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# P.E.S. College of Engineering, Mandya - 571 401

*(An Autonomous Institution affiliated to VTU, Belgaum)*

**First Semester, M. Tech - Mechanical Engineering (MMDN)**

**Semester End Examination; Jan - 2017**

**Computer Applications in Design**

Time: 3 hrs                                                                                      Max. Marks: 100

*Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

## UNIT - I

| | | |
|---|---|---|
| 1 a. | Briefly explain the application of computers to design process with a neat block diagram. | 10 |
| b. | Explain data structure in detail with the help of an example. | 10 |
| 2 a. | List and explain various modules of CAD packages. | 10 |
| b. | Explain the functions of graphics package. | 10 |

## UNIT - II

| | | |
|---|---|---|
| 3 a. | Briefly explain Bresenham's algorithm. | 8 |
| b. | With neat flow chart, explain data structure for geometric models of products. | 8 |
| c. | Define WCS and UCS. | 4 |
| 4 a. | Define transformation. Briefly explain different types of transformation in detail. | 10 |
| b. | Explain windowing and clipping. | 4 |
| c. | A point in 2D is located at (3, 4). It is desired to relocate the point by means of rotation and scaling transformation to a new position defined by (0, 8). | |
| | i) Describe the sequence of transformation required | 6 |
| | ii) Write the transformation matrix for each step in the sequence | |
| | iii) Write the concatenated transformation matrix for the sequence. | |

## UNIT - III

| | | |
|---|---|---|
| 5 a. | Explain the different types of surfaces used in geometric modeling. | 10 |
| b. | Differentiate between C-rep and B-rep. | 5 |
| c. | Write a note on symbolic programming. | 5 |
| 6 a. | List and explain different picture formats used in graphic standards. | 10 |
| b. | Write a short note on DXF standard. | 4 |
| c. | What is meant by DMIS? Explain the importance in the manufacturing of mass consumption items. | 6 |

## UNIT - IV

| | | |
|---|---|---|
| 7 a. | Explain parametric representation of curves in detail. | 10 |
| b. | The coordinates of four control points relative to current WCS are given by, $P_0 = [2\ 2\ 0]^T$, $P_1 = [2\ 3\ 0]^T$, $P_2 = [3\ 3\ 0]^T$ and $P_3 = [3\ 2\ 0]^T$. Find the equation of resulting Bezier curve. Also find points on the curve for $\mu = 0, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}$ and 1. | 10 |

8  a. Explain the various features of surface manipulation. 10

   b. Define the following :

   i)  Rational parametric surface

   ii) Offset surface 10

   iii) β-spline surface.

## UNIT - V

9  a. Enumerate and brief the different methods of solid modelling (Explain any two). 12

   b. Explain Liaison-Sequence analysis. 8

10. Write short notes on :

   i) Mating conditions

   ii) Graph structure

   iii) Location graph 20

   iv) Precedence diagram.

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