

GUJARAT TECHNOLOGICAL UNIVERSITY

BE-7 SEMESTER – OLD PAPER – S22 TO S25 – QUESTION BANK

Subject Name & Code:

Rapid Prototyping- 3171926

Chapter 1: Introduction

Repeated Questions:

1. **Differentiate between Conventional/Traditional Prototyping and Rapid Prototyping.**
 - (Winter 2023 - 04 Marks, Summer 2025 - 03 Marks)
2. **Define/What is Rapid Prototyping? Enlist its advantages.**
 - (Summer 2022 - 03 Marks, Winter 2024 - 03 Marks)
3. **Compare/Differentiate Additive and Subtractive Manufacturing processes.**
 - (Summer 2024 - 03 Marks, Summer 2022 - 04 Marks, Winter 2022 - 03 Marks, Winter 2023 - 03 Marks)
4. **Give the classification of Rapid Manufacturing/Rapid Prototyping processes.**
 - (Summer 2024 - 04 Marks, Winter 2023 - 07 Marks, Summer 2025 - 04 Marks)
5. **Explain the steps/generic process of a typical Rapid Prototyping/Additive Manufacturing process.**
 - (Summer 2022 - 07 Marks, Winter 2024 - 07 Marks)
6. **Briefly explain the need for Rapid Prototyping.**
 - (Summer 2023 - 03 Marks)
7. **Discuss the evolution of RP systems indicating the history and their growth rate.**
 - (Summer 2023 - 04 Marks)

Other Important Questions:

8. Distinction between RP and CNC, other related technologies. (Implied from syllabus, not directly asked as a full question but forms the basis for comparisons).
9. What is Prototyping? (Winter 2024 - Part a of a question)

Chapter 2: CAD Modelling and Data Processing for RP

Repeated Questions:

1. **Describe/Elaborate on the STL file format. Explain its importance in RP.**
 - (Summer 2022 - 03 Marks, Winter 2022 - 04 Marks, Winter 2024 - 03 Marks, Summer 2025 - 07 Marks)
2. **Write the full form of various CAD data formats (STL, IGES, STEP, LEAF, etc.).**
 - (Summer 2023 - 04 Marks, Summer 2024 - 03 Marks, Winter 2023 - 03 Marks)
3. **Why is part orientation important in Rapid Prototyping/3D printing? Explain with examples.**
 - (Summer 2023 - 07 Marks, Summer 2022 - 04 Marks, Summer 2025 - 03 Marks, Winter 2024 - 04 Marks)
4. **Differentiate between Direct/Uniform Slicing and Adaptive Slicing.**
 - (Summer 2024 - 04 Marks, Summer 2022 - 04 Marks, Winter 2023 - 04 Marks, Summer 2025 - 04 Marks)
5. **Explain the validity checks and repair procedures for CAD data/file conversion for RP.**
 - (Summer 2024 - 07 Marks OR, Winter 2023 - 07 Marks OR, Summer 2025 - 07 Marks)
6. **Explain support structure generation and tool path generation.**
 - (Summer 2023 - 07 Marks, Summer 2025 - 07 Marks OR, Winter 2024 - 07 Marks)
7. **Explain slicing of a tessellated CAD model / contour and tool path generation with a flowchart.**
 - (Winter 2022 - 07 Marks, Winter 2024 - 07 Marks)

Other Important Questions:

8. What is Data interfacing formats? (Summer 2023 - 04 Marks)
9. Explain the strengths and weaknesses of CLI & HP/GL file formats. (Summer 2022 - 07 Marks)
10. Differentiate RPI and STL file format. (Summer 2022 - 07 Marks OR)
11. Write a short note on .slc file format. (Summer 2025 - 07 Marks)
12. Define: Chord Height, Staircase effect, Infill. (Summer 2022 - 03 Marks)
13. What is tessellation in CAD modelling? (Winter 2023 - 03 Marks OR)
14. List the various types of solid models and explain CSG/B-Rep models. (Summer 2023 - 03 Marks, Winter 2022 - 07 Marks)

