



B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Seventh Semester

MECHATRONICS ENGINEERING

U18MCE0010: Additive Manufacturing

COURSE OUTCOMES

- CO1: Recognize the development of AM technology and how AM technology propagated into various businesses and developing opportunities
- CO2: Acquire knowledge on process of transforming a concept into the final product in AM technology
- CO3: Elaborate the vat polymerization and material extrusion processes and its applications.
- CO4: Acquire knowledge on powder bed fusion processes and its applications
- CO5: Acquire knowledge on direct energy deposition processes and its applications.
- CO6: Evaluate the advantages, limitations, applications of binder jetting, material jetting and laminated object manufacturing processes.

Time: Three Hours

Maximum Marks: 100

**Answer all the Questions: -
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)**

- | | | |
|---|-----|-------------------|
| 1. Give the principle of additive manufacturing. | CO1 | [K ₂] |
| 2. In your own word, justify the needs for part consolidation. | CO2 | [K ₂] |
| 3. What is photo polymerization? | CO3 | [K ₂] |
| 4. Explain process parameters in manufacturing. | CO4 | [K ₂] |
| 5. List the various direct energy deposition process. | CO5 | [K ₂] |
| 6. The build volume of binder jetting machines is among the largest of any of the 3D printing technologies – Why? | CO6 | [K ₂] |
| 7. List some of the slicing software. | CO2 | [K ₂] |
| 8. Give the limitations of FDM process. | CO3 | [K ₂] |
| 9. What are the various process parameters that affects the SLS technique? | CO4 | [K ₂] |
| 10. What is the principle behind the beam deposition process? | CO5 | [K ₂] |

**Answer any FIVE Questions: -
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)**

- | | | | |
|---|----|-----|-------------------|
| 11. a) Give your understanding on the additive manufacturing process chain with a | 10 | CO1 | [K ₂] |
|---|----|-----|-------------------|

	suitable illustration.			
	b) Discuss the possibilities in the various fields of engineering with additive manufacturing technology.	6	CO1	[K ₂]
12.	a) Briefly write a few words on AM fabrication for medical applications.	6	CO2	[K ₂]
	b) Explain slicing and discuss on the components of slicing software.	10	CO2	[K ₂]
13.	a) Illustrate the digital light processing with the principle, process parameters, working, advantages and limitations.	16	CO3	[K ₂]
14.	a) Compare the function of SLS and SLM process.	8	CO4	[K ₂]
	b) Illustrate the selective laser sintering process with a neat sketch.	8	CO4	[K ₂]
15.	a) Discuss the working of the LENS process with a suitable sketch.	16	CO5	[K ₂]
16.	a) Illustrate on LOM process with the principle, process parameters, operation / working, advantages and limitations.	16	CO6	[K ₂]
