



Instructions to Candidates

This paper contains **05** Questions in **02** pages.
Answer **all** questions.
Time Allowed: **Two (02)** hours.

Question 1.

(20 marks)

- (a) What is computer Graphics? How it is different from image processing?
- (b) Explain the difference between the bitmap and the pixmap.
- (c) Compare and contrast the graphics produced by CorelDraw and Photoshop.
- (d) "The intensity histogram of a digital image gives some useful clues about the shapes of the objects in the image" Do you agree with this statement? Justify your answer.
- (e) What is color depth? Explain reasons why we don't need more than 24bit color depth for displaying graphics on a PC monitor.

Question 2.

(20 marks)

- (a) What is meant by "graphic workstation"? List a modern day PC hardware configuration needed to develop high quality graphics for the print industry.
- (b) What is meant by "Dot trio" in computer monitors? Explain the functionality of the shadow mask.
- (c) What is the maximum refresh rate of a monitor with a horizontal scanning frequency of 96 kHz at a resolution of 1280 x 1024?
- (d) A 3D model is viewed by a digital camera through a 'window' and the image thus captured is needed to be displayed on a 'viewport' of a Graphical User Interface. Explain how it is being done?
- (e) "CRT displays are harmful to human beings" - This is a quote appeared in a newspaper. Write your opinion about the above quote within a technological framework that you have learnt.

Question 3.

(20 marks)

- (a) What is "Projection"? Explain in your own terms.
- (b) What is the difference between parallel and perspective projections? Describe an application where each type of projection would be preferable.
- (c) Rendering can be done efficiently if the polygons are broken into triangles. State whether you agree/disagree with the above statement by explaining.
- (d) What is rendering pipeline? Briefly explain.
- (e) Ray tracing is a high quality rendering method. Outline the principle behind this method.

Question 4.

(20 marks)

- (a) What are the three basic transformations in 2D geometric transformation? State the matrix representation of them.
- (b) Consider the following two transformations. Do they have the same effect or not? Prove your answer.
 - I. Rotate the object in the anti clockwise direction by an angle 180° around the 'x' axis and then rotate in the anti clockwise direction by an angle 180° around the 'y' axis.
 - II. Rotate the object in the anti clockwise direction by an angle 180° around the 'y' axis and then rotate in the anti clockwise direction by an angle 180° around the 'x' axis.
- (c) Find the matrix representation for Shearing transformation.
- (d) Find the transformation matrix for rotation in 3D geometric transformation.

Question 5.

(20 marks)

Write short notes about the following topics. Use diagrams where appropriate.

- (a) Image Acquisition Using Sensor Arrays.
- (b) The Cohen-Sutherland Line Clipping Algorithm.
- (c) TARGA image file format.
- (d) Deployment of Quadtrees.