

The University of Fiji

Undergraduate Programme
Department of Computer Science and Mathematics
Semester 1 Year 2019

FINAL EXAMINATION PAPER

ITC326 Three Dimensional Design

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours) to complete this paper**.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. **This Final Course Examination Paper is worth 100 marks contributes 50% of the total course assessments.**
6. This paper contains section A only. All questions are compulsory to answer.
7. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
8. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-5	Open Ended Questions	100	180 minutes
		TOTAL	100	180 Minutes

Question 1**[20 marks]**

- a. How are the Non-Uniform Rational B-splines (NURBS) surface created? Name two applications of NURBS curves and surfaces. **[2 marks]**
- b. What is the major purpose of increasing the number of subdivisions width for a primitive object like cube? **[1 mark]**
- c. Tony has created two curves parallel to each other with the CV curve tool. After selecting both the curves from the surface menu set he clicked surfaces and then loft. What will be the output after these steps? **[1 mark]**
- d. Explain revolve modelling technique. **[1 mark]**
- e. Suppose that you are creating a profile curve and one of the requirements of the design is to create a sharp point or a corner in the curve. Explain how you will accomplish this? **[1 mark]**
- f. What is the purpose of the hypershade window? **[1 mark]**
- g. Write the steps to create a bend to a cube. **[1 mark]**
- h. After adding a file texture to an object what happens when you click Create UVs > Spherical Mapping? **[1 mark]**
- i. Differentiate between orthographic and perspective view. **[1 mark]**
- j. When the plane objects are grouped together they create a hierarchy. What is a hierarchy? Name the window which helps us to view and edit hierarchy. **[2 marks]**
- k. There are three main types of selection modes. Name and briefly explain the selection modes. **[3 marks]**
- l. What is a pivot point? **[1 mark]**
- m. Explain the feature of cut face tool. **[1 mark]**
- n. What is the purpose of the visor window? **[1 mark]**
- o. Differentiate between attributes editor and channel box. **[2 marks]**

Question 2**[20 marks]**

- a. What is parameterization? **[1 mark]**
- b. Differentiate between point constraint, parent constraint and orient constraint. **[3 marks]**
- c. Write the steps to create and animate a cube moving and rotating from left to right on the workspace. **[3 marks]**
- d. Explain the important things a designer needs to know before using the bridge feature. **[2 marks]**
- e. Booleans is one to the important feature in Maya. Explain Booleans and its application. **[2 marks]**

- f. What is the advantage of templating the display of the objects in your scene? [0.5 mark]
- g. Explain the three primary methods for manipulating the camera view in Maya? [1.5 marks]
- h. What is the difference between dragging the time indicator on the time slider using the left mouse button and middle mouse button? [0.5 mark]
- i. To extrude an object, name the mode into which you will have to enter? [0.5 mark]
- j. Elaborate on the term rigging. Explain the 6 basic steps for this process. [4 marks]
- k. Explain what a mirror joint tool does? Write the advantage of using this tool. [2 marks]

Question 3

[20 marks]

- a. Vani is working on a 3d project, where she has to add lights and design other objects for a room and animate it through a camera. She is bit confused on how to do this. Help her to:
 - I. Prevent the spot light from passing through the concrete wall. [1.5 marks]
 - II. Insert and animate the camera. [2 marks]
 - III. Create a vase for the flowers. [2 marks]
 - IV. Add more section on the wall to embed/place a fancy vase holder. [2 marks]
 - V. Animate the door with the set driven key animation. The door should slide to open. [2 marks]
 - VI. Build a chair with back support. [4 marks]
 - VII. Insert a sky.jpeg file as the background of the scene. [1 mark]
 - VIII. Playblast and see the animation. [0.5 mark]
- b. Differentiate between Lambert and Blinn materials. [2 marks]
- c. What is the importance of using transformation tools' reflection setting? [1 mark]
- d. Explain the term parenting in Maya. Also identify which one is the parent node and which one is the child node from the statement called out by your instructor while parenting: "select the node named ArmEnd and then Shift-select the node named joint4". Elaborate on your choice. [2 marks]

Question 4**[20 marks]**

- a. Explain the purpose of freeze transformation while adding a control object in the scene. **[2 marks]**
- b. When editing a revolve curve, selecting the original creation curve can be challenging when it is situated amongst other existing curves and surfaces. Explain the editor which comes in useful to help developer perform the task. **[2 marks]**
- c. Differentiate between the area of low falloff and the area of high falloff. Give the colour coding which differentiates both. Explain how a developer can control the falloff size. **[2 marks]**
- d. Explain how a paint selection tool works? **[1 mark]**
- e. List 5 different types of renderers in Maya and explain where each of those is used. **[3 marks]**
- f. Write the steps, on how to enter into vertex editing mode. **[1 mark]**
- g. Blending between motion path and keyframe animation types is possible in Maya. What is Blending? Explain the advantage of blending. Explain how to blend the two animation types? **[3 marks]**
- h. The overall production process is divided into three major phases: preproduction, production and postproduction. Explain in detail, what happens in these three phases. **[5 marks]**
- i. Explain the concept of smooth skinning/ binding in Maya. **[1 mark]**

Question 5**[20 marks]**

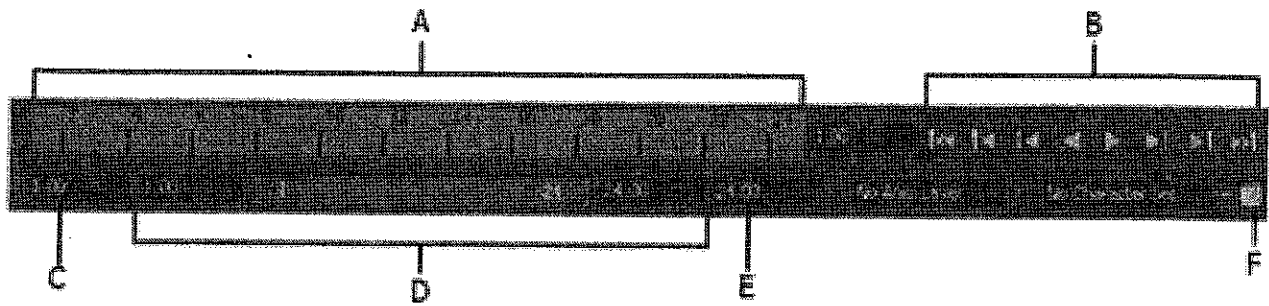
- a. Navneel created two models in Maya and wants to put those models in different layers. Explain him how to create a new layer and how to add the models in those layers. **[1 mark]**
- b. Why is the wireframe mode faster than the shaded mode? **[0.5 mark]**
- c. Write the functionalities of the following short-cut keys. **[3 marks]**

Key	Functions
Ctrl+g	
e	
Ctrl+shift+g	
q	
P	
4	

- d. Differentiate between Forward Kinematics and Inverse Kinematics. **[1.5 marks]**

e. Label the Figure below and explain the function of each.

[5 marks]



f. List the different types of renderers in Maya and explain what each is used for.

[4 marks]

g. How do you think at-home 3D printing can democratize manufacturing? What are ways that cheap 3D printers are changing the world right now? Do you think there will be a day when every home has its own 3D printer? What would an average day be like for someone in this 3D printing utopia? Write an essay on 3D printing focusing on the questions above.

[5 marks]

End of Exam

