Reg. No.												

Question Paper Code	11601

M.E - DEGREE EXAMINATIONS, NOV/DEC 2022

Third Semester

M.E - CAD/CAM

20PCDEL305 - ADDITIVE MANUFACTURING

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	What is the need for a support structure in additive manufacturing?	2,K1,CO1
2.	Name any four 3D printing companies for printing polymers.	2,K1,CO1
3.	What is data interfacing?	2,K2,CO2
4.	Define tessellation.	2,K1,CO2
5.	Define photo polymerization.	2,K3,CO3
6.	Why SLA is a good process to use to fabricate patterns for investment casting of metal parts?	2,K2,CO3
7.	Why the support structures are not generally required in the powder bed fusion process?	2,K2,CO4
8.	What are the laser parameters that affect the Laser-engineered net shaping (LENS) process?	2,K2,CO4
9.	Which material among the following is difficult to process in powder form? Justify your answer. A) Co-Cr-MO B) Gold C) Ti alloys D) Nickel alloys	2,K2,CO5
10.	What is the working principle of Ballistic Particle Manufacturing (BPM)?	2,K1,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Explain in detail the steps involved in the generic additive manufacturing process with neat sketches.	13,K2,CO1
		OR	
	b)	Explain in detail the various additive manufacturing process. Also, give the benefits and the applications of all the processes.	13,K2,CO1
12.	a)	Explain in detail the support generation and support structure design for a polymer-based additive manufacturing process.	13,K2,CO2
		OR	

b) Explain elaborately the data processing of rapid prototyping techniques. *13,K2,CO2*

13. a) Explain the resin formulation in terms of photoinitiator system, monomer formulation and interpenetrating polymer network formulation. *13,K2,CO3*

OR

b) Explain the working principle of Laminated Object Manufacturing (LOM) with a clean sketch. Briefly discuss its advantages and limitations. *13,K2,CO3*

14. a) Explain the various powder bed fusion mechanisms for selective laser sintering. *13,K2,CO4*

OR

b) Explain elaborately the Laser-engineered net shaping (LENS) process with a neat sketch. What are the materials that can be made by the LENS process? *13,K2,CO4*

15. a) Discuss the strength and weaknesses of solid-based, liquid-based and powder-based additive manufacturing processes. *13,K2,CO5*

OR

b) Discuss the difference between Selective laser melting (SLM) and Electron beam melting (EBM) with a neat sketch. Why Titanium alloys are mostly printed using the EBM technique? *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Distinguish between additive and subtractive manufacturing processes. What are the steps in your opinion that should be incorporated by manufacturers to make the additive manufacturing process more successful than subtractive manufacturing? *15,K2,CO1*

OR

b) Elaborate on the various thermal techniques for the post-processing of additive manufacturing parts. *15,K2,CO4*