**PVP 20**

Code: 20ME4703B

**IV B.Tech - I Semester – Regular / Supplementary Examinations**
**OCTOBER 2024**

# ADDITIVE MANUFACTURING
## (MECHANICAL ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

| | | | BL | CO | Max. Marks |
|---|---|---|---|---|---|
| **UNIT-I** | | | | | |
| 1 | a) | Compare and explain the differences between CNC and Additive Manufacturing process. | L1 | CO1 | 7 M |
| | b) | Explain the advantages, disadvantages and application of Additive Manufacturing process. | L2 | CO1 | 7 M |
| **OR** | | | | | |
| 2 | a) | Discuss in detail steps in AM process. | L2 | CO1 | 7 M |
| | b) | Explain the classifications of AM Processes | L2 | CO1 | 7 M |
| **UNIT-II** | | | | | |
| 3 | a) | Explain with a neat sketch the working principle of Stereo - lithography (SLA) process. | L1 | CO1 | 7 M |
| | b) | Explain the advantages and disadvantages of Stereo - lithography (SLA) process. | L2 | CO2 | 7 M |

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| | | **OR** | | | |
| 4 | a) | Discuss with a neat sketch the working principle of Vat Photo polymerization AM process | L2 | CO1 | 7 M |
| | b) | Describe with a neat sketch the working principle of Mask Projection process with advantages and disadvantages. | L2 | CO2 | 7 M |
| | | **UNIT-III** | | | |
| 5 | a) | Illustrate the sequential steps involved in LOM process. | L1 | CO3 | 7 M |
| | b) | Discuss the advantages, disadvantages and applications of FDM process. | L2 | CO3 | 7 M |
| | | **OR** | | | |
| 6 | a) | With a neat sketch discuss the working principle of Extrusion-Based AM Processes. | L2 | CO3 | 7 M |
| | b) | Explain the advantages, disadvantages and applications of sheet Lamination AM Processes | L2 | CO3 | 7 M |
| | | **UNIT-IV** | | | |
| 7 | a) | Explain with a neat sketch the working principle of Electron Beam melting (EBM) in powder Bed fusion AM process. | L3 | CO4 | 7 M |
| | b) | Using a neat sketch the working principle of Powder Bed Fusion Processes in context of selective Laser melting. | L3 | CO4 | 7 M |
| | | **OR** | | | |

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| 8 | a) | List out the materials used in Powder Bed Fusion Processes. | L3 | CO1 | 7 M |
| | b) | How does the fusion mechanism differ when using ceramics in SLS compared to metals? | L3 | CO4 | 7 M |
| **UNIT-V** | | | | | |
| 9 | a) | With a neat sketch discuss the working principle of Electron Beam Based Metal Deposition. | L3 | CO4 | 7 M |
| | b) | Discuss the Processing-structure-properties of Directed Energy Deposition process. | L3 | CO4 | 7 M |
| **OR** | | | | | |
| 10 | a) | Illustrate the working principle of Directed Energy Deposition process. | L3 | CO4 | 7 M |
| | b) | How does the directed energy source, such as a laser or electron beam contribute to DED? | L3 | CO4 | 7 M |