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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 03-01-2025 **Time:** 09:30 am – 12:30 pm |

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| **School: SOE** | **Program:** B.Tech (MEC) |
| **Course Code :** MEC3017 | **Course Name :** CAD for Additive Manufacturing |
| **Semester**: V | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** |
| **Marks** | **30** | **30** | **40** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. 10 x 2 Marks=20 Marks** |
| **1** | Define computer graphics. | **2 Marks** | **L1** | **CO1** |
| **2** | Name two input devices used in the computer graphics. | **2 Marks** | **L1** | **CO1** |
| **3** | What are the LEDs and LCDs? | **2 Marks** | **L1** | **CO1** |
| **4** | Difference between Implicit and Explicit forms of equations | **2 Marks** | **L1** | **CO1** |
| **5** | Define additive manufacturing. | **2 Marks** | **L1** | **CO1** |
| **6** | What are the main frame-based systems? | **2 Marks** | **L1** | **CO2** |
| **7** | Define geometric transformation. | **2 Marks** | **L1** | **CO2** |
| **8** | Difference between Hermite curve and Bezier curve. | **2 Marks** | **L1** | **CO2** |
| **9** | What is a workstation-based system? | **2 Marks** | **L1** | **CO2** |
| **10** | Abbreviations i.e. GES and GKS are used for which components of graphics. | **2 Marks** | **L1** | **CO2** |

**Part B**

**Answer the Questions Total 80 Marks**

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| **11.** | A Bezier curve is to be constructed using control points Po(35,30), P1(25,0), P2(15,25) and P3(5,10). The Bezier curve is anchored at P0 and P3. Find the Bezier curve's equation and calculate the curve's data points for u=0, 0.2, 0.4, 0.6, 0.8 and 1 | **20 Marks** | **L2** | **CO3** |
| **OR** |
| **12.** | Show that the reflection about an arbitrary line *ax* + *by* + *c* = 0 is given by $\left[\begin{matrix}b^{2}-a^{2}&-2ab&0\\-2ab&a^{2}-b^{2}&0\\-2ac&-2bc&\frac{1}{a^{2}+b^{2}}\end{matrix}\right]$  | **20 Marks** | **L2** | **CO3** |
|  |  |  |  |  |
| **13.** | A cubic spline curve has start point Po(16, 0) and endpoint P1(3,1). The tangent vector for endpoint Po is given by a line joining Po and P2(14,8). The tangent vector for end P1 is given by a line joining P2 and P1.1. Determine the parametric equation of the Hermite cubic curve.
2. Plot the Hermite cubic curve.
 | **20 Marks** | **L3** | **CO2** |
| **OR** |
| **14.** | 1. Write down the steps involved in designing a new product in any industry.
2. Write down the advantages of computers in the design of new products.
 | **10 Marks****10 Marks** | **L3** | **CO2** |

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| **15.** | The endpoints of a cubic spline curve are P0 (1,2) and P1 (7,1). The tangent vector for end P0 is given by the line joining P0 and point P2 (-2,1). The tangent vector for end P1 is given by a line joining P3 (9,-2) and point P1.1. Determine the parametric equation of the hermite cubic curve.
2. Determine the parametric equation for the tangent vector.
3. Calculate the curve's data points for the values 0, 0.2, 0.4, 0.6, 0.8, and 1.
 | **20 Marks** | **L3** | **CO3** |
| **OR** |
| **16.** | 1. Write short notes on Additive Manufacturing. Mention the advantages and limitations of Additive Manufacturing.
2. Explain fuse deposition modelling.
 | **10 Marks****10 Marks** | **L3** | **CO3** |

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| **17.** | 1. Explain the process involved in the powder bed fusion process.
2. Explain the process of slicing CAD models for Additive Manufacturing.
 | **20 Marks** | **L3** | **CO1** |
| **OR** |
| **18.** | Lamina *ABCD* with an inner point *P* with coordinates (4, 3), (3, 1), (8, 1), (7, 4), and (5, 2), respectively, is first rotated through 60° and then translated by (5, 4). In another sequence, the trapezoid is first translated by (5, 4) and then rotated through 60°. Compare coordinates obtained for both sequence and comment. | **20 Marks** | **L3** | **CO1** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***