

**IV B.Tech I Semester Supplementary Examinations, February- 2020****ADDITIVE MANUFACTURING****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B*

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**PART-A (14 Marks)**

1. a) List the different materials used in manufacturing of products in SLA technique. [2]
- b) State any two limitations of laminated object manufacturing. [2]
- c) What affects the dimensional accuracy in powder-based Rapid Prototyping Systems? [2]
- d) State classification of rapid tooling. [3]
- e) Write any two differences between Magics and 3 Data Expert. [2]
- f) How does aerospace technology make use of rapid tooling applications? [3]

**PART-B (4x14 = 56 Marks)**

2. a) Classify rapid prototyping process. [5]
- b) Explain the working of Stereo Lithography apparatus. Write the advantages and applications of Stereo Lithography. [9]
3. a) Narrate Laminated Object manufacturing in detail with a neat sketch. [7]
- b) Discuss on any four types of materials, their applications and the processes in which they are used. [7]
4. a) Explain with a neat sketch the working principle of Selective Laser Sintering process. [7]
- b) Elaborate the principle and working of 3D printing with diagram. [7]
5. a) Discuss the process of making a rapid tool for die casting. Assume your own example as product. [7]
- b) What is Rapid Tooling? How is it different from conventional tooling? [7]
6. a) Discuss about rapid prototyping data formats. [7]
- b) State the applications of MIMICS in RP. [7]
7. a) Explain with an example the application of rapid prototyping in automotive industry. [7]
- b) Write notes on the any three of the applications of RP&T in the following fields : [7]
  - (i) Coin industry
  - (ii) Bioengineering applications
  - (iii) Electronic industries
  - (iv) Aerospace industry



Code No: R164103C

**R16**

**Set No. 1**

**IV B.Tech I Semester Supplementary Examinations, July/Aug - 2021**

**ADDITIVE MANUFACTURING**

**(Mechanical Engineering)**

**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

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**PART-A (14 Marks)**

1. a) Write any two applications in liquid based RP processes. [2]
- b) List the different materials which may be used in FDM machine [2]
- c) List the specifications 3 dimensional printing (3DP) machine. [3]
- d) Define direct AIM. [2]
- e) Define tessellation. [2]
- f) Explain the application of RP in jewelry industry with a case study. [3]

**PART-B (4x14 = 56 Marks)**

2. a) What is rapid prototyping? Give its advantages and limitations. [8]
- b) Discuss about photo polymerization. [6]
3. a) Explain with a neat sketch the working principle of FDM process. [7]
- b) Briefly discuss about the Laminated Object Manufacturing (LOM) operation and its materials. [7]
4. a) Briefly explain the principle and process details in Selective Laser Sintering (SLS) and its applications with neat sketch. [7]
- b) With a neat sketch, explain different steps involved in fabrication of model using 3D printing process. [7]
5. a) Discuss EOS direct tool process. [7]
- b) Describe the role of indirect methods of rapid tool production. What are its limitations? [7]
6. Write short notes on following: [14]
  - (i) part building errors
  - (ii) Errors in STL files
  - (iii) Features of Mimics software
7. a) Discuss with a case study in medical application. [7]
- b) Describe how reverse engineering will be applied to rapid prototyping techniques. [7]

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**R16**

**Set No. 1**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**ADDITIVE MANUFACTURING**

**(Mechanical Engineering)**

**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

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**PART-A (14 Marks)**

1. a) Define prototype. What is its need? [2]
- b) What is solid based RP? [3]
- c) Write any two applications of SLS? [2]
- d) What is indirect Rapid Tooling? [2]
- e) Name various RP softwares. [3]
- f) Write the applications of RP in automotive industry. [2]

**PART-B (4x14 = 56 Marks)**

2. a) Explain the historical development of Rapid Prototyping. [7]
- b) How liquid based RP differs from that of powder based RP? [7]
3. a) Explain the sequential steps involved in LOM process. [7]
- b) Write the case studies of FDM process. [7]
4. a) Discuss the materials used in SLS process? [7]
- b) What are the applications of 3D printing? [7]
5. a) Explain the process of 3D keltool in brief. [7]
- b) Write and explain about EOS direct tool process? [7]
6. a) How the problem of "MISSING FACETS" is solved using generic solution? [7]
- b) Explain various features of Mimics and View expert. [7]
7. a) Write the applications of RP in engineering. [7]
- b) Write the applications of additive manufacturing in forensic and anthropology. [7]

