

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
MAY EXAMINATIONS 2002

SUBJECT: COMPUTER GRAPHICS
CODE: SCS 5204

INSTRUCTION TO CANDIDATES

Answer two questions from Section A and all two questions from Section B.
Each question carries 25 marks

Time: 3 hours

QUESTION ONE

- a) Analyze the applications of computer graphics. [7]
- b) Give an overview of how the Refresh Cathode ray tube operates. Include in your explanation the following issues:
- i) How an electron gun operates [3]
 - ii) Electrostatic focusing [3]
 - iii) Magnetic focusing [3]
 - iv) Magnetic deflection [3]
 - v) Electrostatic Deflection [3]
 - vi) How the glow is produced [3]

QUESTION TWO

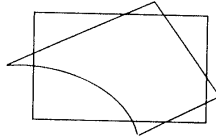
Compare and contrast the following: .

- a) Random scan display and Raster scan display. [9]
- b) Beam penetration method and shadow-mask methods. [7]
- c) Direct storage scheme and color Tables. [9]

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QUESTION THREE

- a) Outline the steps that are followed for modeling a world co-ordinate description of a scene to device co-ordinates [10]
- b) Illustrate how clipping is done for shape shown below: [10]



- c) What modification to the algorithm can be employed to handle 3-dimension clipping? [5]

QUESTION FOUR

Write brief notes on:

- a) Window and viewport. [6]
- b) Cohen SurtherLand line clipping [9]
- c) Anti aliasing [3]
- d) Persistence and aspect ratio [4]
- e) Resolution [3]

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SECTION B

QUESTION FIVE

- a) State the basic geometric transformations. [3]
- b) Derive the combined transformation for $R(x_r, y_r, \theta)$ [8]
- c) Prove that $T(x_r, y_r) \cdot R(\theta)T^{-1}(x_r, y_r) = R(x_r, x_r, \theta)$ [8]
- d) State the general steps that are followed when an object is to be rotated about an axis that is not parallel to one of the co-ordinate axes. [6]

QUESTION SIX

- a) Synthesis, from the first principle the mid point circle algorithm. [10]
- b) Based on the algorithm developed in 2(a) show how a circle centered at the origin and having a radius of 8 can be produced. [9]
- c) What are the disadvantages of using the following formular in generating a circle:

i) $(x - x_c)^2 + (y - y_c)^2 = r^2$

ii) $x = x_c + r \cos \theta$
 $y = y_c + r \sin \theta$ [6]

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END OF QUESTION PAPER

GOOD LUCK!