U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 22AM7PEAUR **Max Marks: 100**
Course: Augmented Reality and Virtual Reality

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	Describe Augmented Reality (AR) with its Scope in Modern Technology and outline the historical development of AR.	*CO 1*	*PO 1*	**10**
	b)	Discuss different types of visual displays used in AR and their role in enhancing its experiences.	*CO 1*	*PO 1*	**10**
		UNIT - II			
2	a)	In a scenario where eye tracking is integrated into an educational Virtual Reality (VR) application. How might this technology personalize the learning experience for students	*CO 1*	*PO 1*	**10**
	b)	Provide an overview of different tracking techniques in VR. How do these techniques contribute to the accuracy and responsiveness of VR systems	*CO 1*	*PO 1*	**10**
		OR			
3	a)	A user needs to manipulate virtual objects in a VR environment. Elaborate how navigation and manipulation interfaces would facilitate a seamless and intuitive interaction for the user.	*CO 2*	*PO 2*	**10**
	b)	Justify the role of three-dimensional position trackers in VR input devices, and how do they contribute to user interactions	*CO 2*	*PO 1*	**10**
		UNIT - III			
4	a)	Outline the key process involved in designing interactions for VR. Considering the unique aspects of VR interactions differentiate VR design process from traditional 2D interfaces.	*CO 2*	*PO 1*	**10**
	b)	Explain the interactions methods and technologies that are commonly used for object manipulation in virtual spaces.	*CO 2*	*PO 1*	**10**
		OR			

	5	a)	Analyze the role of stationary VR systems in providing VR experiences. Provide the advantages and limitations of such systems compared to mobile setups.	*CO 2*	*PO 2*	**10**
		b)	Illustrate the mechanism applied in head mounted displays to enhance mechanisms of immersion in VR, and highlight the essential factors should be taken into account in crafting their design and utilization for an optimal user experience.	*CO 2*	*PO 1*	**10**
			UNIT - IV			
	6	a)	Explore the impact of latency in VR systems. How does minimizing latency contribute to a more immersive VR experience, and what techniques are employed to achieve real time responsiveness	*CO 3*	*PO 1*	**10**
		b)	In context of virtual reality environments, why is efficient collision detection crucial for a seamless user experienc. Explore the utilization of bounding volumes contributes to the optimization of collision detection, providing a real-world scenario to illustrate the impact on responsiveness of user interactions within Virtual spaces.	*CO 3*	*PO 1*	**10**
			UNIT - V			
	7	a)	Analyze the significance of points and affine spaces in mathematical underpinnings of AR/VR. Emphasize on mathematical concepts alied in the representation of spatial relationships in virtual and augmented environment.	*CO 3*	*PO 2*	**10**
		b)	Illustrate the usage of matrices in the mathematical foundations of VR for transformations and manipulations of objects within virtual and augmented environments.	*CO 3*	*PO 1*	**10**

****