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Code No. : 42422 A

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Mech. Engg.) IV Year II-Semester Main Examinations, May-2019

Additive Manufacturing Technologies

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Q.No.	Stem of the question	M	L	CO	PO
Part-A (10 × 2 = 20 Marks)					
1.	What are the three aspects of interest in describing a prototype?	2	1	1	1
2.	Classify AM processes based on the initial form of raw material.	2	1	1	1
3.	What do you mean by post-curing?	2	1	2	1
4.	What is the principle of SLA process?	2	1	2	1
5.	Discuss the pre-processing in LOM process.	2	1	3	1
6.	What are the strengths of FDM technology?	2	1	3	1
7.	Compare selective laser sintering (SLS) process with powder metallurgy sintering.	2	1	4	1
8.	What are the limitations of 3-Dimensional Printing process?	2	1	4	1
9.	Distinguish between direct and indirect tooling methods.	2	1	5	1
10.	What do you mean by organ-printing?	2	1	5	1
Part-B (5 × 10 = 50 Marks)					
11. a)	What is Rapid Prototyping? Discuss the four areas on which the development of Rapid prototyping depends?	5	1	1	1
b)	Distinguish cleaning, post-curing and finishing which are the various tasks of postprocessing. Name two AM processes that do not require post-curing and one that does not require cleaning.	5	1	1	4
12. a)	State and explain the process flow of the Cubital's Solid Ground Curing (SGC) process.	5	2	2	1
b)	How investment casting parts can be made using following? (i) 3D System's SLA (ii) Cubital's SGC system	5	3	2	4
13. a)	State and explain the critical factors that will influence the performance and function of the following systems: (i) Cubic's LOM (ii) Stratasys's FDM	6	5	3	1
b)	What are the advantages and disadvantages of solid-based systems compared with liquid-based systems?	4	1	3	1
14. a)	Using a sketch to illustrate your answer, describe the Selective Laser Sintering (SLS) process.	6	1	4	1
b)	Discuss the advantages and disadvantages of powder-based AM systems compared with: (i) Liquid-based AM systems (ii) Solid-based AM systems	4	3	4	4
15. a)	List the types of industries that AM can be used. Explain any two specific industrial applications.	4	3	5	1
b)	Compare and contrast the use of AM patterns for the following: (i) casting of die inserts (ii) sand casting	6	3	5	4

Contd... 2

16. a)	Each one of the following manufacturing processes in the below Table belongs to one of the three basic types of fabricators. Tick under the column if you think it belongs to that category.	5	2	1	4																														
	<table border="1"> <thead> <tr> <th>S. No.</th> <th>Manufacturing Process</th> <th>Subtractive</th> <th>Additive</th> <th>Formative</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CNC milling</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Injection moulding</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>FDM</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>CNC nibbling</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>Press working</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	S. No.	Manufacturing Process	Subtractive	Additive	Formative	1	CNC milling				2	Injection moulding				3	FDM				4	CNC nibbling				5	Press working							
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	b) How do you generate mask in SGC process? Explain its applications.	5	2	2	1																														
17.	Answer any <i>two</i> of the following:																																		
	a) In the LOM systems, what do you think are the factors that limit the work volume of the systems?	5	5	3	4																														
	b) Describe the purpose of various hardware components in Sinterstation Pro SLS system.	5	3	4	1																														
	c) How AM technology is helpful in GIS data?	5	1	5	4																														

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	63
2	Knowledge on application and analysis (Level-3 & 4)	25
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	12

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