

Total No. of Questions : 8]

SEAT No. :

P-652

[Total No. of Pages : 2

[6004]-613

**B. E. (Mechanical Engineering)**

**ELECTIVE IV: ADDITIVE MANUFACTURING**

**(2019 Pattern) (Semester - VII) (402045C)**

**Time : 2½ Hours]**

**[Max. Marks : 70**

**Instructions to the candidates:**

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of electronic pocket calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1)** a) Explain process Fused Filament Fabrication (FFF) with suitable sketch. [6]  
b) Explain process Robocasting with suitable sketch. [6]  
c) Explain process Multi-jet Modeling (MJM) with suitable sketch. [6]

OR

- Q2)** a) Explain process Plasma Deposition with suitable sketch. [6]  
b) Explain process Direct Metal Deposition (DMD) with suitable sketch. [6]  
c) Compare Fused Deposition Modeling (FDM) with Fused Filament Fabrication (FFF) Techniques. [6]

- Q3)** a) Explain use of Polymers in Additive Manufacturing with important process parameters, benefits, drawbacks, Limitations and appropriate applications. [6]  
b) Describe rules and recommendations for metal based additive manufacturing process and product. [6]  
c) Write a short note on Surface enhancement Techniques used in additive manufacturing based products. [5]

OR

**P.T.O.**

- Q4)** a) Explain use of Shape-Memory Alloys in Additive Manufacturing with important process parameters, benefits, drawbacks, Limitations and appropriate applications. [6]
- b) Write a short note on Hot isostatic pressing of additive manufacturing based products. [6]
- c) Explain error sources in Additive Manufacturing. [5]

- Q5)** a) Explain the Construction, Layout and sub-system of Material Jetting process based 3D Printers. [6]
- b) Explain the Construction, Layout and sub-system of Direct Metal Laser Sintering [DMLS] process based 3D Printers. [4]
- c) Explain the classification of Equipment Topology/Layout Frame Designs used in 3D Printers with illustrations. [8]

OR

- Q6)** a) Explain the Construction, Layout and sub-system of Fused Filament Fabrication [FFF] process based 3D Printers [6]
- b) Explain the Construction, Layout, sub-system and sub-type of DELTA based 3D Printers' Topology/Layout Frame Designs. [6]
- c) Explain the types of filling pattern used in different slicing and path planning. [6]
- Q7)** a) Explain how additive manufacturing is used in Automotive Industries. Also write merits, demerits and practical feasible applications with illustrations. [9]
- b) Write a short note on Bio-materials and its applications. [8]

OR

- Q8)** a) Explain how additive manufacturing is used in Health-Care Sector. Also write merits, demerits and practical feasible applications with illustrations. [9]
- b) Write a short note on 3D Printing and its application in Mass Production of goods. [8]