Chapter 3: RP Processes

A. Stereolithography (SLA) / Photopolymerization

Repeated & Important Questions:

1. **Explain the principle of working/physics of the Stereolithography (SLA) process with a neat sketch.**
 - (Summer 2023 - 07 Marks, Summer 2024 - 04 Marks, Summer 2025 - 04 Marks)
2. **What is photopolymerization? Explain the process.**
 - (Summer 2023 - 03 Marks, Summer 2022 - 04 Marks OR, Winter 2023 - 04 Marks)
3. **List the materials used for the Stereolithography/photopolymerization process.**
 - (Summer 2024 - 03 Marks, Summer 2025 - 03 Marks)
4. **Write advantages, limitations, and applications of Stereolithography.**
 - (Winter 2023 - 07 Marks OR, Summer 2025 - 07 Marks)
5. **What is micro-stereolithography?**
 - (Summer 2024 - 03 Marks, Summer 2025 - 07 Marks)

Other Questions:

6. Compose the principles behind stereo litho sintering process. Briefly explain the materials. (Summer 2023 - 07 Marks) *[Note: This seems like a typo, likely meaning Stereolithography].*

B. Powder Bed Fusion (SLS, EBM, 3D Printing)

Repeated & Important Questions:

1. **Explain the Selective Laser Sintering (SLS) process with a neat sketch. Write its applications.**
 - (Winter 2022 - 03 Marks List, Winter 2023 - 07 Marks OR, Summer 2025 - 07 Marks OR, Winter 2024 - 04 Marks List)
2. **Write advantages, limitations, and applications of Fused Deposition Modelling (FDM).**
 - (Summer 2024 - 07 Marks, Summer 2022 - 07 Marks, Winter 2024 - 07 Marks)
3. **Explain the Fused Deposition Modelling (FDM) process with a neat sketch.**
 - (Summer 2023 - 07 Marks OR, Winter 2023 - 07 Marks OR, Summer 2022 - 07 Marks, Winter 2024 - 07 Marks)
4. **List the important process parameters of FDM and explain any two.**
 - (Winter 2022 - 04 Marks)
5. **Write applications of the 3D Printing process.**
 - (Summer 2024 - 03 Marks, Winter 2023 - 03 Marks OR)

6. Explain the 3D printing process with a neat sketch.

- (Summer 2025 - 04 Marks OR)

Other Questions:

7. Write down the principle of Electron Beam Melting (EBM) Process. (Summer 2022 - 03 Marks, Winter 2024 - 03 Marks)
8. Compare SLS, 3D Printing, and LOM processes. (Summer 2024 - 07 Marks OR)
9. Distinguish the following process: FDM, LOM, SGC, and SLS. (Summer 2023 - 04 Marks)
10. Differentiate SLA and SLS. (Summer 2023 - 03 Marks OR)

C. Sheet Lamination (LOM, Ultrasonic Consolidation)

Repeated & Important Questions:

1. **Define/Explain the principle of Laminated Object Manufacturing (LOM) process.**
 - (Summer 2024 - 03 Marks OR, Winter 2023 - 03 Marks OR)
2. **Explain Laminated Object Manufacturing (LOM) process with a neat sketch.**
 - (Winter 2022 - 07 Marks)
3. **Write advantages, limitations, and applications of Laminated Object Manufacturing (LOM).**
 - (Summer 2022 - 03 Marks, Winter 2023 - 04 Marks OR, Summer 2025 - 04 Marks OR)
4. **Explain the Ultrasonic Consolidation process with a neat sketch and its applications.**
 - (Summer 2024 - 07 Marks OR, Summer 2025 - 07 Marks OR)

Other Questions:

5. Discuss various materials used for LOM. (Summer 2024 - 04 Marks OR)
6. Briefly explain the process physics of Ultrasonic Consolidation process. (Summer 2024 - 04 Marks)

D. Beam Deposition (LENS, DMD)

Repeated & Important Questions:

