

Reg. No. :

Question Paper Code : 10880

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023

Second Semester

Manufacturing Engineering

MF 4204 – ADDITIVE MANUFACTURING

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. 'Can rapid prototyping be termed as additive manufacturing?'- justify your answer.
2. State any four benefits of additive manufacturing.
3. What is a Bezier curve?
4. Why do we require slicing in additive manufacturing?
5. Recoating is not easier using stereolithography process- why?
6. List the critical process variables of Fused deposition modelling.
7. 'Is scanning speed a process parameter in Selective Laser Centering?'- Justify your answer.
8. State the advantage of sintering over 'melting and fusing' of powders.
9. Mention any four limitations of Three-dimensional Printing.
10. State the working principle of Ballistic Particle Manufacturing process.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss the role of prototypes in product development process. (7)
(ii) Citing an example, brief on virtual prototyping. (6)

Or

- (b) With a neat sketch, elaborate on Process chain of Rapid prototyping process.
12. (a) With neat sketches, explain any one type of contact and one type of non-contact and 3D digitization technique.

Or

- (b) With suitable examples, explain the significance of part orientation and support generation in layered manufacturing.
13. (a) Illustrate the construction of a Stereolithography (SLA) apparatus. Highlight on the part-building and post-build processes with respect to SLA. (8 + 5)

Or

- (b) Describe the data preparation, mask generation and model making steps in Solid Ground Curing (SGC) process.
14. (a) Describe the method of producing metal-polymer composites using indirect Selective Laser (SLS) process. Also, brief on post processing of SLS parts. (10 +3)

Or

- (b) Illustrate how fully dense parts with no compositional degradation can be manufactured using Laser Engineered Net Shaping (LENS) process.
15. (a) With neat sketches, explain the principle of producing parts using Three-dimensional Printing (3DP). Brief on the process capabilities of 3DP. (8+5)

Or

- (b) Explain how it is possible to use different materials within the same part in Shape Deposition Manufacturing (SDM) process.

PART C — (1 × 15 = 15 marks)

16. (a) A castle made of paper (Fig.16a) is to be made for an exhibition. Explain the procedure to produce the castle using Laminated Object Manufacturing (LoM) technique. List the advantages and limitations of LoM. (12 + 3)

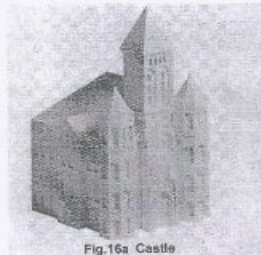


Fig.16a Castle

Or

- (b) A part as shown in Fig.16b is to be manufactured using titanium alloy powder. Explain the manufacture of part using Electron beam melting process. State the advantages and limitations of the process. (12 + 3)



Fig 16b. Part made of titanium alloy