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## Galgotias College of Engineering and Technology, Greater Noida

### Pre University Test (PUT) : Odd Semester 2024 - 2025

Course/Branch : B. Tech / ME Semester : VII (7<sup>th</sup>)  
 Subject Name : Additive Manufacturing Max. Marks : 100  
 Subject Code : KME071 Time : 180 min

CO-1 : Understand the basics of additive manufacturing/rapid prototyping and its advantages and disadvantages (K2)  
 CO-2 : Understand the role of additive manufacturing in the design process and the implications for design. (K2)  
 CO-3 : Understand the processes used in additive manufacturing for a range of materials and applications. (K2)  
 CO-4 : Understand the various software tools, processes and techniques that enable advanced / additive manufacturing and personal fabrication. (K2)  
 CO-5 : Apply knowledge of additive manufacturing for various real-life Applications. (K3)

#### Section – A # 20 Marks (Short Answer Type Questions)

Attempt **ALL** the questions. Each Question is of 2 marks (10 x 2 = 20 marks)

Q. No.	COx	Question Description # Attempt <b>ALL</b> the questions. Each Question is of 2 marks	
1	a	CO1 Highlight the drawbacks of additive manufacturing when compared to traditional manufacturing methods. (K2)	
	b	CO1 Define additive manufacturing and describe one key advantage it offers. (K2)	
	c	CO2 What is the concept of Design for Additive Manufacturing (DFAM)? (K2)	
	d	CO2 Explain how additive manufacturing impacts the product design process. (K2)	
	e	CO3 Compare the powder bed fusion process with the material extrusion process. (K2)	
	f	CO3 Name two types of additive manufacturing technologies and mention their applications. (K2)	
	g	CO4 Identify two software tools commonly used in additive manufacturing and their purposes. (K2)	
	h	CO4 What are the challenges associated with the STL file format in additive manufacturing? (K2)	
	i	CO5 Explain the role of additive manufacturing in producing personalized prosthetic devices. (K3)	
	j	CO5 Provide an example of how additive manufacturing is applied in the aerospace sector. (K3)	

#### Section – B # 30 Marks (Medium / Long Answer Type Questions)

Attempt **ALL** the questions. Each Question is of 6 marks (5 x 6 = 30 marks)

**Q.2 (CO-1): a.** Highlight the environmental benefits of additive manufacturing compared to conventional production methods.

**OR**

**b.** Trace the historical development of additive manufacturing and its impact on modern manufacturing.

**Q.3 (CO-2): a.** Identify the key design principles essential for producing intricate geometries using AM technologies.

**OR**

**b.** Explain how additive manufacturing facilitates innovation in product design and development.

**Q.4 (CO-3): a.** Provide a detailed explanation of the powder bed fusion process, including its steps and applications.

**OR**

**b.** Elaborate on the working mechanism of VAT photopolymerization and describe its common uses.

**Q.5 (CO-4): a.** Analyze the significance of the STL file format in the AM process and how it can improve manufacturing outcomes.

**OR**

**b.** Discuss the preparation steps and challenges involved in creating CAD models for additive manufacturing.

**Q.6 (CO-5): a.** Examine the contributions of additive manufacturing to advancements in architectural engineering.

**OR**

**b.** Describe how additive manufacturing has transformed prototyping processes in the automotive industry.

#### Section – C # 50 Marks (Medium / Long Answer Type Questions)

Attempt **ALL** the questions. Each Question is of 10 marks.

**Q.7 (CO-1):** Attempt any **TWO** questions. Each question is of 5 marks. (2 x 5 = 10 marks)

**a.** Discuss the opportunities and obstacles in scaling up additive manufacturing for mass production.

**b.** Compare the material efficiency and waste generation in additive manufacturing versus CNC machining.

**c.** Analyze the constraints of additive manufacturing in terms of material properties and build time.

**Q.8 (CO-2):** Attempt any **TWO** questions. Each question is of 5 marks. (2 x 5 = 10 marks)

**a.** Explore the cost-saving potential of Design for Additive Manufacturing (DFAM) in industrial applications.

**b.** Explain how additive manufacturing supports mass customization in modern industries.

**c.** Discuss how layer-by-layer fabrication influences the mechanical properties of AM-produced parts.

**Q.9 (CO-3):** Attempt any **TWO** questions. Each question is of 5 marks. (2 x 5 = 10 marks)

**a.** Compare the features and applications of binder jetting and material jetting techniques.

**b.** Explain the critical process parameters in powder bed

fusion and their influence on output quality.

**c.** Illustrate the working principles of extrusion-based AM systems and highlight their applications in healthcare.

**Q.10 (CO-4):** Attempt any **TWO** questions. Each question is of 5 marks. (2 x 5 = 10 marks)

**a.** Explain the significance of topology optimization in achieving efficient and sustainable designs through AM.

**b.** Discuss the challenges encountered in generating STL files and suggest methods for addressing them.

**c.** Highlight the advanced software functionalities that enhance simulation and optimization in additive manufacturing.

**Q.11 (CO-5):** Attempt any **TWO** questions. Each question is of 5 marks. (2 x 5 = 10 marks)

**a.** Explore how AM has been utilized to create intricate and functional models for architectural purposes.

**b.** Investigate the role of additive manufacturing in expediting the prototyping of consumer electronic devices.

**c.** Analyze the impact of additive manufacturing on the production of lightweight components in the aerospace sector.