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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015**

COURSE NAME : VIRTUAL REALITY
COURSE CODE : BIT 32503
PROGRAMME : 4 BIT
EXAMINATION DATE : JUNE 2015/JULY 2015
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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

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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° rotations, second, 90° pitch rotations about the x -axis and the last rotation consist of a 90° yaw rotation about the y -axis. Calculate and sketch the final location of the point P' in the object coordinate system (OCS). (7 marks)

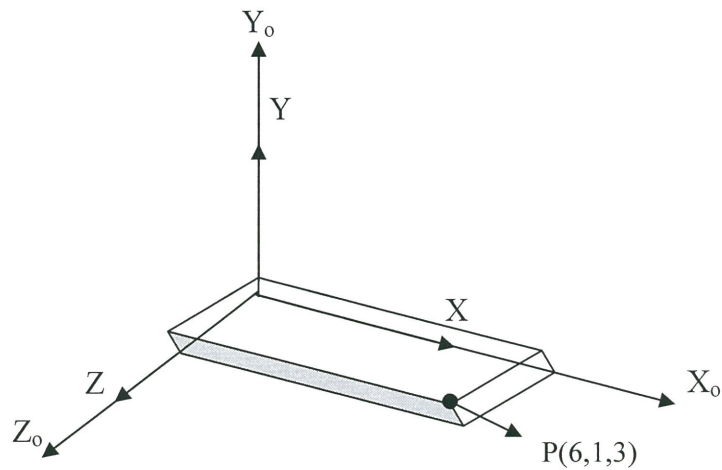


FIGURE Q1

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 game 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 -