Total No. of Questions : 8]

SEAT No. :

PA-2642

[Total No. of Pages : 3

[5927]-423

B.E. (Mechanical Engineering)

(402045C) ADDITIVE MANUFACTURING

(2019 Pattern) (Semester - VII) (Elective - IV)

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 Deposition Modeling (FDM) with suitable sketch. Also write merits, demerits and application. **[8]**

b) Explain process Direct Ink Writing (DIW) with suitable sketch. **[5]**

c) Explain process Polyjet Printing with suitable sketch. **[5]**

OR

Q2) a) Explain process Color-Jet Printing (CJP) with suitable sketch. List it's Benefits, Drawbacks, Limitations and Applications. **[8]**

b) Explain process Electron Beam-based DED with suitable sketch. **[5]**

c) Compare Extrusion-Based Deposition with Energy Deposition Techniques. **[5]**

Q3) a) Explain use of Metals in Additive Manufacturing with important process parameters, benefits, drawbacks, Limitations and appropriate applications. **[6]**

P.T.O.

b) Explain varieties of heat treatment applied in pre- and post-processing of additive manufacturing based products. **[6]**

c) Write a short note on acetone treatment in post-processing of additive manufacturing based products. **[5]**

OR

Q4) a) Explain the Process specific strategies used in quality control of material specific additive manufacturing based products. **[6]**

b) Write a short note on DfAM based Process specific strategies. **[6]**

c) Write a short note on Support Removal in post-processing of additive manufacturing based products. **[5]**

Q5) a) Explain the two approaches used in Photopolymerization process based 3D printers. **[6]**

b) Explain the Construction, Layout and sub-system of Selective Laser Sintering [SLS] process based 3D Printers. **[6]**

c) Explain the Construction, Layout, sub-system and sub-type of Cartesian based 3D Printers' Topology/Layout Frame Designs. **[6]**

OR

Q6) a) Explain the Construction, Layout and sub-system of Binder Jetting process based 3D Printers. **[6]**

b) Explain the Construction, Layout, sub-system and sub-type of Extruder Design used in Polymer based 3D Printer Construction. **[6]**

c) Explain the M-codes used in the Control software of Additive Manufacturing based 3D Printers. **[6]**

Q7) a) Explain how additive manufacturing is used in Aerospace Industries. Also write merits, demerits and practical feasible applications with illustrations. **[9]**

b) Write a short note on 4D Printing and its applications. **[8]**

OR

Q8) a) Explain how additive manufacturing is used in Machine-Tools Industries. Also write merits, demerits and practical feasible applications with illustrations. **[9]**

b) Explain how additive manufacturing is used in Personalized Surgery Sector. Also write merits, demerits and practical feasible applications with illustrations. **[8]**