B.Sc. (Engineering) in CSE
Semester Final Examination **2017**
Level **4**, Semester **II**, Course Code: **CSE 453**, Credit: **3.0**
Course Title: **Computer Graphics**

Time: **03** hours | Total Marks: **90**

[N.B. The figure in the right margin indicates the marks allocated for respective question. Split answer of any question is not allowed.]

Section-A

*(Answer any **03(three)** from the following questions)*

1. (a) What is computer graphics? Differentiate between computer graphics and digital image processing. 2+3

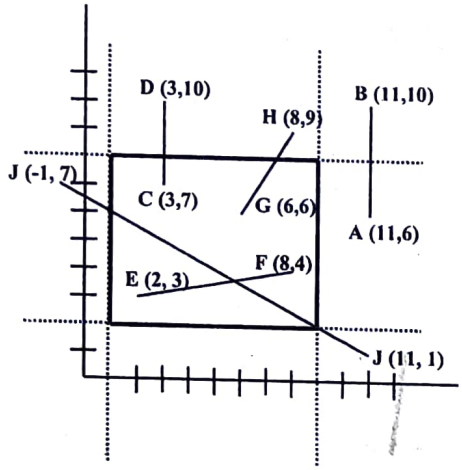
   (b) Draw the block diagram and explain the working principles of raster scan display. Differentiate between the horizontal retrace and vertical retrace. 4+2

   (c) Does projection preserve a straight line? Justify your answer. 1+3

2. (a) What is clipping? Why clipping is necessary? 2+2

   (b) Define normalized coordinate system. Explain the procedures for windows to viewport mapping. 1+4

   (c) Clip the line of the following figure using Linag-Barsky algorithm. 6



3. (a) What is animation? Explain the design process of animation sequence. 1+4

   (b) What is the role of computer graphics in animation? Briefly explain the fundamental principles of traditional animation techniques. 2+5

   (c) Define key frame. How does morphing help in key frame animation? 1+2

4. (a) What is translation? Translate the square ABCD whose co-ordinates are A (0, 0), B (3, 0), C (3, 3) and D (0, 3) by 2 units in both direction and then scale by 1.5 units in x direction and 0.5 units in y direction. 1+5

   (b) Show that $R(\theta_1).R(\theta_2) = R(\theta_1 + \theta_2)$, where $R(\theta)$ represents the rotational matrix. 3

   (c) Briefly explain the terms: shear and reflection. 3+3

Section-B

(Answer any 03(three) from the following questions)

1. (a) What is rasterization? What are the drawbacks of DDA algorithm? 1+2

   (b) Briefly explain the midpoint circle algorithm. 7

   (c) Write the steps that are required to plot a line whose slop is between 0° and 45° using Bresenham's method. 5

2. (a) Differentiate between spline and B-spline. 3

   (b) What are the uses of Bezier curves in computer graphics? Write the properties of Bezier curve giving their usefulness. 2+5

   (c) What is Hermite spline? Explain how to find the Hermite matrix M_H. 1+4

3. (a) Define projection. Explain the anomalies while constructing a perspective view in computer graphics projection. 1+4

   (b) Briefly explain RGB color model. 5

   (c) Describe the mathematical description of parallel projection in computer graphics. 5

4. (a) Describe hidden surface removal problem. Why does hidden surface need to remove? 3+2

   (b) What is depth cueing? Explain Z-buffer method with an example. 2+4

   (c) Differentiate between frame buffer and depth buffer. How can the depth value be calculated efficiently? 2+2