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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech/ M.Tech V Semester

COURSE CODE: 18B11CI515 MAX. MARKS: 35

COURSE NAME: Computer Graphics

COURSE CREDITS: 03 MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q.1 Solve the following questions - (3x2=6)

a. Determine the resolution (pixels per centimeter) in the x and y directions for the video monitor in use on your system. Determine the aspect ratio, and explain how relative proportions of objects can be maintained on your system.

b. Consider three different raster systems with resolutions of 640 by 400, 1280 by 1024, and 2560 by 2048. What size frame buffer (in bytes is needed for each of these systems to store 12 bits per pixel? How, much storage is required for each system if 24 bits per pixel are to be stored?

c. Suppose an RGB raster system is to be designed using an 8-incl? by 10-inch screen with a resolution of 100 pixels per inch in each direction. If we want to store 6 bits per pixel in the frame buffer, how much storage (in bytes) do we need for the frame buffer?

Q.2 Explain the following - (2x2=4)

a. Compare the advantages and disadvantages of a three-dimensional monitor using a varifocal mirror with a stereoscopic system.

b. Explain the differences between a general graphics system designed for a programmer and one designed for a specific application, such as architectural design?

Q.3 Using the midpoint method, and taking symmetry into account, develop an efficient algorithm for scan conversion of the following curve over the Interval -10 <= x <= 10. (3)

$$y = \left(\frac{1}{12}\right)x^3$$

Q.4 What do you mean by Projection? Differentiate between Parallel & Perspective projection along with their sub-categories. (3)

Q.5 How digital image differs from an ordinary image? Discuss image compression standard JPEG in detail. (3)

Q.6 What is 3-D Rotation? Write down matrices & equations for Rotation of three dimensional object about xy plane, yz plane & xz plane. (3)

Q.7 Can a unit square turn into a shifted parallelogram with parameter values SHy = 0.5 and Xref = −1 in the Y-direction using shearing transformation. Justify your answer with suitable explanation. (3)

Q.8 Suppose, two scaling parameters S1 and S2 are described along orthogonal directions defined by the angular displacement θ. Is it possible? Justify the above statement with suitable example. Which type of transformation achieves for aforementioned statement? (3)

Q.9 A point (Xw, Yw) in a world-coordinate clipping window is mapped to viewport coordinates (Xv, Yv), using a unit square. Determine the relative positions of the two points using the pipeline procedure with respective rectangles. (3)

Q.10 Suppose, ABCD is a rectangular window with A(0,0), B(10, 0), C(10,10) and D(0,10). By using the Liang Barsky algorithm to clip the line P0P1 with P0(-5,3) and P1(15,9). (4)