UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	GRAPHICS PROGRAMMING
COURSE CODE	:	BIT 20203
PROGRAMME	:	BIT
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 State **THREE (3)** differences between raster image and vector image.

(6 marks)

Q2 (a) Explain what is meant by rigid body transformation.

(4 marks)

(b) List **TWO (2)** rigid body transformation.

(4 marks)

Q3 Suppose a 2-dimensional clipping window has its lower left corner at `A(20, 20)` and its upper right corner at `C(90, 90)`. There are 2 lines P_1P_2 with P_1`(10,15)` P_2`(80,80)` and P_2P_3 with P_3`(30,95)` in the window. By using Cohen-Sutherland line clipping algorithm,

(a) find the region codes for the endpoints P_1 , P_2 and P_3.

(6 marks)

(b) calculate the new endpoints P_1' and P_3'.

(10 marks)

(c) draw the output that will be displayed in the window.

(4 marks)

Q4 Given below is an OpenGL code to generate a square.

```
glBegin(GL_QUADS);
    glVertex2i(50,50);
    glVertex2i(100,50);
    glVertex2i(100,100);
    glVertex2i(50,100);
glEnd();
```

(a) By using the homogeneous coordinate, write the individual transformation matrices to implement the following transformation

```
glRotatef(45.0f, 0.0f, 0.0f, 1.0f);
glScalef(0.5, 0.5, 1.0f);
glTranslatef(100.0f, 0.0f, 0.0f);
```

(6 marks)

(b) Calculate the new position of the square if it were subjected to transformations in **Q4 (a)**.

(8 marks)

(c) Sketch an output display of the square at it's initial position and after performing the transformation.

(4 marks)

Q5 (a) Figure **Q5** shows a 2D image of a house. Identify any **THREE (3)** properties of a 3D object that can be used to transform the image into a 3D object.

(6 marks)

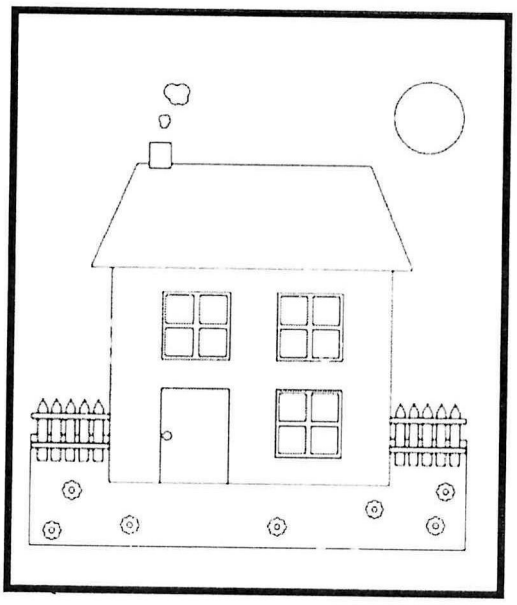

Figure Q5

(b) Based on your anwsers in **Q5 (a)**, describe how the properties can be used to tranform the 2D image into a 3D object.

(9 marks)

(c) Suggest a projection type to display the 3D object and justify your selection.

(3 marks)

- END OF QUESTION -