Code No: **R204103P** **R20** **Set No. 1**

IV B.Tech I Semester Regular Examinations, January – 2024

ADDITIVE MANUFACTURING

(PE-V: Mechanical Engineering and OE-III for Other Branches)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

*****

UNIT - I

1	a)	Why is additive manufacturing important? Explain the classification of additive manufacturing systems.	[7]
	b)	What is photopolymerization? Explain the VAT polymerization process with neat sketch.	[7]
		(OR)	
2	a)	Discuss the desirable features of Stereolithography resin? What are the advantages and disadvantages of SLA?	[7]
	b)	Define additive manufacturing. Explain the basic methodology involved in it.	[7]
		UNIT - II	
3	a)	Explain in detail about laminated object manufacturing and its applications.	[7]
	b)	What are the applications of FDM models? Give an example.	[7]
		(OR)	
4	a)	Explain the working principle and details of process parameters of an FDM machine.	[7]
	b)	What are the merits and demerits of LOM?	[7]
		UNIT - III	
5	a)	Explain how SLS process can be used to produce direct and in-direct prototypes.	[7]
	b)	Explain in detail about process details and machine details of 3D printing.	[7]
		(OR)	
6	a)	NC machining is often referred to as a 2.5D process. What does this mean? Why might it not be regarded as fully 3D?	[7]
	b)	Explain the working principle of three-dimensional printing along with its advantages.	[7]
		UNIT - IV	
7	a)	Compare Rapid tooling with Conventional tooling.	[7]
	b)	Explain various steps involved in production of inserts using 3D Keltool process.	[7]
		(OR)	
8	a)	Discuss the need of Rapid Tooling in manufacturing industry nowadays.	[7]
	b)	Explain the process of Room Temperature Vulcanizing (RTV) epoxy tooling with neat sketches.	[7]
		UNIT - V	
9	a)	List out newly proposed RP data formats and explain about any one of them.	[7]
	b)	Briefly explain application of RP systems in Bio-medical engineering.	[7]
		(OR)	
10	a)	Discuss the advantages and disadvantages of STL file format.	[7]
	b)	Briefly explain application of RP systems in engineering industry.	[7]

Code No: **R204103P** **R20** **Set No. 2**

IV B.Tech I Semester Regular Examinations, January – 2024

ADDITIVE MANUFACTURING

(PE-V: Mechanical Engineering and OE-III for Other Branches)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

*****

UNIT - I

1	a)	With neat sketches explain solid ground curing process and its advantages.	[7]
	b)	Discuss the role of Computer Aided Design technology in the development of additive manufacturing processes.	[7]
		(OR)	
2	a)	What are the various resulting perspectives of AM? Discuss them briefly.	[7]
	b)	Describe the laser and laser scanning importance in liquid based RP systems.	[7]

UNIT - II

3	a)	What are the materials suitable for FDM process? Discuss them.	[7]
	b)	Distinguish the following process: FDM and LOM.	[7]
		(OR)	
4	a)	Describe the factors influencing accuracy in FDM process.	[7]
	b)	Describe the characteristics of the materials used for LOM process.	[7]

UNIT - III

5	a)	Differentiate between Selective Laser Sintering and 3D printing process.	[7]
	b)	Describe the requirements of various materials used for SLS process.	[7]
		(OR)	
6	a)	List out the merits and demerits of 3D printing over other additive manufacturing processes.	[7]
	b)	In detail explain about process details and machine details of SLS.	[7]

UNIT - IV

7	a)	Explain the classification of Rapid Tooling process. Also list the limitations of Rapid Tooling.	[7]
	b)	Explain about Spray metal tooling and Vacuum casting.	[7]
		(OR)	
8	a)	Differentiate between the terms direct RT and Indirect RT.	[7]
	b)	Explain Direct AIM process.	[7]

UNIT - V

9	a)	What are common STL file problems? Explain any two of them.	[7]
	b)	Discuss the significance of RP in planning of complex surgeries.	[7]
		(OR)	
10	a)	Explain about View Expert software in detail.	[7]
	b)	Discuss the application of Rapid prototyping in the aerospace industry with examples.	[7]

