MCA-14-44 COMPUTER GRAPHICS

Maximum marks: 100 (External: 80, Internal: 20)   Time: 3 hours

Note: Examiner will be required to set NINE questions in all. Question Number 1 will consist of objective type/short-answer type questions covering the entire syllabus. In addition to question no. 1, the examiner is required to set eight more questions selecting two from each unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit. All questions will carry equal marks.

UNIT – I

Introduction to Computer Graphics and its applications, Components and working of Interactive Graphics; Video Display Devices: Raster scan and Random Scan displays, Display Processors; Resolution, Aspect Ratio, Refresh CRT, interlacing; Color CRT monitors, LookUp tables, Plasma Panel and LCD monitors, Interactive Input and Output Devices: keyboard, mouse, trackball, joystick, light pen, digitizers; image scanners, Touch Panels; Voice systems; printers, plotters; Graphics Software; Coordinate Representations;

UNIT – II

Drawing Geometry: Symmetrical and Simple DDA line drawing algorithm, Bresenham's line Algorithm; loading frame buffer; Symmetrical DDA for drawing circle, Polynomial method for circle drawing; circle drawing using polar coordinates, Bresenham's circle drawing; Generation of ellipse; parametric representation of cubic curves, drawing Bezier curves; Filled-Area Primitives: Flood fill algorithm, Boundary fill algorithm, Scan-line polygon fill algorithm

UNIT – III

2-D Transformations: translation, rotation, scaling, matrix representations and homogeneous coordinates, composite transformations, general pivot point rotation, general fixed point scaling, Shearing; Reflection ; Reflection about an arbitrary line;
2-D Viewing: window, viewport; 2-D viewing transformation, zooming, panning; Clipping operations: point and line clipping, Cohen-Sutherland line clipping, mid-point subdivision line clipping, Liang-Barsky line clipping, Sutherland-Hodgman polygon clipping; Weiler-Atherton polygon Clipping
Pointing and positioning techniques; rubber band technique; dragging;

UNIT – IV

3-D Graphics: 3-D modeling of objects, 3D transformation matrices for translation, scaling and rotation, parallel projection: Orthographic and oblique projection; perspective projection; Hidden surface removal: Z-buffer, depth-sorting, area subdivision, BSP-Tree method; Ray casting;
Shading: Modelling light intensities, Gouraud shading, Phong shading;
Introduction to Animation, Tweening, Morphing, Fractals;

Text Books:
1. Donald Hearn, M. Pauline Baker, Computer Graphics, Pearson Education.
2. Foley etc., Computer Graphics Principles & Practice, Pearson Education.

Reference Books:
1. D.P. Mukherjee, Fundamentals of Computer Graphics and Multimedia, PHI.
2. Newmann & Sproull, Principles of Interactive Computer Graphics, McGraw Hill.
3. Rogers, Procedural Elements of Computer Graphics, McGraw Hill.
4. Anirban Mukhopadhyay, Arup Chattopadhyay, Introduction to Computer Graphics and Multimedia, Vikas Publications.
5. Zhigang Xiang, Roy Plastock, Computer Graphics, Tata McGraw Hill.
6. Apurva A. Desai, Computer Graphics, PHI.
7. Malay K. Pakhira, Computer Graphics, Multimedia and Animation, PHI