B.Sc. Engg. / HD CSE 6th Semester

22 August 2017 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION — **SUMMER SEMESTER, 2016-2017**

Duration: 1 Hour 30 Minutes — **FULL MARKS: 75**

CSE 4607: Computer Graphics and Multimedia Systems

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

---

1. a) Define viewport and window. Clarify their ideas with the help of 'Screen Coordinates' and 'World Coordinates'. 2+3

   b) Find the new coordinates of a unit cube (Figure 1) 60°-rotated about an axis defined by its endpoints A(2,1,0) and B(3,3,1). Calculation should be shown in 5 steps. 4×5

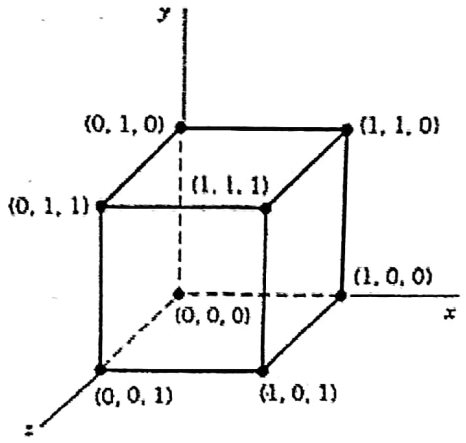

Figure 1 : A Unit Cube

2. a) Explain the cylindrical HSV color model with respect to RGB color model. 5

   b) To map the window in world coordinates to the viewport in screen coordinates figure out the final transformation matrix. 8
   [Hint: Viewport is a square where (Umin,Vmin) = (2,4) and for window (Xmin,Ymin) = (8,8), where the window length= 8 ,bredth=4 and the length of the viewport is 4.]

   c) Draw an *arc* of the circle at the center with radius 10, in the octant of 45 to 90 degrees. 12

3. a) When does flickering occur in a video? What is Trichromatric theory? State its significance. Why CMYK model used for printing instead of RGB? 2+3

   b) Derive the Bresenham's Mid point line drawing algorithm for an octant lying from 45 to 90 degrees. Draw a line from A(1,2) to B(7,11) following the algorithm. 10

   c) What is Rasterization and Ray-tracing? Briefly explain the six GPU pipelines and the role of 3 kinds of shader programs in it. 10

4. a) Find the following transformation matrices
   i. T1 = Matrix to rotate any coordinates by 60 degrees about the point P(5,5). 6
   ii. T2 = Matrix to scale any line twice. 6
   iii. T3 = Matrix to reflect any coordinates about the given line AB (x-5y=15). 8

b) If T1, T2 and T3 are applied in the following sequences on Figure 2, Will the final images be same for both cases? Answer mathematically or logical sequence ruling. 5

Seq 1 : T1, T3, T2
Seq 2 : T2, T1, T3

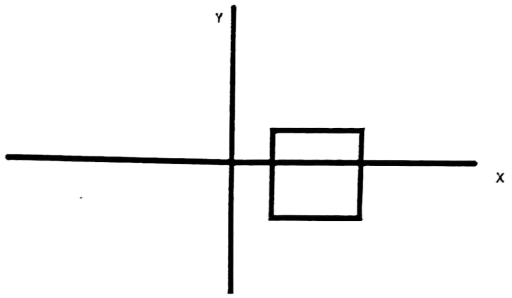

Figure 2 : A 2D drawing.