Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Mid Term (Odd) Semester Examination March 2025

Roll no.....

Name of the Course and semester: BTech(CSE) 6th semester
Name of the Paper: Introduction to Virtual Reality
Paper Code: TCS 675
Time: 1.5 hour Maximum Marks: 50

Note:
(i) Answer all the questions by choosing any one of the sub questions
(ii) Each question carries 10 marks.
(iii) Please specify COs against each question.

Q1. (10 Marks)

a. "VR Application = VR Experience." Explain this in your own words. Use the concepts of Immersion, Interaction and Virtual World to explain a VR experience as well as applications that do not count as VR experiences.

OR

b. What is WebVR? Summarize the basic structure of an A-frame program. Write a simple code to create a box and sphere in A-frame.

Q2. (10 Marks)

a. Summarize the Monocular Depth Cues for Depth perception and explain all of them in detail. Also discuss the two binocular cues.

OR

b. What is the role of 'Quantization', 'Chroma Subsampling' and 'Huffman Encoding' in JPEG compression? How would you optimize the trade-off between file size and image quality in JPEG compression?

Q3. (10 Marks)

a. What do you understand by Degrees of Freedom? Summarize the Three Degrees of Freedom and Six Degrees of Freedom.

OR

b. You are using the 'World in a Miniature' approach in a VR scene that contains multiple buildings in a street. The street is filled with moving cars, trees, benches etc. You want to work on a building and due to the number of objects in the scene it is difficult to move around virtually. Also, you do not want to move the object (building), work on it and put it back. What approach would you use?

Q4. (10 Marks)

a. Assess the various parameters which influence the effectiveness of selection and manipulation operations.

OR

b. Using two examples for each explain Isomorphic and Non-Isomorphic operations.

Q5. (10 Marks)

a. You want to simulate the real hand, by providing a virtual hand in the virtual environment which the user can interact with the objects around them. Which interaction method will you use? Explain the different algorithms that can be used in this interaction method.

OR

b. Briefly examine the various techniques available for selection using HMDs. As a VR developer choose an approach to handle lack of controllers in HMD and to avoid fatigue.