Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40853

B.E./B.Tech DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh Semester

Aerospace Engineering

MF 8071 – ADDITIVE MANUFACTURING

(Common to Manufacturing Engineering/Material Science and Engineering/ Mechanical Engineering/ Mechanical Engineering (Sandwich)/ Mechatronics Engineering)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What is the difference between prototyping and rapid-prototyping.
2. Differentiate additive manufacturing and 3D printing.
3. List the names of STL file problems.
4. Write the difference between DFM and DFAM.
5. What is photo polymeriztion process?
6. Define sintering.
7. What are the reasons for warping in FDM process?
8. Write the reason for why LOM is not been widely used by AM-industries?
9. How the bonding takes place in 3D printing?
10. What are the advantages and disadvantages of laser and electron beam melting?

PART B — ($5 \times 13 = 65$ marks)

11. (a) With a case study, write in details AM process chain.

Or

(b) Write in details AM processes and their relationship with subtractive manufacturing based on design complexity, material and production quantity.

12. (a) With a case study write briefly how part orientation and support structure generation are important while printing a part with neat diagrams to support your answer.

Or

(b) Can DFAM improve the part quality? Justify your answer with neat diagram.

13. (a) Write in details the science behind the bonding in different photo polymerizations techniques with an application.

Or

(b) Write in details with neat sketch, how metal powders are melted using laser power; also write its advantages, limitation and application.

14. (a) Write in details the factors to be considered to print a part with PEEK material with neat diagram, advantage and disadvantage.

Or

(b) Write in details the different bonding techniques used in LOM and their advantages, disadvantages and applications.

15. (a) A metal casting industry interested in manufacturing pattern less sand moulds without using any heat source or conventional CNC route, write your recommendation, advantages and dis-advantages in details with a neat sketch.

Or

(b) Write in details the process parameters used LENS process and explain how each parameter influence the properties of the manufactured part.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Indian navy is looking for a solution to repair the propeller of their war ship. As an AM expert recommends them a best AM process which could solve their problem with neat sketch, write them in details the working principles, advantages and disadvantages.

Or

(b) A person met with an accident and his knee got damaged severely, the team of doctors planned to do surgery to fix the implants, one off of the implant is made out of Titanium material and other off of the implant with high molecular weight polyethylene. As a mechanical engineer how will you help doctors to perform this life saving task. Write in details with neat sketches, sequence of operations/steps involved in manufacturing such implants. Justify the reasons for selection of two different materials in manufacturing implants.

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