

Exam Date & Time: 09-Dec-2023 (09:30 AM - 12:30 PM)



# MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV 2023

3D Printing and Design Code:MIE2129

**3D PRINTING AND DESIGN [MIE 2129]**

**Marks: 50**

**Duration: 180 mins.**

**A**

**Answer all the questions.**

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

- 1) Illustrate the working principles of Selective Laser Sintering (SLS) process and highlight its process parameters (5)
  - A)
  - B) Summarize the application of additive manufacturing in automotive, healthcare and consumer goods with their specific advantages (3)
  - C) Describe the classification of additive manufacturing process (2)
- 2) Sketch and describe the wet spinning process of manufacturing polymer fibre (5)
  - A)
  - B) Describe the binding mechanism of powder fusion technique (3)
  - C) Compare laser bed fusion and electron beam melting process (2)
- 3) Sketch and discuss the working principle of binder jetting process (5)
  - A)
  - B) Interpret the process parameters of direct energy deposition process (3)
  - C) Distinguish between continuous and drop on demand printing techniques (2)
- 4) With neat sketch explain thermal spray direct writing technology (5)
  - A)
  - B) Describe the property enhancements that take place in AM parts using thermal techniques of post processing (3)
  - C) Discuss the importance of microstructural characterization techniques (2)

- 5) Sketch and describe working process of Scanning Electron Microscope (5)
- A)
- B) Identify and describe any three non-destructive method of analysing AM parts (3)
- C) Summarize the common defects observed within AM components (2)

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