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B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

Mechanical Engineering

Seventh Semester

MF 9023 – RAPID PROTOTYPING

(Regulation 2008)

27

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Distinguish between from conventional tooling and rapid tooling
2. List the practical applications Direct Metal Deposition.
3. What Is the fundamental principle of SLA process?
4. In the LOM systems, what are the factors that limit the work volume of the systems?
5. List the practical applications of SLS process in Tooling and Patterns manufacturing.
6. What are the critical factors that influence the performance of 3D Printing?
7. List the materials used in RP medical applications.
8. What are the common types of Polymers used in FDM?
9. What is meant by re-sampling in reverse engineering process?
10. Name the medical imaging techniques used in reverse engineering.

Part – B (5 x 16 = 80 marks)

11. a. (i) Compare and contrast the LOM process and the FDM systems. What are the advantages and disadvantages for each of the systems? (12)
- (ii) What are the advantages and disadvantages of solid-based systems compared with liquid-based systems? (4)
12. a. (i) What is the Rapid Prototyping Wheel? Describe its four primary aspects. Is the *Wheel* a static representation of what is Rapid Prototyping today? Why? (10)
- (ii) Discuss the Impact of Rapid Prototyping on Product Development. (6)

(OR)

- b. (i) Describe the advantages of Rapid Prototyping in terms of its beneficiaries such as the product designers, tool designer, manufacturing engineer, marketers and consumers? (8)
- (ii) Describe the process flow of Shape Deposition Manufacturing (SDM). List the major advantages and limitations. (8)
- 13 a. (i) With the aid of simple sketch explain the principle of Selective Laser Sintering. (6)
- (ii) Describe the process flow Direct Shell Production Casting (DSPC). (10)
- (OR)**
- b. (i) What is the principle of laser engineered net shaping (LENS) process? (4)
- (ii) Explain how 3D color printer manufactures multicolored parts. How do colorized prototypes add value to the RP part? List the practical applications. (12)
- 14 a. What are the types of materials used for SLS system? What are their respective applications? (16)
- (OR)**
- b. (i) What are the four-step approaches suggested by Mueller for selecting the proper type of rapid prototyping material? Explain with suitable example. (12)
- (ii) What are the critical properties that can be considered in the material selection in RP process? (4)
- 15 a. (i) Explain the need for reverse engineering in design, manufacturing and medical fields with suitable examples. (12)
- (ii) What are the advantages of all non-contact systems in reverse engineering? (4)
- (OR)**
- b. (i) Distinguish between Active and Passive Technique in Non-contact Reverse engineering (4)
- (ii) With aid of simple sketches explain the CMM Measurement process in reverse engineering? Explain the Digitization from the surface, Data Collection Procedure and Preprocessing of the point clouds steps in the CMM Measurement process in reverse engineering. (12)