Code No: **R204103P** **R20** **Set No. 3**

IV B.Tech I Semester Regular Examinations, January – 2024

ADDITIVE MANUFACTURING

(PE-V: Mechanical Engineering and OE-III for Other Branches)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

*****

UNIT - I

1	a)	What are the engineering design rules for AM? Explain their effect.	[7]
	b)	Summarize the factors to be considered in implementing AM processes in manufacturing.	[7]
		(OR)	
2	a)	Explain the process details on the quality of product in SLA.	[7]
	b)	Is Rapid Prototyping is considered as 3Dprinting? Justify your answer.	[7]

UNIT - II

3	a)	Describe the mechanical properties of the materials used for LOM process.	[7]
	b)	Explain the factors to be considered in selecting materials used for FDM process.	[7]
		(OR)	
4	a)	Explain the path generation in fusion decomposition modelling (FDM).	[7]
	b)	Describe the advantages, disadvantages and applications of Laminated object manufacturing process.	[7]

UNIT - III

5	a)	Discuss clearly about the different types of materials used for 3D printing and also state their respective applications.	[7]
	b)	List out technical specifications of SLSmachine.	[7]
		(OR)	
6	a)	Enumerate the basic process and capabilities of SLS process.	[7]
	b)	Compare FDM with SLS with suitable reasons.	[7]

UNIT - IV

7	a)	Describe the spray metal deposition method with a neat sketch.	[7]
	b)	Describe the various steps involved in ceramic tooling process.	[7]
		(OR)	
8	a)	List out the various indirect rapid tooling methods and explain about the siliconrubber tooling.	[7]
	b)	Explain how vacuum casting is important with reference to Rapid tooling?	[7]

UNIT - V

9	a)	Describe the importance of Magic software used in Rapid prototyping.	[7]
	b)	Discuss the application of Rapid prototyping in the automotive industry with examples.	[7]
		(OR)	
10	a)	Explain briefly about the Rapid Prototyping software used in medical field.	[7]
	b)	Identify and explain the important applications of RP systems in the field of Forensic.	[7]

|'''|'|'|''||'''||||

Code No: **R204103P** **R20** **Set No. 4**

IV B.Tech I Semester Regular Examinations, January – 2024

ADDITIVE MANUFACTURING

(PE-V: Mechanical Engineering and OE-III for Other Branches)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE Questions
ONE Question from Each unit
All Questions Carry Equal Marks

*****

UNIT - I

1	a)	Describe the classification of RP process with neat flow chart.	[7]
	b)	Why is additive manufacturing important? Explain the reasons.	[7]
		(OR)	
2	a)	Define the term layer-based manufacturing. Enumerate the differences between model and prototype.	[7]
	b)	What is compression engineering? Describe its importance in AM process.	[7]

UNIT - II

3	a)	Discuss clearly about the different types of materials used for FDM and also state theirrespective applications.	[7]
	b)	List out technical and process specifications of LOMmachine.	[7]
		(OR)	
4	a)	Describe laminated object manufacturing process and discuss the principle and effect of process parameters on qualities of final product.	[7]
	b)	What are the various LOM materials and their typical applications?	[7]

UNIT - III

5	a)	Explain how the process of SLS is different from LOM. List out its advantages and disadvantages.	[7]
	b)	Distinguish the following process: FDM, LOM, SGC and SLS.	[7]
		(OR)	
6	a)	List and describe the effect of process parameters in SLS process?	[7]
	b)	Describe the 3D printing process with a case study.	[7]

UNIT - IV

7	a)	Explainthe Sand-casting tooling and Laminate toolingmethods.	[7]
	b)	Describe the role of direct methods of rapid tool production. What are itslimitations?	[7]
		(OR)	
8	a)	List out the differences between diecasting and sand-casting methods of tooling.	[7]
	b)	Summarise the need of rapid tooling in manufacturing components.	[7]

UNIT - V

9	a)	Discuss the importance of Mimics software in Rapid prototyping.	[7]
	b)	Explain the application of RP with respect to ―Scaling, Form and Fit in engineering analysis and planning.	[7]
		(OR)	
10	a)	Explain briefly about the importance of RP software used.	[7]
	b)	Explain the significant role of Rapid Prototyping in Jewellery industry?	[7]