[Time: 3 Hours]

Roll No:- 5112521200377

Sem-V Diploma Exam 2023 (Odd)
(Common Branch) (Theory)
3D Printing & Design (Basics) (2000505E)

[Max. Marks: 70]

- All questions are compulsory.
- Marks are mentioned on the right side of each question.

Group (A)

Q.1 Choose the most suitable answer from the following options. (1*20=20)

i. Full form of STL is
(a) Straight-lithography (b) Stereolithography (c) Straight-lipsography (d) Stereomonography

ii. What ofoes the SLS stand for
(a) Selective Lases solution
(b) Selective Liquid Sintering
(c) Selective Lases Sintering
(d) Standard Laser Selection

iii. What does PLA stand for?
(a) Polylactic acid
(b) Potentially found arguments
(c) Polyester liquid acid
(d) Polylactic augment

iv. 3.D printing is what kind of process?
(a) Equalitive (b) Additive (c) Subtractive (d) None of the above

v. The binding material used in inkjet 3-D printing is in the form
(a) Granular (b) Gaseous (c) Liquid (d) No binding material

vi. Which method of 3-D printing melts a plastic filament and builds the object on a plate layer by payer?
(a) FSAM (b) SLA (c) SLS (d) FDM

vii. What are the steps for making a 3-D printed object?
(a) Design-Idea-print-Export
(b) Idea-Design-Export-Print
(c) Idea-think-make-food
(d) Idea-think-print-Export

viii. Which of the following is the solid-state based rapid prototyping?
(a) Selective Laser solution
(b) Solid Ground curing
(c) Powder based fusion
(d) Fused deposition Modelling

ix. Which of the following material is used in VAT photopolymerization?
(a) Curing Liquid resin (b) Rubber (c) Copper (d) None of the above

x. What is the function of extruedes nossle?
(a) To heat the filament
(b) To extrude the material
(c) Level the bed
(d) None of the above

xi. 3-D printing is what kind of process?
(a) Equalitive (b) Additive (c) Subtractive (d) None of the above

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kunal kumar

xii. An ultraviolet (UV) is used in
(a) Binder Jetting
(b) Both bindes jetting and Sterelithography
(c) Stereolithography
(d) Fused deposition modelling

xiii. What is ASTM standard?
(a) American Society for Testing and materials
(b) American Standard for Testing and Materials
(c) American Standard for Technology and Materials
(d) American society for Technology and minerals

xiv. In which type of 3-D printing process ABS and PLA material is used
(a) SLA
(b) FDM
(c) SLS
(d) LOM

xv. Which one is full form of STL file
(a) Standard triangular language
(b) Standard tessellation language
(c) Both (a) and (b)
(d) None of the above

xvi. Which one coordination arrangement of STL file
(a) Rectangle
(b) Triangle
(c) Circle
(d) Parabola

xvii. In which type of 3-D printing process plastic film are used as a material.
(a) LOM
(b) SLA
(c) FDM
(d) SLS

xviii. Additive manufacturing process used as a principal on
(a) Lager by Lager addition
(b) Lager by Lager subtraction
(c) Fused deposition modelling
(d) Selective lager sintering

xix. What is the function of process plate?
(a) To heat the filament
(b) 3-D printing plate
(c) Level the bed
(d) None of these

xx. Reverse engineering process concerned with
(a) 3-D printing process
(b) Subtractive manufacturing process
(c) Both (a) and (b)
(d) None of the above

Group (B)

Q.2 Why do you need 3.D printing? What are the main limitations of 3.D printing? 4

OR

Explain about Directed Energy deposition (DED)? 4

Q.3 What is fused deposition modelling (FDM) printing? How does FDM 3.D printing work? 4

OR

Explain about FDM printer components? 4

Q.4 What is reverse engineering? What are the three main basics steps of reverse engineering? 4

OR

Explain how the five main types of FDM printers work in your own word. 4

Q.5 What is the basic principle of selective laser sintering (SLS) process? Name the parts is the schematic of SLS process. 4

OR

Explain about the material selection criteria for 3D printers with example. 4

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Q.6 Explain about Reverse engineering write down its advantages and disadvantages. 4

OR

Explain about 3D scanners with example. 4

Group (C)

Q.7 What is the basic principle of material jetting 3D printing process? Draw a near schematic sketch with parts name of the material jetting process. 6

OR

Explain about at least for basic slicer settings? 6

Q.8 What I VAT photopolymerization 3D printing technique? Explain with neat schematic diagram. Write the important applications of Vat photopolymerization 3D printing technique. 6

OR

Explain about Hybrid materials used in 3D printers. With example also Explain why need Hybrid material in 3D printers though conventional material are available. 6

Q.9 Write the short note (1) Extraction Fused Layer Modeling (2) Electron Beam melting (3) Selective Laser melting 6

OR

Explain with diagram about following 6

(a) Cartesian 3D FDM Printer
(b) Delta 3D FDM Printers
(c) Polar 3D FDM Printers
(d) Robotic Arm 3D FDM Printers

Q.10 Explain the different kinds of power Bed fusion method used in 3D printers. 6

OR

What is the sintering process in selective laser sintering (SLS)? Write the three important strength and weakness of the SLS process. 6

Q.11 Explain four mechanical component and four electrical components of an FDM 3D printer. 6

OR

How solidification occurs in SLM process? Calculate the size of the critical radius and the number of atoms in the critical nucleus when solid copper forms by homogeneous nucleation at 849 deg C (Given, $\gamma = 177\times10^{-3}$, $\alpha_{cu} = 3.615\times10^{-10}$ m, $T_{mp} = 1083$ deg C, and $\Delta H_f = 1628\times10^{6}$) 6

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