1. **What is Laser Engineered Net Shaping (LENS)? Explain with a neat sketch.**
 - (Summer 2024 - 07 Marks, Summer 2025 - 03 Marks, Winter 2024 - 07 Marks)
2. **Explain the Direct Metal Deposition (DMD) process with a neat sketch and its applications.**
 - (Summer 2022 - 03 Marks List, Summer 2025 - 07 Marks OR)
3. **Explain the principle of Beam deposition RP processes.**

- (Winter 2023 - 03 Marks OR)

Other Questions:

4. Discuss the advantages and disadvantages of LENS. (Winter 2022 - 03 Marks)
5. Write a short note on: Laser Engineered Net Shaping. (Summer 2024 - 07 Marks)

E. Other Processes (SGC)

1. With neat sketches explain Solid Ground Curing (SGC) process and its advantages. (Summer 2023 - 04 Marks OR)
2. Discuss the advantages and disadvantages of SGC. (Winter 2022 - 03 Marks OR, Winter 2024 - 04 Marks)

Chapter 4: Errors in RP Processes

Repeated Questions:

1. **Explain various part building errors in RP / in SLA & SLS processes.**
 - (Summer 2024 - 07 Marks OR, Summer 2022 - 04 Marks, Summer 2025 - 07 Marks)
2. **Explain various errors that may occur during the post-processing phase in RP.**
 - (Winter 2022 - 04 Marks OR, Summer 2024 - 04 Marks OR, Summer 2025 - 04 Marks)
3. **What are pre-processing errors? Explain different errors in the pre-processing part of RP processes.**
 - (Winter 2022 - 04 Marks, Summer 2025 - 03 Marks)
4. **Discuss the influence of various factors in determining the part building error and data preparation error.**
 - (Summer 2023 - 07 Marks)
5. **Explain the effect of part building, part finishing, and part deposition orientation on accuracy.**
 - (Summer 2023 - 07 Marks OR)

Other Important Questions:

6. What is meant by data preparation error? (Summer 2023 - 03 Marks)
7. 'Usually RP parts need the finishing processes' Justify. (Winter 2023 - 03 Marks)

Chapter 5: RP Applications

Repeated Questions:

1. **What is Rapid Tooling? Explain with an example / one method.**
 - (Summer 2023 - 03 Marks, Summer 2022 - 07 Marks, Winter 2023 - 03 Marks, Summer 2025 - 03 Marks)
2. **Define Reverse Engineering. Explain its steps/process with an example.**
 - (Summer 2023 - 07 Marks, Summer 2024 - 07 Marks, Summer 2022 - 07 Marks, Summer 2025 - 07 Marks)
3. **Explain the applications of RP in the Medical field.**
 - (Winter 2022 - 07 Marks, Summer 2022 - 07 Marks OR, Summer 2025 - 04 Marks)
4. **Explain RP applications for automotive industries.**
 - (Summer 2022 - 04 Marks, Winter 2024 - 07 Marks)
5. **List out the various indirect rapid tooling methods and explain silicon rubber tooling.**
 - (Summer 2023 - 07 Marks)
6. **Differentiate between soft and hard tooling.**
 - (Summer 2023 - 03 Marks on Page 2)

Other Important Questions:

7. How is rapid prototyping transforming the jewelry industry? (Winter 2022 - 07 Marks, Winter 2024 - 07 Marks)
8. How does aerospace technology make use of rapid tooling? (Winter 2022 - 03 Marks, Winter 2024 - 07 Marks)
9. Enlist the different application of RP in the construction industry. (Winter 2022 - 04 Marks, Winter 2024 - 04 Marks)
10. Explain with an example the application of RP in the Bio-Medical industry. (Summer 2023 - 04 Marks on Page 2)
11. Enlist & explain the RP applications in the field of manufacturing & tooling. (Summer 2022 - 04 Marks, Winter 2024 - 07 Marks)
12. Explain sand casting tooling and laminate tooling. (Summer 2023 - 07 Marks on Page 2)
13. Give comparison of Powder Based Fusion RP and Extrusion based RP. (Winter 2023 - 04 Marks OR)
