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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016**

COURSE NAME : VIRTUAL REALITY
COURSE CODE : BIM 30803
PROGRAMME CODE : BIM
EXAMINATION DATE : JUNE / JULY 2016
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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

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Q1 **Figure Q1** below is the actual orientation of both frames of reference. A cube is placed in world coordinate with P(1,1,1). Based on **Figure Q1**, answer the following questions using the XYZ fixed angles method. Show your working step by step.

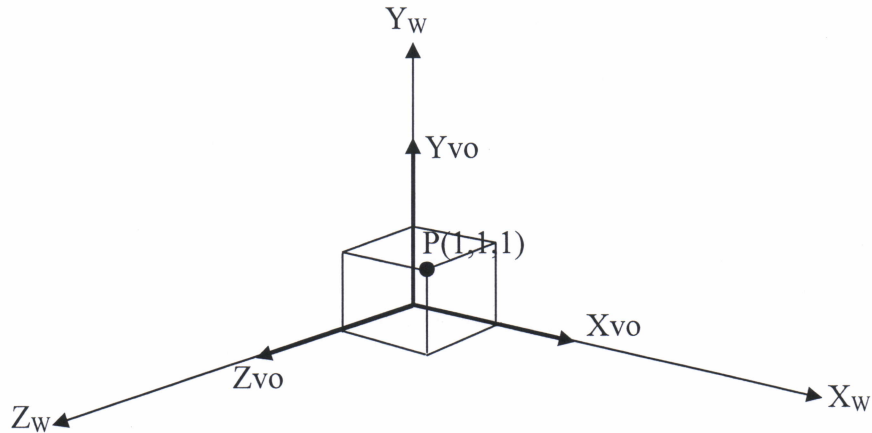


Figure Q1

(a) Sketch a new orientation of virtual observer (VO) if the following conditions are given:

$$\text{roll} = 90^{\circ}, \text{pitch} = 90^{\circ}, \text{yaw} = -180^{\circ}$$

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

(10 marks)

(b) Calculate P', a new position of P.

(10 marks)

Q2 Analyze the following scenario:

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

(a) Sketch a new orientation of VO.

(10 marks)

(b) Calculate the coordinate for (x', y', z') if the coordinate $(1, 1, 1)$ for (x, y, z) is given. Show your working.

(10 marks)

Q3 (a) A unit pyramid is offset along the x -axis and y -axis by 1 unit and z -axis by 2 units. Then it is scaled by a factor of 4. Calculate the P' of the scaled pyramid if $P(2, 1, 1)$ of unit pyramid is given.

(5 marks)

(b) Based on **Figure Q3(b)** below, the pyramid is rolled about the z -axis, after performing the 90° pitch rotation. Sketch the new orientation of the pyramid after accomplishing the rotation using direct cosine.

(15 marks)

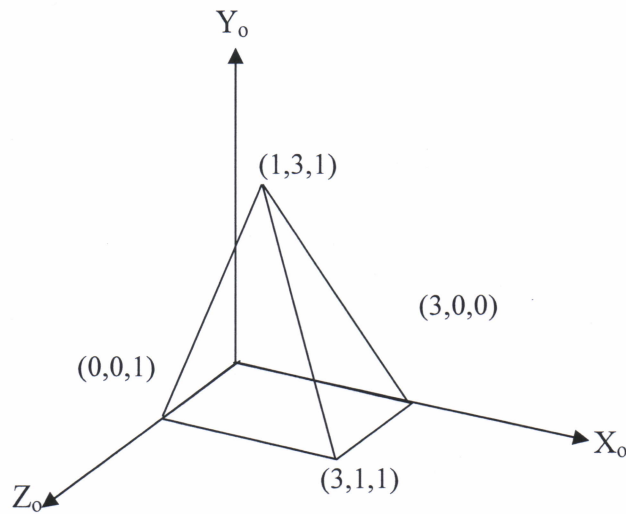


Figure Q3(b)

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 **ONE (1)** geometric shape that suits the object and character modeling for cartoon series titled “Upin and Ipin”.

(1 mark)

(ii) List **FOUR (4)** characteristics of the geometric shape based on your answer in **Q4(b)(i)**.

(2 marks)

- (iii) Sketch **ONE (1)** object or character that represents cartoon theme with the characteristics based on your answer in **Q4(b)(ii)**. Give **TWO (2)** characteristics of the sketched object or character.

(3 marks)

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

(8 marks)

- (b) Name **TWO (2)** typical ways of implementing the actual movements and interactions of the crowd.

(2 marks)

- (c) As a multimedia student, you are asked to develop an application of interactive virtual walkthrough for FSKTM building. The application has three features that allows user to select item, explore the walkthrough and choose from a menu list. Suggest **ONE (1)** direction selection method that suits your development and explain how it should work to deal with those features.

(7 marks)

- Q6** (a) Name **THREE (3)** types of tracking methods in mixed realities application. Identify **ONE (1)** point that differentiates them based on its functionality.

(6 marks)

- (b) Discuss **THREE (3)** social impacts that might be triggered by virtual reality (VR) and society.

(7 marks)

- END OF QUESTION -