Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME	:	VIRTUAL REALITY
COURSE CODE	:	BIM 30803
PROGRAMME	:	2 BIM / 3 BIM
EXAMINATION DATE	:	JUNE 2015 / JULY 2015
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 In virtual reality application, a virtual environment (VE) is constructed within a 3D Cartesian frame of reference whereby the objects and virtual observer (VO) is located.

(a) Explain the terminology frame of reference.

(3 marks)

(b) List **TWO (2)** transformation styles in 3D modeling transformation.

(2 marks)

(c) A unit cube is offset along the *x*-axis by `2` units and then scaled by a factor of `4`. Calculate the `P'` of the scaled cube if `P(1,0,1)` of unit cube is given.

(5 marks)

(d) Consider the activities happened in **Figure Q1**. 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).

(7 marks)

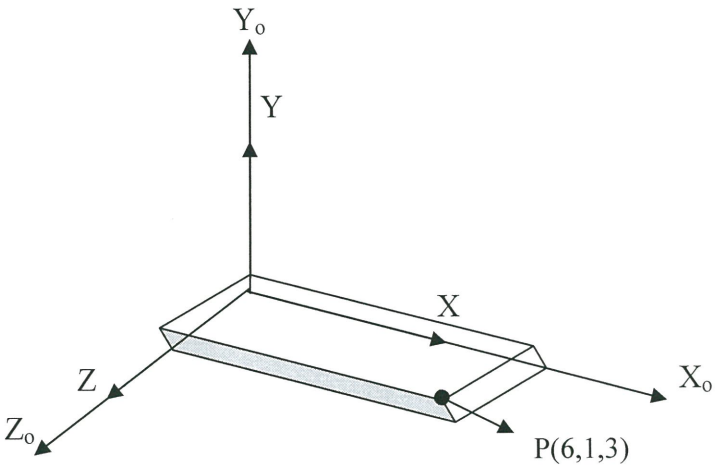

FIGURE Q1

Q2 Key-frame animation consists of the automatic generation of intermediate frames, called in-betweens. It is based on a set of key-frames supplied by the animator.

(a) Explain **TWO (2)** fundamental approaches of key-frame.

(8 marks)

(b) State **TWO (2)** serious problems while handling the image-based key-frame and their solution.

(6 marks)

Q3 Besides key-frame animation, procedural animation also plays an important role in creating complex animation such as in video games and special effects.

(a) Analyse **TWO (2)** differences between key-frame animation and procedural animation.

(4 marks)

(b) Physics-based modeling/animation can be considered as a subset of procedural animation. Name **FOUR (4)** types of physics-based modeling/animation with **ONE (1)** example for each.

(8 marks)

Q4 (a) Explain any **TWO (2)** manipulation methods which can be performed within a VR experience.

(4 marks)

(b) There are seven ways of applying direction selection method. Among them, which method is a preferred option for indicating direction of traveling or exploring the virtual environment? State, why it is more preferable and what is its limitation?

(3 marks)

(c) Explain marker-based motion capture.

(6 marks)

Q5 (a) What is mixed realities?

(2 marks)

(b) State **THREE (3)** objectives of applying tracking mechanism in mixed realities.

(6 marks)

(c) Give **TWO (2)** points that differentiate marker-based tracking and markerless tracking.

(6 marks)

- END OF QUESTION -