22681

24225

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **5 × 2 = 10**

(a) Define CAD.

(b) Define Material Extrusion.

(c) Define VAT photopolymerization.

(d) What does STL stand for in 3D printing ?

(e) Define curing in 3D printing.

(f) How to overcome the defect of "Nozzle too close to Print Bed" ?

(g) Explain the advantages and disadvantages of using polymers in 3D printing.

2. Attempt any THREE of the following : **3 × 4 = 12**

(a) Define 3D printing and explain the basic process of Additive Manufacturing.

(b) Explain different errors in STL files.

(c) Compare BJ (Binder Jetting) and MJ (Material Jetting).

(d) List and explain the four Common Faults in 3D printing.

3. Attempt any THREE of the following : **3 × 4 = 12**

(a) Explain Selective laser sintering is an additive manufacturing technology.

(b) Explain the key quality assurance techniques for ensuring the reliability of 3D printed parts.

(c) What are the implications of data loss in CAD projects, both in terms of quality and project timelines ?

(d) Describe the following :

(i) Resin 3D printing liquid

(ii) PETG

4. Attempt any THREE of the following : **3 × 4 = 12**

(a) Explain Thermoplastics and state any 4 applications of thermoplastics related to 3D printing.

(b) Explain the concept of extrusion in Fused Deposition Modeling (FDM) and how it contributes to part fabrication.

(c) Define polymer. Explain properties of it.

(d) Explain the role of build platforms and support structures in the additive manufacturing process.

(e) Compare Additive manufacturing and Traditional Manufacturing (any 4 points).

5. Attempt any TWO of the following : **2 × 6 = 12**

(a) Draw and explain the block diagram for 3D Printing Process.

(b) Explain in detail Trouble-shooting Methods in 3D printing.

(c) List and explain six different types of 3D printing materials with their applications.

6. Attempt any TWO of the following : **2 × 6 = 12**

(a) Explain the impact of bonding mechanisms on material selection in additive manufacturing.

(b) Explain in detail the use of additive manufacturing process in Health-Care domain.

(c) Compare and contrast the use of liquid, solid, wire and powder forms of raw materials in 3D printing.