2015

MCA

4th SEMESTER EXAMINATION

COMPUTER GRAPHICS

PAPER — MCA-401

Full Marks : 100

Time : 3 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group — A

(*Graphics*)

Answer any *three* questions.

1. (a) Define pixel. Write DDA line drawing algorithm. Compare it with Bresenham's line drawing algorithm. 1+5+3

(b) Write the differences between Raster Scan and Random Scan display. What are the various application areas of computer graphics? 3+2

2. (a) Write down the steps of midpoint circle generating algorithm. Compare it with Bresenham's Circle drawing algorithm. 9+3

(b) List any four graphics file formats. 2

3. (a) Digitize a line from (10, 12) to (15, 15) on a raster screen using Bresenham's straight line algorithm. 10

(b) List down any two attributes of lines. Write down the function of frame buffer. 2+2

4. (a) Perform a 45° rotation of triangle A(0, 0), B(1, 1) and C(5, 2)

(i) about the origin and

(ii) about point P(–1, –1) 6+6

(b) Write down the shear transformation matrix. 2

5. How polygon is represented in Computer graphics system? Explain boundary fill algorithm. 5+9

6. (a) Describe the 2-D transformation matrix for rotation about arbitrary point. 6

(b) Find out the final co-ordinates of a figure bounded by the co-ordinate (1, 1), (3, 4), (5, 7) and (10, 3) when scaled by two units in X direction and three units in Y direction. 8

Group — B

(*Multimedia*)

Answer any *two* questions.

7. (a) What do you mean by GM and GM2 ? Why do we need GM ? 4+3

(b) How MIDI devices are connected with each other ? Briefly explain all the possible form of connections. 7

8. (a) What is Digitization ? How does it differs from Quantization ? 2+2

(b) Mention the different forms of modulation required during quantization and transmission of audio. Explain any two of them. 2+(4+4)

9. (a) Write short notes on *any two*: 4×2

(i) Nyquist theorem.

(ii) Dithering.

(iii) GIF.

(iv) Lossless Compression.

(b) What is Color LUT ? How can we device a color LUT ? 2+4

Internal Assessment :

Graphics — 20

Multimedia — 10

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6. In the missionaries and unbelievers problem, three missionaries and three unbelievers stand at the left bank of the river. They wish to cross the river. There is a small boat (without a boatman) to ferry them across, but it holds at most two persons. Whenever there are more missionaries than unbelievers on either bank of the river, the missionaries will convert the unbelievers. The problem is to find out whether there is any possible sequence of ferrying for the six persons to cross the river without any of the unbelievers getting converted.

(a) Formulate the problem as a state-space search problem.

(b) Draw implicit search graph.

(c) Does there exist a solution to the problem ? If so, specify the solution. Otherwise, clearly explain why there is no solution.

(d) What is expected to happen if you apply Depth First Search ? 3+3+3+5

7. Write short notes on *any four*: $4 \times 3\frac{1}{2}$

(i) Genetic algorithm.

(ii) Turing test.

(iii) Depth Limited search.

(iv) Hill climbing.

(v) Ant colony optimization.

(vi) Simulated Annealing.

Internal Assesment — 30
