Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018

COURSE NAME	:	VIRTUAL REALITY
COURSE CODE	:	BIM 30803
PROGRAMME CODE	:	BIM
EXAMINATION DATE	:	JUNE/JULY 2018
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1 (a) Using XYZ fixed angles method, sketch a new orientation of virtual observer (VO) if the following conditions are given:

roll = 90^0 , pitch = 90^0 , yaw = -180^0

$(t_x, t_y, t_z) = (1,1,5)$

(13 marks)

(b) Calculate P′, if the coordinate of P (1,1,0) is given .

(10 marks)

Q2 Analyze the following scenario:

If a VO is oriented in a VE using XYZ Euler angles in the sequence roll, pitch, yaw and translate with the following values roll = 270^0, pitch = 90^0 and yaw = -180^0; (t_x, t_y, t_z) = (1,2,2).

(a) Sketch a new orientation of VO.

(12 marks)

(b) Prove that the coordinate of P′ is similar with P if the coordinate P(1,0,1) is given. Show your working.

(12 marks)

Q3 In virtual reality application, a 3D cartesian frame of reference within which objects and virtual observer (VO) location is required to construct a virtual environment (VE).

(a) List **THREE (3)** transformation styles in 3D modeling transformation.

(3 marks)

(b) A unit cube is offset along the x-axis by 1 unit and z-axis by 2 unit. The cube is then scaled by a factor of 4. Calculate the P′ of the scaled cube if P(1,1,1) of unit cube is given.

(5 marks)

(c) Consider the activities happened in **Figure Q3** using XYZ Euler angles method. First, roll the object about the *z*-axis through an angle of 90^0 rotations, second, 90^0 pitch rotations about the *x*-axis and the last rotation consist of a 90^0 yaw rotation about the *y*-axis. Calculate and sketch the final location of the point P' in the object coordinate system (OCS).

(18 marks)

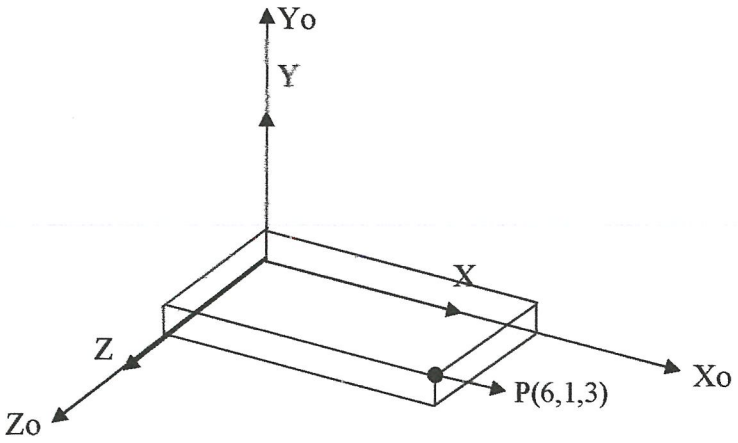

Figure Q3

Q4 (a) Exaggeration is one of the principles in 3D modeling for object and character. Describe exaggeration and support your description with an example.

(4 marks)

(b) In order to perform 3D modeling for object and character, the model should apply some modeling principles such as volume.

(i) Give **TWO (2)** geometric shapes that suits the object and character modeling for cartoon series titled "Upin and Ipin".

(2 mark)

(ii) List **TWO (2)** characteristics of the geometric shape based on your answer in **Q4(b)(i)**.

(4 marks)

Q5 (a) Explain crowd simulation and give **TWO (2)** reasons why it is very important especially in virtual cinematography.

(8 marks)

(b) Explain **TWO (2)** types of haptic interface.

(5 marks)

(c) Name **TWO (2)** types of tracking methods in mixed realities application. Identify **ONE (1)** point that differentiates them based on its functionality.

(4 marks)

- END OF QUESTION -