



**B.E. DEGREE EXAMINATIONS: NOV/DEC 2024**

(Regulation 2018)

Seventh Semester

**MECHANICAL ENGINEERING**

U18MEE0012: Additive Manufacturing

**COURSE OUTCOMES**

- CO1:** Apply the basics of additive manufacturing techniques in manufacturing  
**CO2:** Apply the liquid and solid based rapid prototyping system in suitable applications  
**CO3:** Apply powder based rapid prototyping system in suitable applications  
**CO4:** Apply the different materials for rapid prototyping system  
**CO5:** Apply the concepts of modelling, data processing and reverse engineering in rapid prototyping  
**CO6:** Apply the new technologies in rapid prototyping for various applications

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

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|--|-----|-------------------|
| 1. Why rapid prototyping is important in industries.                         | CO1 | [K <sub>2</sub> ] |
| 2. List out the advantages of rapid prototyping process                      | CO1 | [K <sub>2</sub> ] |
| 3. Define the fundamental principle of stereo lithography process.           | CO2 | [K <sub>2</sub> ] |
| 4. Compare solid based rapid prototyping and liquid based rapid prototyping. | CO2 | [K <sub>2</sub> ] |
| 5. Discuss the advantages and disadvantages of Selective laser sintering.    | CO3 | [K <sub>3</sub> ] |
| 6. What are the applications of LENS models? Give an example.                | CO3 | [K <sub>2</sub> ] |
| 7. Predict what materials Cannot be 3D printed?                              | CO4 | [K <sub>3</sub> ] |
| 8. State the most common material used for 3D printing.                      | CO4 | [K <sub>2</sub> ] |
| 9. Discuss on STL files and define slicing relevant to CAD.                  | CO5 | [K <sub>3</sub> ] |
| 10. How the rapid prototyping is useful in the Biomedical industry?          | CO6 | [K <sub>3</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

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|---|---|-----|-------------------|
| 11. a) Summarize the history of additive manufacturing technology.                        | 8 | CO1 | [K <sub>2</sub> ] |
| b) What meant by rapid prototype. What are the roles of prototype in development process? | 8 | CO1 | [K <sub>2</sub> ] |

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|-----|---|----|-----|-------------------|
| 12. | Explain the SLA process with a neat sketch. Mention its advantages, limitations and applications.   | 16 | CO2 | [K <sub>2</sub> ] |
| 13. | Explain with a neat sketch the working principle of Selective Laser Sintering process. Discuss the applications, limitations and advantages.  | 16 | CO3 | [K <sub>2</sub> ] |
| 14. | a) Elaborate the principle and process details of Direct Shell Production casting system.   | 8  | CO4 | [K <sub>3</sub> ] |
|     | b) Explain how the moulds for injection plastics are fabricated using Epoxy tools.  | 8  | CO4 | [K <sub>2</sub> ] |
| 15. | a) Explain in detail about CAD data formats and their types.  | 8  | CO5 | [K <sub>2</sub> ] |
|     | b) Summarize the procedure to create STL file from various CAD files.   | 8  | CO5 | [K <sub>2</sub> ] |
| 16. | Write notes on the applications of Additive Manufacturing in the following fields:<br>(1) Medical field<br>(2) Automotive engineering<br>(3) Electronic industries<br>(4) Architecture. | 16 | CO6 | [K <sub>3</sub> ] |

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