MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VII SEMESTER B.TECH.

END SEMESTER EXAMINATION

SUBJECT: AUGMENTED AND VIRTUAL REALITY (PE-III) – CSE 4051

Duration: 3 Hours Date: 30/11/2023 MAX.MARKS: 50

Note:

1. Missing data may be assumed suitably.

Q.No	Questions	Marks	CO /CLO	AHEP LO	Blooms Taxonomy level
1a)	Outline the factors that help massively adopt augmented and virtual reality applications.	3	1	1,3	2
1b)	Describe the architecture of the virtual reality system and the functional aspects of each part in brief.	3	1	1,3	2
1c)	Justify how immersion, interaction, and creativity could help virtual reality feel natural.	4	1	1,3	4
2a)	How visual experience in augmented and virtual reality is transformed into technical details?	3	2	3	3
2b)	Give the required details to distinguish between optical and video see-through displays.	3	2	3	3
2c)	Discuss the various requirements of a head-mounted device. Describe how a head-mounted device is integrated into a VR system.	4	2	3	3
3a)	Analyze three crucial areas of optical tracking analysis.	3	3	2	4
3b)	Identify and detail a marker with a 2D barcode and a black square.	3	3	2	3
3c)	Analyze how camera position is obtained from observations in the image using natural feature tracking without requiring the environment to be instrumented with markers. What are the five steps in a normal tracking pipeline that look for sparse interest points?	4	3	2	4

4a)	Describe the differences between double and single buffering in terms of pipeline balance.	3	4	2,3	4
4b)	Analyze the synchronization of video displays in virtual and augmented reality.	3	4	2,3	4
4c)	Analyze how the forces and mechanical textures related to haptic feedback are computed.	4	4	2,3	4
5a)	For geometric modeling, illustrate the situations of "same geometry with different topology" and "same topology but different geometry" with a drawing.	3	5	1,3,5	3
5b)	Enumerate at least five techniques for 3D object geometry modeling. Mention a few software suppliers and their standout features.	3	5	1,3,5	3
5c)	How does the haptics rendering pipeline detect collisions? What method is used to identify collisions more accurately? Describe in depth.	4	5	1,3,5	3

Abbreviations:

M – Marks

CO/CLO– Course Outcome (NBA)/Course Learning Outcome (IET).

CLO – Course Learning Outcome as per AHEP 4

BT - Blooms Taxonomy Level