Register Number:……..

KUMARAGURU
college of technology
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**B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Seventh Semester

**AUTOMOBILE ENGINEERING**

U18AUE0008: Additive Manufacturing and Tooling

**COURSE OUTCOMES**

**CO1:** Classify the concepts and terminologies of additive manufacturing.
**CO2:** Apply the reverse engineering concepts for design development.
**CO3:** Identify the variety of additive manufacturing techniques based on end product applications.
**CO4:** Design and develop newer tooling models.
**CO5:** Familiarize with cutting edge technologies in rapid tooling and manufacturing.
**CO6:** Analyze the cases relevant to additive manufacturing.

**Time: Three Hours** **Maximum Marks: 100**

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

| | | | |
|---|---|---|---|
| 1. | List the applications for Additive Manufacturing. | CO1 | [$K_1$] |
| 2. | Define rapid tooling. | CO1 | [$K_1$] |
| 3. | List any four materials used in additive manufacturing technology (AMT). | CO2 | [$K_1$] |
| 4. | What is meant by reverse engineering? | CO2 | [$K_1$] |
| 5. | Write short notes on any two CAD models used in AMT. | CO3 | [$K_1$] |
| 6. | What are the limitations of SLA process and how are they modified. | CO3 | [$K_1$] |
| 7. | What is known as ‘staircase effect’ in model building? | CO4 | [$K_1$] |
| 8. | What are the post processing defects in SLS. | CO4 | [$K_1$] |
| 9. | How additive manufacturing helps in aerospace and electronics industries ? | CO5 | [$K_1$] |
| 10. | What is meant by Tissue engineering? | CO5 | [K1] |

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

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|---|---|---|---|---|---|
| 11. | a) | Briefly discuss Additive manufacturing process chain. | 10 | CO1 | [$K_1$] |
| | b) | List out the benefits and applications of Additive manufacturing. | 6 | CO1 | [$K_2$] |
| 12. | | Enumerate the additive manufacturing techniques of Stereo- Lithography. | 16 | CO2 | [$K_1$] |

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|---|---|---|---|---|---|
| 13. | | Explain with suitable flow chart, the process of reverse engineering for the development of a new type of mobile phone. | 16 | CO2 | [$K_2$] |
| 14. | a) | Draw suitable sketches and explain the photo polymerization of SL resins process. | 8 | CO3 | [$K_2$] |
| | b) | Explain the functioning of FDM process model and how the various techniques are carried out. | 8 | CO3 | [$K_2$] |
| 15. | | Explain the Working Each process of LENS in sintered based additive manufacturing system. Also mention the merits and demerits of the same. | 16 | CO4 | [$K_2$] |
| 16. | | Explain classification of tooling in additive manufacturing. | 16 | CO5 | [$K_2$] |

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