Answer THREE questions.

1.

(a) Describe those unique features of interactive systems that provide the user with what is commonly known as 'virtual reality'. Attempt a definition of 'virtual environment' in this context.

[11 Marks]

(b) What are the factors thought to be important in inducing a sense of presence of participants in a virtual environment? In what kinds of applications would such a sense of presence be an important requirement?

[14 Marks]

2.

(a) What are the factors in an image likely to enhance perception of 3D depth, the psychological and physiological depth cues?

[7 Marks]

(b) Describe the setup of a head-mounted display and how stereo depth perception may be achieved.

[8 Marks]

(c) What is Robinett's method for overcoming the problem of distortion in a head-mounted display?

[10 Marks]

3. Discuss the factors that might lead to enhanced collaboration between people in the same shared virtual environment. Quote systems and experimental evidence in support of your discussion.

[25 Marks]

4.

(a) What is visibility culling and what is view volume culling? Briefly describe a view volume culling method.

[5 Marks]

(b) Describe the "cells and portals" visibility culling method. Include in your answer how the data structures are built during preprocessing and how they are used at runtime.

[8 Marks]

(c) Outline briefly the hierarchical occlusion maps method for visibility culling. Discuss the differences in approach and applicability between this and the method described in (b).

[12 Marks]

5.

(a) In the context of image based rendering, what are 'impostors' and how can they be used to accelerate rendering?

[8 Marks]

(b) What is a billboard and how does it differ from an impostor? What kind of objects are billboards most useful for?

[7 Marks]

(c) Describe briefly how level of detail control (Funkhouser 93) is used for maintaining a constant frame rate and how impostors can be integrated into this.

[10 Marks]

END OF PAPER