Exam.Code:1015
Sub. Code: 35227

2055

M.E. (Mechanical Engineering)-Second Semester

Elective - II

MME-205(h): Imaging and Additive Manufacturing

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, selecting atleast two questions from each Part. Assume suitable/missing data wherever applicable. Wherever applicable, the explanation should be with suitable example/sketch.*

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Part A

1. Explain the history of digital image processing. What are the main milestones in its development? Also, mention some key applications that made it more popular and helped it improve over time. (10)

2. a) Define sampling and quantization. How do they affect the quality of digital images? (6)

   b) Briefly describe the followings :

   1) Resolution , 2) Image pixels (4)

3. With respect to medical imaging, compare CT, MRI, X-Ray, and USG in terms of working principle and applications. (10)

4. Find the new position of the pentagon [A(2, 2), B(4, 2), C(4, 3), D(3, 4) , E(2, 3)] after its rotation by 90^{o} anti-clockwise about A point and then reflection about a line passing through (4, 1) and parallel to y-axis ? Plot intermediate and final position. (10)

Part B

5. Compare B-rep and CSG approaches of solid modeling. Mention the advantages and limitations of each. (10)

6. Differentiate between Bezier and B-spline surfaces. List the advantages of B-spline surfaces over Bezier surfaces. Discuss the parametric equation of both Bezier and B-spline surfaces. (10)

7. Explain in detail about the process of FDM and SLS in Rapid Prototyping. Highlight differences in material types and resolution. (10)

8. Write short notes on the following: (5+5)

   (i) Types of 3D scanners

   (ii) Surfaces of Revolution

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