UGANDA MARTYRS UNIVERSITY

NKOZI

UNIVERSITY EXAMINATIONS

END OF SEMESTER FINAL EXAMINATIONS

SEMESTER II, 2015/16

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION SYSTEMS

SECOND YEAR DIPLOMA IN COMPUTER SCIENCE & INFORMATION TECHNOLOGY

Computer Graphics and Animation

DIPS 2202

DATE: 6TH, MAY 2016

TIME: 2:00 PM – 5:00 PM

DURATION: 3 HOURS

Instructions:

1. *Answer **FOUR** Questions.*
2. *Question **ONE** of Section A is compulsory and carries 40 Marks.*
3. *Answer any other **THREE** Questions from Section B. Each question carries 20 marks.*
4. *Write clearly and legibly.*
5. *Do not write anything on the question paper.*
6. *Do not take Mobile Phones into the examination room.*
7. *Follow the instructions of the examination supervisor.*
8. *Indicate questions answered on the Answer Sheet in the column of Questions.*

SECTION A

QUESTION ONE

a) Explain any four components of a typical graphics system. [4 Mks]

b) Using an example, explain the concept of valuators as used in graphics systems. [2 Mks]

c) Explain any four areas where computer graphics can be applied. [4 Mks]

d) With an illustration explain the conceptual framework for interactive graphics systems. [3 Mks]

e) Identify the five basic output primitives used in computer graphics. [5 Mks]

f) Differentiate between polylines and filled polygons as used in computer graphics. [3 Mks]

g) Explain the difference between passive and active computer graphics. [4 Mks]

h) Explain the concept of rendering as used in computer graphics. [2 Mks]

i) Explain the concept of computer animation as used in computer graphics. [3 Mks]

j) Differentiate between CT and MRI scans as used graphics processing. [4 Mks]

k) Find the magnitude of vector **v=[4 3 5]** [4 Mks]

l) Differentiate between uniform and non-uniform scaling [2 Mks]

SECTION B

QUESTION ONE

a) Explain any four reasons for applying transformations in graphics systems. [8 Mks]

b) Discuss any four transformation methods used in computer graphics. [8 Mks]

c) Explain two applications of interpolation and approximation curves. [2 Mks]

d) Discuss the term graphic rendering. [2 Mks]

QUESTION TWO

Rotate a point with coordinates (2, 6) in 2D by an angle θ=90 clockwise about the origin. Find the new coordinates after rotation: [20 Mks]

i) Using the functional form $x' = x\cos\theta + y\sin\theta$ and $y' = -x\sin\theta + y\cos\theta$.

ii) Prove your answer using the matrix formula.

iii) Plot the original point and the point after rotation on the Cartesian plane (x, y coordinate system).

QUESTION THREE

a) Discuss any four techniques used in computer graphics animation [8 Mks]

b) Normalise vector p = [11, 14, 7] [4 Mks]

c) Differentiate between Raster and vector graphics. [4 Mks]

d) Differentiate between OPENGL and GLUT [4 Mks]

QUESTION FOUR

a) Scale the point with coordinates (3, 9) using scaling factors of 2 in x-direction and 2 in the y-direction. . Find the new coordinates after scaling: [14 Mks]

i) Using the functional form $x' = s_x \cdot x$ and $y' = s_y \cdot y$

ii) Prove your answer using the matrix formula.

iii) Plot the points before scaling and after scaling on the Cartesian plane (x, y coordinate system).

b) Identify any four input devices used in computer graphics. [4 Mks]

c) List the two types of graphics cards used in graphics processing [2 Mks]

QUESTION ~~FOUR~~ Five

a) Find the inverse of matrix M below [6 Mks]

$$A = \begin{bmatrix} 14 & 17 \\ 12 & 16 \end{bmatrix}$$

b) Imagine point M has coordinates of [3,4]and p = [6,8]. [10 Mks]

Point M has only arrange of 3 and can only shoot ~~arrange~~ range of 3 and point P has ~~arrange~~ range of 7 a nd can only shoot ~~arrange~~ range of 7. Predetermine whether two points can hit each other.

c) Identify any four output devices as used in computer graphics. [4 Mks]