Reg. No.																

Question Paper Code	14114

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Sixth Semester

Mechanical and Automation Engineering

20MUPC601 - ADDITIVE MANUFACTURING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Additive Manufacturing primarily refers to: (a) Subtractive machining techniques (b) Layer-by-layer construction of parts (c) Injection molding methods (d) Using CAD to design prototypes	1	K1	CO1
2.	What is the first step in the AM process chain? (a) Layer-by-layer printing (b) CAD model design (c) Surface finishing (d) Assembling components	1	K1	CO1
3.	Why is part orientation important in AM? (a) It ensures proper cooling during manufacturing (b) It minimizes support structure requirements and improves quality (c) It limits the need for CAD adjustments (d) It avoids rasterization error	1	K1	CO2
4.	Which file format is most commonly used for transferring 3D models to AM systems? (a) STL (b) PNG (c) DWG (d) PDF	1	K1	CO2
5.	What type of material is primarily used in SLA 3D printing? (a) Thermoplastic pellets (b) Photopolymer resin (c) Metal powder (d) Nylon filament	1	K1	CO3
6.	What is the energy source used to cure the resin in SLA? (a) Infrared heater (b) Laser beam (c) UV light (d) Extruder	1	K1	CO3
7.	What is the primary energy source in Selective Laser Sintering (SLS)? (a) Electron beam (b) Laser (c) UV light (d) Heated nozzle	1	K1	CO4
8.	Which type of material is most commonly processed using SLM and EBM? (a) Ceramics (b) Polymers (c) Metals and metal alloys (d) Composites	1	K1	CO4
9.	Which of the following is a commonly used material in binder jetting? (a) Liquid resin (b) PLA filament (c) Metal powder (d) Glass sheets	1	K1	CO5
10.	What is the core principle of Laminated Object Manufacturing (LOM)? (a) Laser sintering of powders (b) Layering and bonding sheets of material (c) Jetting binder droplets (d) Melting wires	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Define Additive manufacturing.	2	K1	CO1
12.	How does the pattern differ from the prototype?	2	K1	CO1
13.	List any five different names of Additive manufacturing.	2	K1	CO1
14.	Difference between topology optimization and generative design.	2	K2	CO2
15.	What is an STL file?	2	K1	CO2
16.	Define the Tessellation process.	2	K1	CO2
17.	List down the basic elements of SLA.	2	K1	CO3
18.	Define Fused Deposition Modeling.	2	K1	CO3
19.	What is Powder Bed Fusion?	2	K1	CO4

20.	List down the elements essential for a SLS machine.	*2*	*K1*	*CO4*
21.	Define 3D Printing.	*2*	*K1*	*CO5*
22.	Mention the parameters affecting the 3D printing process.	*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Illustrate the overview of the Additive Manufacturing.	*11*	*K2*	*CO1*
		OR			
	b)	Compare and contrast between Additive Manufacturing and Traditional Manufacturing.	*11*	*K2*	*CO1*
24.	a)	Demonstrate the design considerations of Design for Additive Manufacturing.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the Topology Optimization process.	*11*	*K2*	*CO2*
25.	a)	Summarize the Stereo lithography technique and describe its working with the help of a neat diagram.	*11*	*K2*	*CO3*
		OR			
	b)	Elaborate the working principle and process parameters of Digital Laser Processing.	*11*	*K2*	*CO3*
26.	a)	Construct the working principle and process parameters of Selective Laser Sintering (SLS). Summarize its advantages and disadvantages.	*11*	*K3*	*CO4*
		OR			
	b)	Build the working principle and process parameters of an Electron Beam Melting (EBM). Write the advantages and disadvantages of EBM.	*11*	*K3*	*CO4*
27.	a)	Apply the working principle of Three Dimensional Printing (3DP) with its process parameters and its applications.	*11*	*K3*	*CO5*
		OR			
	b)	Select and compare the SLA and Material Jetting Process.	*11*	*K3*	*CO5*
28.	a)	Explain the need and development of Additive Manufacturing.	*11*	*K2*	*CO1*
		OR			
	b)	Discuss the applications of Additive Manufacturing in Bio Printing and Food Printing sectors.	*11*	*K2*	*CO1*