

GUJARAT TECHNOLOGICAL UNIVERSITY**BE-MINOR - SEMESTER-IV EXAMINATION – WINTER 2022****Subject Code:114AN01****Date:24-02-2023****Subject Name:Introduction to Additive Manufacturing****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) Define the following:	03
	1. Additive Manufacturing	
	2. Subtractive Manufacturing	
	3. Formative Manufacturing	
	(b) Write possible future growth and opportunities of additive manufacturing in medical field.	04
	(c) Classify various additive manufacturing technologies with basic principle of each.	07
Q.2	(a) Write down advantages of Polyjet 3D printing.	03
	(b) Enlist various materials used in stereo lithography along with its material properties.	04
	(c) Explain Solid Object Ultraviolet-laser Printer (SOUP) in detail with neat sketch.	07
OR		
	(c) Write principle and working of Stereo lithography Apparatus (SLA).	07
Q.3	(a) What is Colourjet Printing (CJP)?	03
	(b) Explain process parameters of SLS.	04
	(c) Explain basic principle and working of Selective Laser Sintering (SLS) with neat sketch.	07
OR		
Q.3	(a) Enlist various powder based additive manufacturing processes.	03
	(b) Write materials used in EBM method with its properties and also write applications of EBM method.	04
	(c) Explain Laser Engineered Net Shaping (LENS).	07
Q.4	(a) Write the causes of any three FDM defects shown below.	03
	1. Layer shifting	
	2. Warping	
	3. Cracking (delamination)	
	4. Stringing	
	(b) Write applications of FDM.	04
	(c) Explain steps involved in 3D printing process.	07
OR		
Q.4	(a) What are the types of supports used in 3D printing?	03
	(b) Justify the following:	04
	1. Selective laser sintering does not require support structures.	
	2. Large surfaces, tiny holes are difficult to manufacture accurately using SLS.	

- (c) Explain process parameters of FDM in brief. **07**
- Q.5** (a) Enlist main process parameters that significantly influences sintered parts in SLS method. **03**
- (b) Compare and write benefits and drawbacks of FDM and LOM. **04**
- (c) Explain Laminated Object Manufacturing (LOM) with neat sketch. **07**
- OR**
- Q.5** (a) What is post processing in 3D printing? **03**
- (b) Enlist various thermoplastic materials used in FDM along with its properties. **04**
- (c) Explain basic principle and working of Fused Deposition Modeling process (FDM). **07**