Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

MMIP-204

M.E./M.Tech., II Semester

Examination, June 2016

Rapid Prototyping and Rapid Tooling

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) All parts of each question are to be attempted at one place.

1. a) i) Why new product development is needed? 2
   ii) What are the phases of product development process? 5
   b) i) How 'Virtual Reality' can be linked with 'Virtual Manufacturing'? 2
   ii) Discuss the importance of virtual manufacturing in rapid product development process. 5

2. a) i) What do you mean by Rapid Prototyping? 2
   ii) Give a detailed classification of Rapid Prototyping processes. 5
   b) i) What is the concept of Solid Based Rapid Prototyping system? 2
   ii) Explain the process of LOM (Laminated Object Molding) giving its schematic. 5

3. a) i) Give the principle of Liquid based Rapid Prototyping. 2
   ii) Explain the working of the SLA (Stereo-Lithography) process with diagram 5
   b) i) Explain the concept of Photo Masking. 2
   ii) Explain the working of SGC (Solid Ground Curing) with diagram. 5

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4. a) i) Define 'Reverse Engineering'. 2
   ii) Give an overview on recent developments in the field of Rapid Prototyping. 5
   b) i) Give the principle of CT SCAN. 2
   ii) What is MRI? Explain its concept and its working. 5

5. a) i) What is Epoxy Tooling? 2
   ii) Elaborate the principle and working of 3D printing with diagram. 5
   b) i) Explain the principle of Powder Based Rapid Prototyping system. 2
   ii) Describe Selective Laser Sintering (SLS) process giving its schematic. 5

6. a) Discuss the features and advantages of virtual reality techniques in context of new product development. 7
   b) Discuss the consequences of building a valid and invalid tessellated models using STL file format. 7

7. Give a detailed comparative analysis on the process parameters, machine process capabilities, materials used and application areas of LOM, SLA, SLS, FDM and SGC techniques. 14

8. Give short notes on (any four) of the following: 4×3½=14
   a) Inter-relation between CAD/CAM and Rapid Prototyping
   b) Comparison between 3D Printing and other Rapid Prototyping
   c) Micro and Nano Fabrication using Rapid Prototyping
   d) Process capabilities of Rapid Tooling Processes
   e) Concept and applications of CAST
   f) Advantages of Rapid Prototyping in medical and engineering applications