Hall Ticket Number:

Code No. : 17555 (A) N/O

R-20

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (Mech. Engg.) VII-Semester Main & Backlog Examinations, Dec.-23/Jan.-24

Additive Manufacturing Technologies (PE-IV)

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Which step in the entire AM process chain (1. 3D Modelling, 2. Data conversion and transmission, 3. Checking and preparing, 4. Building, 5. Post processing) is, in your opinion, (i) shortest? (ii) most tedious? (iii) most automated? (iv) time consuming?	2	2	1	2
2.	Give the classification of AM processes as per the ASTM F42 Committee.	2	3	1	2
3.	What is the relevance of post-curing in SLA process?	2	2	2	2
4.	Why SLS powders are coated with low-melting materials?	2	3	2	1
5.	STL files are simplest among all other AM data formats. Is this a fair statement to make? Justify.	2	2	3	2
6.	Is hot isostatic pressing (HIP) AM post processing technique? Justify.	2	3	3	1
7.	Distinguish between soft and hard tooling methods.	2	2	4	1
8.	What is Direct AIM tooling process?	2	1	4	1
9.	What are the typical AM applications in analysis and planning?	2	1	5	2
10.	Why is AM popular within the medical industry?	2	2	5	2
	Part-B (5 × 8 = 40 Marks)				
11. a)	List out the commonly used AM data formats. Describe any one data format.	3	3	1	1
b)	Describe the historical development of Rapid Prototyping and its related technologies.	5	1	1	1
12. a)	Which of the following system produce more wastage. Justify your answer. i) Cubic's LOM ii) Stratasys's FDM system	4	3	2	6
b)	Discuss the advantages and disadvantages of powder-based AM systems compared with: i) Solid-based AM systems ii) Liquid-based AM systems	4	1	2	2

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13. a)	List and describe at least three problems that are encountered with STL files. Suggest the corrective methods. Name some software tools which can be used to over come these kinds of problems.	4	1	3	1
b)	Explain any one of the AM post processing technique for the following: i) accuracy improvement ii) surface texture improvement	4	2	3	2
14. a)	Compare and contrast the use of AM patterns for the following: i) casting of die inserts ii) sand casting iii) investment casting	4	2	4	5
b)	What are the ways the AM pattern can be used to create the injection mold for plastic parts? Briefly describe the processes.	4	2	4	5
15. a)	Explain whether AM technology is more suitable for "high technology" industries like aerospace than it is for consumer products industries like electronic appliances. Give examples to substantiate your answer.	4	3	5	5
b)	Describe how AM can be used for design and production of medical devices. Use appropriate examples to illustrate your answer.	4	2	5	5
16. a)	What is your favourite term (Additive Manufacturing, 3D Printing & Rapid Prototyping) for describing this technology and why?	4	3	1	1
b)	Explain how 3D Printing colour printer manufactures multi-colored parts. How do colourized prototypes add value to the AM part?	4	4	2	2
17.	Answer any ***two*** of the following:				
a)	STL files does not consists of material and topology information. Is this a fair statement to make? Justify your answer.	4	4	3	2
b)	Explain how an AM pattern can be used for vacuum casting with silicon moulding. Use appropriate examples to illustrate your answer.	4	1	4	1
c)	How AM technology helpful in arts and architecture applications?	4	3	5	5

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	47.5%

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