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**R16**

**Set No. 2**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**ADDITIVE MANUFACTURING**

**(Mechanical Engineering)**

**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

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**PART-A (14 Marks)**

1. a) Why RP is called as additive manufacturing? [2]
- b) What is LOM? [2]
- c) How SLS differs from 3D printing? [3]
- d) What is direct rapid tooling? [2]
- e) What are the general errors that usually generate in STL? [3]
- f) Write any two applications of RP in coin industry. [2]

**PART-B (4x14 = 56 Marks)**

2. a) Explain the fundamentals of rapid prototyping? [7]
- b) What are the advantages and limitations of SLA? Explain in brief. [7]
3. a) Write the applications of LOM. [7]
- b) Explain the principle of FDM and what are the materials used in FDM process? [7]
4. a) What are the major applications of SLS? [7]
- b) What are the advantages and limitations of 3DP? [7]
5. a) What is RT? What is the need of RT in additive manufacturing? [7]
- b) Explain the process of direct metal tooling using 3DP [7]
6. a) Write about STL file formats. [7]
- b) Explain about 3D view, velocity 2 and 3D doctor. [7]
7. How RP is applied in  
(i) arts and architecture  
(ii) visualization of bimolecular  
(iii) GIS application [14]

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**R16**

**Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021

**ADDITIVE MANUFACTURING**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

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**PART-A** (14 Marks)

1. a) What is virtual or soft prototyping? [2]
- b) Write any two differences between LOM and SLA? [3]
- c) What is powder based RP? [3]
- d) Name some indirect rapid tooling techniques. [2]
- e) What is generic solution in STL problems? [2]
- f) Write any two applications of RP in analysis planning. [2]

**PART-B** (4x14 = 56 Marks)

2. a) Write the direct and indirect benefits of RP? [7]
- b) Explain the principle behind SLA process in brief. [7]
3. a) What are the advantages and limitations of LOM? [7]
- b) Explain the process of FDM with two applications. [7]
4. a) Explain the principle of SLS in brief. [7]
- b) Write the specifications of 3DP and write a case study of 3DP? [7]
5. a) Write any seven differences between conventional tooling and rapid tooling? [7]
- b) What is DTM rapid tooling process? Explain. [7]
6. a) What are newly proposed data formats in RP? [7]
- b) Explain the Rhino, STL view 3Data expert softwares. [7]
7. a) Write the applications of additive manufacturing in following industries  
(i) automotive industry  
(ii) customized implant and prosthesis [7]
- b) Write the applications of RP in following industries  
(i) aerospace industry  
(ii) simulation of complex surgeries [7]

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**R16**

**Set No. 4**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**ADDITIVE MANUFACTURING**

**(Mechanical Engineering)**

**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

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**PART-A (14 Marks)**

1. a) What is photo polymerization? [3]
- b) Write any two applications of FDM. [2]
- c) Why is 3DP most trending RP in powder based RP? [3]
- d) Name some direct rapid tooling techniques. [2]
- e) Explain 3D doctor software. [2]
- f) Writ any two applications of RP in medical industry. [2]

**PART-B (4x14 = 56 Marks)**

2. a) How the classification of additive manufacturing is done? Explain the classification of RP with a tree diagram. [7]
- b) Explain the process of SLA with a neat sketch. [7]
3. a) What is the principle of LOM? Enumerate? [7]
- b) What are the advantages and applications of FDM process? [7]
4. a) What are the advantages and disadvantages of SLS over other RP processes? [7]
- b) Explain the process of 3DP. [7]
5. a) Explain in brief about spray metal deposition indirect RT process. [7]
- b) Write and explain direct AIM process. [7]
6. a) What are general STL file problems? [7]
- b) What are the features of Magics, solid view? [7]
7. What are the applications of RP in various industries? [14]