P. Pages : 2   **GUG/W/16/3811**

Time : Three Hours |||||||||||||||||||||| Max. Marks : 70
                     * 3 5 8 3 *

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Notes : 1.   All questions carry equal marks.
2.   Answer **any five** questions.
3.   Illustrate your answers wherever necessary with the help of neat sketches.

1. a) With a neat sketch describe colour raster display.   **7**

    b) An eight plane raster has a resolution of 1280 x 1024 and a refresh rate of 60 Hz. Find   **7**
      i)   The RAM size of the bitmap (Refresh buffer).
      ii)   The time required to display a scan line and a pixel.
      iii)   The active display area of the screen if the resolution is 78 dpi.
      iv)   The optimal design if the bitmap size is to be reduced by half .

2. a) Discuss the criterion for selection of horizontal, vertical or Diagonal pixel while generating a circle in the First Quadrant with centre at origin.   **7**

    b) Compare DDA and Bresenham's Line generation algorithm. Explain with suitable example, the pixel choren by two algorithms.   **7**

3. a) i)   What do you understand by homogeneous co – ordinate why is it used.   **7**

      ii)   Write the 2D transformation matrix for reflection about y – axis, x – axis of origin.

    b) Perform the reflection of triangle A(-8, 3), B(5, 4) and C(-8, 6) about the line $y = 3x + 5$.   **7**

4. a) Distinguish between CSG and wireframe modelling.   **7**

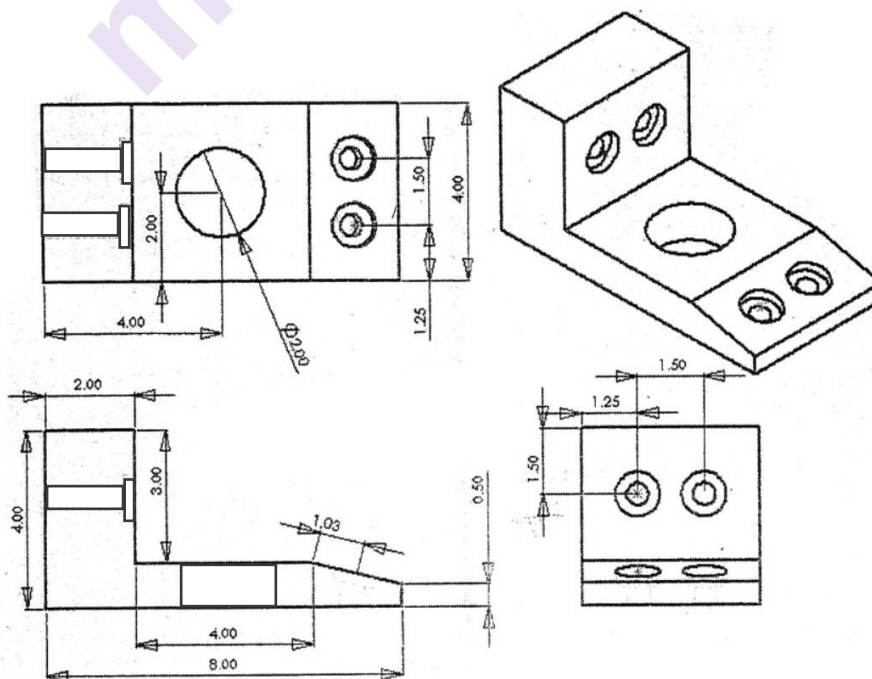   b) Write in detail the steps for constructiosn of CSG model shown in fig 4.   **7**

Fig. 4

5. A 3D curve passes through point (0, 0, 0) and (1, 1, 1). Derive b_0, b_1, b_2 and b_3 for x, y, z **14**
position vectors.

$$P = b_0 + b_1 t + b_2 t^2 + b_3 t^3$$

provided that point (0.3, 0.2, 0.25) and (0.6, 0.65, 0.63) are on curve. Also find position
vector at t = 0.5.

6. a) What are the features of Bezier curves. Discuss in detail. **7**

b) Explain the difference between Analytical and synthetic curves. **7**

7. a) Discuss Hermite Cubic Spline in detail. **7**

b) What is perspective projection? Explain with suitable example. **7**

8. Write short notes on **any three.** **14**

    i) NURBS

    ii) Parametric modelling

    iii) 3D transformations

    iv) Windowing and clipping

    v) GUI Design

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