



**K. K. Wagh Institute of Engineering Education and Research,
Nashik**

(An Autonomous Institute from A. Y. 2022-23)

**End-Sem Examination- Winter 2025
Marking Scheme**

Academic Year: 2025-2026	Semester: I
Name of Programme: MCA	Pattern: 2024
Name of Course: Augmented Reality and Virtual Reality	Course Code: 2409505C
Max. Marks: 60	Duration: 2:30Hr.

Q. No.	Details	(step wise marks)	Max. Marks
1	Define computer graphics. Explain its applications in real life. <ul style="list-style-type: none"> • Definition of Computer Graphics (accurate and concise) • Explanation of purpose and concept (generation and manipulation of visual content using computers) • Listing applications in real life (any 4–5 relevant areas) • Examples or diagram / short conclusion 	[2] [1] [2] [1]	[6]
2	What is animation? Explain types and principles of animation. <ul style="list-style-type: none"> • Definition of Animation • Explanation of concept (illusion of motion, frame-by-frame technique) • Types of animation (2D, 3D, Stop-motion, Computer-generated, etc.) – at least 3 types explained • Principles of animation (any 3–4 principles like squash and stretch, timing, anticipation, follow-through) 	[1] [1] [2] [2]	[6]
Q.3	a) Illustrate the use of Augmented Reality in a practical application and explain its working principle. (8marks) <ul style="list-style-type: none"> • Definition of Augmented Reality (AR) • Basic concept and explanation (integration of real and virtual environments) • Explanation of working principle (tracking, registration, rendering) • Diagram / real-life example / conclusion <p style="text-align: center;">OR</p>	[2] [2] [3] [1]	[16]
	b) Show different types of AR displays: visual, audio, and haptic. <ul style="list-style-type: none"> • Introduction to AR displays 	[1]	



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	<ul style="list-style-type: none"> • Visual Displays – types and function • Audio Displays – spatial and directional sound • Haptic Displays – tactile or force feedback • Example or conclusion 	<p>[2] [2] [2] [1]</p>	
	<p>c) Compare Augmented Reality and Virtual Reality with examples. (8 marks)</p> <ul style="list-style-type: none"> • Definition of AR • Definition of VR • At least 4 comparison points (interaction, immersion, environment, technology) • Example of each and short conclusion <p>OR</p>	<p>[1] [1] [4] [2]</p>	
	<p>d) Explain the process of marker-based tracking in AR applications. (8marks)</p> <ul style="list-style-type: none"> • Definition and concept of marker-based tracking • Stepwise working (marker detection, camera calibration, pattern recognition, 3D overlay) • Types of markers (binary, image, QR-code based) • Example / diagram 	<p>[2] [4] [1] [1]</p>	
Q.4	<p>a) How does Simultaneous Localization and Mapping (SLAM) support AR applications? (8 marks)</p> <ul style="list-style-type: none"> • Definition of SLAM • Working concept (mapping + localization process) • Role in AR (accurate environment tracking and virtual overlay) • Example or diagram <p>OR</p> <p>b) Illustrate the working of a Virtual Reality system by applying its key components in a practical scenario. (8 marks)</p> <ul style="list-style-type: none"> • Definition of Virtual Reality (VR) • Concept of VR experience (immersion, interaction) • Key components (input, output, software, tracking) – 3 to 4 components explained • Diagram / example 	<p>[2] [3] [2] [1] [2] [2] [3] [1]</p>	[16]
	<p>c) Describe the architecture of a Virtual Reality system. (8 marks)</p>		



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	<p>OR</p> <ul style="list-style-type: none"> • Overview of VR architecture • Explanation of system layers (Input devices, Simulation engine, Rendering engine, Output devices) • Diagram of VR architecture • Example / conclusion <p>d) Illustrate how haptic feedback enhances VR experience. (8 marks)</p> <ul style="list-style-type: none"> • Definition of haptic feedback • Explanation of how it works (force feedback, tactile sensation) • Benefits in VR (realism, interactivity, training) • Example / conclusion 	<p>[2]</p> <p>[4]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[3]</p> <p>[2]</p> <p>[1]</p>	
Q.5	<p>a) Demonstrate the application of different input interfaces used in Virtual Reality systems by explaining how they capture user interactions. (8 marks)</p> <ul style="list-style-type: none"> • Definition and purpose of input interfaces • Explanation of types – trackers, sensors, controllers, gloves • Example / diagram • Conclusion <p>OR</p> <p>b) Explain interactive techniques such as body tracking and hand gesture recognition. (8 marks)</p> <ul style="list-style-type: none"> • Definition of interactive techniques • Explanation of body tracking • Explanation of hand gesture recognition • Example / conclusion 	<p>[1]</p> <p>[5]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[3]</p> <p>[1]</p> <p>[1]</p>	[16]
	<p>c) Write a short note on the GHOST (General Haptics Open Software Toolkit). (8 marks)</p> <ul style="list-style-type: none"> • Introduction and full form of GHOST • Features and functions • Role in VR development • Example / conclusion <p>OR</p> <p>d) Compare different models of input and output interfaces in Virtual Reality. (8 marks)</p> <ul style="list-style-type: none"> • Introduction – meaning of input/output interfaces • Description of input models (tracking, controllers, gestures) • Description of output models (visual, audio, haptic) • Comparison table or example 	<p>[2]</p> <p>[3]</p> <p>[2]</p> <p>[1]</p> <p>[1]</p> <p>[3]</p> <p>[3]</p>	



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