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**Question Paper Code : 20394**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fifth Semester

Computer Science and Design

CCS 331 – 3D PRINTING AND DESIGN

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(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions

PART A — (10 × 2 = 20 marks)

1. Define "Resolution" in 3D printing.
2. List the various file formats used in 3D printing.
3. Under what circumstance are paper based raw materials used in 3D printing give an example.
4. Name some of the limitations in materials.
5. Why do we need to do use inkjet printers? What are its benefits?
6. Give a short note on the technology involved in multijet printer.
7. List the principles of laser technology used in additive manufacturing.
8. What is the need for support structures?
9. Name some of the printing technologies that are used for printing printed electronic components.
10. What is the future trend of 3D printing from biotechnology perspective?

PART B — (5 × 13 = 65 marks)

11. (a) Outline at the design considerations that need to be adopted while printing a product. Discuss write materials, size, pre and post processing parameters.

Or

- (b) Express in detail about the various file formats that could be used for additive manufacturing.
12. (a) Write in detail with a neat sketch about the principle of operation of wire based 3D printing technology.

Or

- (b) Describe about the various materials application in 3D printing. Also discuss about the limitations of the materials.
13. (a) Discuss in detail sketches about the working principal, positioning system and motion control in inkjet technology.

Or

- (b) Sketch and explain about piezoelectric drop on demand technology.
14. (a) Briefly discuss the various types of lasers used and their characteristics.

Or

- (b) Explain in detail about powder based fabrication technique.
15. (a) Discuss in detail the application of 3D printing in making bio-polymers.

Or

- (b) Enlist about the future trends of 3D printing in food based application.

PART C — (1 × 15 = 15 marks)

16. (a) A customer requirement is he wanted a transparent part to be printed in a nonmetallic material. Suggest a suitable printing machine for his requirement. Also explain the principle of operation, pre and post processing process involved and the merits and de-merits of the system.

Or

- (b) Enumerate about the essentiality of;
- (i) Part orientation in additive manufacturing
- (ii) Materials selection in 3D printing technology, use a case study of your choice to substantiate your answer.