

UNIVERSITY OF SWAZILAND

FACULTY OF SCIENCE & ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

MAIN EXAMINATION, MAY 2017

Title of Paper : Computer Graphics

Course Number : CS246

Time Allowed : Three (3) Hours

Instructions : Answer **ALL** questions in Section A
Answer **only THREE** questions from Section B
All questions are worth **20 marks**

Special requirement : Graph paper

This paper should not be opened until permission has been granted by the invigilator.

SECTION A

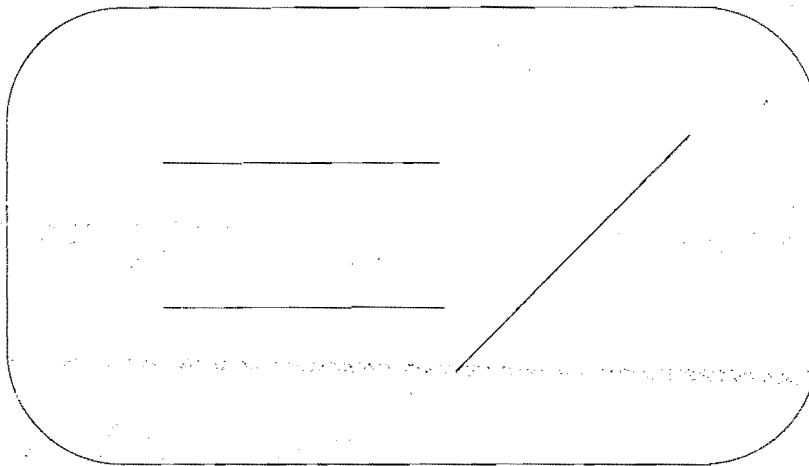
Answer *all* questions from this section.

Question 1.

- (a) Distinguish computer graphics from image processing. [8]
- (b) Discuss three application areas for computer graphics. [7]
- (c) Why should we study UIs alongside computer graphics? [5]

Question 2

- (a) Discuss the criteria for judging a good line drawing algorithm [8]
- (b) Discuss three reasons why we study computer graphics. [6]
- (c) Compute the CRT input signals for the following output signal, stating all assumptions, if any. [6]



SECTION B

Answer any *three* questions from this section.

Question 3

- (a) What is interactive computer graphics? [3]
- (b) Discuss three main bottlenecks of computer graphics in the past. [6]
- (c) Compute the memory needed for a 640 x 480 frame-buffer with depth 2. [5]
- (d) Discuss the GKS as a standard. [6]

Question 4

- (a) Why are lines so important in computer graphics? [2]
- (b) Describe any two requirements for good graphics. [2]
- (b) How does the recursive line drawing algorithm work? [8]
- (c) Use your description in (c) to draw the lines between (using square pixels of half a centimetre each side):
 - i) (8, 8) to (11, 16)
 - ii) (3, 4) to (7, 8). [8]

Question 5

Write a program to draw a chessboard.

[20]

Question 6

Write a program to draw a ball (or a wheel) to keep rolling from left to right and right to left on the screen until the user presses any key on the keyboard.

[20]