	10	CO2
Q 8	In a sheet metal of 2 mm thickness, a hole of 10 mm diameter needs to be punched. The yield strength in tension of the sheet material is 100 MPa and its ultimate shear strength is 80 MPa. Calculate the force required to punch the hole (in kN).	10	CO3
Q 9	Draw a single-point cutting tool in the different views and define the various angles associated with it.	10	CO2
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Explain the working principle of Abrasive Jet Machining with the help of a schematic diagram.	20	CO2

Q 11	Determine the shear plane angle, cutting force component, and resultant force on the tool for orthogonal cutting of a material with a yield stress of 250 N/mm^2. The following are the machining parameters. Tool rake angle = 15° Uncut chip thickness = 0.25 mm Chip width = 2 mm Chip thickness ratio = 0.46 Angle of friction = 40° **OR** During the turning of a 20 mm diameter steel bar at a spindle speed of 400 rpm, a tool life of 20 minutes is obtained. When the same bar is turned at 200 rpm, the tool life becomes 60 minutes. Assume that Taylor's tool life equation is valid. Calculate the tool life when the bar is turned at 300 rpm.	**20**	**CO3**