Hajee Mohammad Danesh Science and Technology University, Dinajpur
Department of Computer Science & Engineering
B.Sc in CSE
Semester Final Examination 2016(July-Dec)
Level 4 Semester II, Course Code: CSE 453, Credit: 3
Course Title: Computer Graphics (Theoretical)

Time: 3 hours | Total Marks: 90

[N.B. The figures in the right margin indicates the marks for respective question]

Section-A

Answer any **THREE**

1. a) Define computer graphics. Write some application of computer graphics. 1+3
   b) What is the resolution of an image? The resolution of a 15' monitor is 640 × 480 with the aspect ratio w: h= 4: 3. Find its dpi (dot per inch). 3
   c) Derive the recursive formula for Bresenham's Line algorithm. 8

2. a) Define digital image processing and explain its advantages. 1+3
   b) Explain the components of digital image processing. 6
   c) What is an image's aspect ratio? If an image has a height of 4 inches and an aspect ratio of 2.5, what is its width? 3
   d) Define the following terms: 2
      (i) Pixel (ii) GUI

3. a) Define brightness, hue and saturation of color images. 3
   b) What is color mode? Describe the RGB color model. 1+5
   c) How can we covert colors from HSI to RGB? 4
   d) Find the RGB coordinates of a color at (0.15, 0.75, 0) in the CMY space. 2

4. a) Define Transformation. Explain 2D basic Transformation. 1+6
   b) Show that the composition of two rotations is additive by concatenating the matrix representations for $R(\theta_1)$ and $R(\theta_2)$ to obtain 4
      $R(\theta_1).\ R(\theta_2) = R(\theta_1+\theta_2)$
   c) What is pivot point? Explain general pivot point rotation. 4

Section-B

Answer any **THREE**

1. a) How can you detect a point inside a window? 2

   b) Describe the process of window to viewport coordinate transformations. 5

   c) What do you mean about polygons? How many kinds they are? 3

   d) Discuss briefly the Sutherland-Hodgeman polygon clipping algorithm. 5

2. a) What is projection? Show the taxonomy of projection. 1+3

   b) Derive the transformation matrix for oblique parallel projection. Can you tell when this projection is cabinet or cavalier? 4+1

   c) Distinguish between perspective and parallel projections. 3

   d) Write the matrix for orthographic projection on the XY plane for a point when p = {10, 12, 15}, Find its projected value. 3

3. a) Define the following terms:

   (i) Polylines (i) Polyhedron (iii) Wireframe models 3

   b) Write the two important properties of Bezier curve. 2

   c) Determine the blending functions for cubic Bezier curves and matrix for the blending functions. 7

   d) What is meant by Interpolation and Approximation? 3

4. Write short notes on any two of the followings: 7.5 ×2 = 15

   i) DDA algorithm

   ii) Cohen-Sutherland Line clipping algorithm

   iii) Z-Buffer Algorithm