Roll No.										

Department of ECE, College of Engineering, Guindy, Anna University, Chennai.

END SEMESTER EXAMINATIONS NOV 2024

V & VII Semester B.E – Biomedical Engineering R2019

BM5016 – Virtual Reality in Medicine

Duration:180 Minutes **Max.Marks: 100**

Answer ALL questions

CO1	Comprehend and appreciate the significance and role of this course in the present contemporary world.
CO2	Understand the basic concepts of Virtual reality.
CO3	Expose the concept of Virtual Reality Programming with toolkits.
CO4	Design of various modeling concepts.
CO5	Develop the Virtual Reality applications in different areas.

ADDITIONAL CONTROLLER OF EXAMINATIONS AU CHENNAI 600 025

Part-A (10X2=20)

Q.No.	Questions	Marks	CO	BL
1.	How are VR, AVR, MR and XR corelated?	2	2	3
2.	What are the three I's of VR and what are their role in the VR programming?	2	2	2
3.	Define the term Model and Simulation. List various types of models.	2	4	3
4.	What role does behaviour modelling has in VR design?	2	4	3
5.	List the various types of sicknesses and distinguish between VR and cyber sickness.	2	1	2
6.	What is sensor conflict and Neural mismatch?	2	1	2
7.	What is OpenGL 3D LWJGL? What are its applications?	2	3	2
8.	What is the principle behind rendering with index buffers?	2	3	2
9.	What is a supervisory controlled robotic surgery?	2	5	2
10.	How shared controlled robotic surgery is beneficial to medical fraternity?	2	5	2

Part-B (5X13=65)

Q.No.			Questions	Marks	CO	BL
11.	a		What is the need for trackers and navigators in a VR system and how do they blend and create a virtual world?	13	2	3
			OR			
	b		How are output devices classified for a VR system? How do they enhance immersive experience?	13	2	3
12.	a		Why do we need Geometric modelling in VR system design? With neat diagrams bring out the applications of mathematical transformations used in geometric modelling..	13	4	4
			OR			
	b		What is Physical modelling in VR? Explain in detail the applications of haptics rendering pipeline in object modelling.	13	4	4
13.	a		Classify VR sicknesses and identify the various causes of VR sickness. Does hardware contribute to VR sickness, if so, how?	13	2	4

			OR			
	b		Does the contents used in any VR system design cause VR sickness? If so, describe those circumstances stating the reasons for the same.	13	2	4
14.	a		With theoretical principles and algorithms clearly outlined write a program to display "Our first display" using OpenGL 3D LWJGL by defining and coding necessary packages, classes and methods.	13	3	4
			OR			
	b		With theoretical principles and algorithms clearly outlined write a program to illustrate the role of VAOs and VBOs in VR design using OpenGL3D LWJGL by defining and coding necessary packages, classes and methods.	13	3	4
15.	a		Bring out the role of VR in human-robot Interaction. What are the key technologies involved and justify their need.	13	5	2
			OR			
	b		How did surgery evolve over the years? what are the roles, salient features, components and unique challenges of a surgical simulator?	13	5	2

Part-C (1X15=15)

Q.No.			Questions	Marks	CO	BL
16.			What are the two measures of evaluation used in VR applications? Why do we need them? Bring out the various processes involved in detail.	15	1	5