

Model Question Paper-1 with effect from 2021(CBCS Scheme)

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Seventh Semester B. Tech Degree Examination
Introduction to Mobile Robotics

TIME: 03 Hours**Max.Marks:100**

Note: Answer any FIVE full questions, choosing at least ONE question from each MODULE

Module-1			*Bloom's Taxonomy Level	COs	Marks
Q.01	a	Write the historical development of telerobotics and its significance in remote handling applications.	L1	1	10
	b	Explain the application of telerobotics in space exploration.	L2	1	10
OR					
Q.02	a	Describe the different control architectures used in telerobotics, including direct control, shared control, and supervisory control.	L2	1	10
	b	Discuss the importance of stability and passivity in the control of telerobotic systems.	L2	1	10
Module-2					
Q.03	a	Describe the role of the Internet in the evolution and functionality of networked telerobots.	L2	1	10
	b	Examine the advantages and limitations of wireless communication in networked telerobot systems.	L2	1	10
OR					
Q.04	a	Discuss future directions and potential research areas in networked telerobotics.	L2	1	10
	b	Describe the role of command coordination in multi-operator networked telerobotic systems.	L1	1	10
Module-3					
Q.05	a	Describe the role of robot manipulators in teleoperation. Use the example of the Jason underwater vehicle manipulator to illustrate your answer.	L2	1	10
	b	Explain the concept of redundancy in robotic manipulators and describe how it can be both beneficial and problematic.	L2	1	10
OR					
Q.06	a	How does the limited bandwidth and communication delay impact teleoperation via the internet? Discuss strategies to mitigate these issues.	L2	1	10
	b	Describe a predictive display in teleoperation. How does it help operators manage latency issues in remote robot control?	L2	1	10
Module-4					
Q.07	a	Explain the concept of networked robot systems. How do these systems differ from traditional telerobotics, and what challenges do they face when integrated into computer networks?	L2	1	10
	b	Analyze the challenges associated with real-time processing and latency in networked robotic systems. How does CORBA address some of these challenges, and what are its limitations?	L1	1	10
OR					
Q.08	a	Explain the design and function of the remote-control camera system for monitoring applications. How does this system manage issues like time delay and overshooting in its interface design?	L2	1	10

	b	Discuss the use of convex cone algorithms in interactive motion planning for robot manipulators. What problem does this approach solve, and how does it optimize response times during teleoperation?	L2	1	10
Module-5					
Q.09	a	Discuss the main challenges and solutions addressed in the development of the Mercury Project, the first online robot system accessible via the Internet.	L4	1	20
OR					
Q.10	a	Discuss the Khep-On-The-Web project, highlighting how it enabled user interaction with a mobile robot through the Internet and the technical strategies used to maintain effective control and user experience.	L4	1	20

*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the Cos and Pos to be attained by every bit of questions.

Model Question Paper-2 with effect from 2021(CBCS Scheme)

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Seventh Semester B. Tech Degree Examination
Introduction to Mobile Robotics

TIME: 03 Hours

Max.Marks:100

Note: Answer any FIVE full questions, choosing at least ONE question from each MODULE

Module-1			*Bloom's Taxonomy Level	COs	Marks
Q.1	a	Write the overview of a Telerobotic System with an illustrative figure.	L1	1	10
	b	What advancements were introduced with the Central Research Laboratory model M2 system in 1982, and why was it significant?	L2	1	10
OR					
Q.2	a	How did NASA utilize teleoperation technology for space applications, and what were the outcomes?	L2	1	10
	b	Describe the significance of the 2001 transatlantic telesurgery demonstration using the ZEUS system. How did it showcase the potential of teleoperation in medicine?	L2	1	10
Module-2					
Q.3	a	What role does the Internet play in enabling networked telerobotics, and how do packet-switching networks enhance their functionality?	L2	1	10
	b	How do wired and wireless communication links differ in their application to networked telerobotics, and what are the limitations of each?	L1	1	10
OR					
Q.4	a	How do collaborative control mechanisms in networked telerobotics accommodate input from multiple human operators while maintaining system stability?	L2	1	10
	b	What are the defining properties of networked telerobotics, and how do these properties enhance public accessibility and usability?	L1	1	10
Module-3					
Q.5	a	Write briefly about the importance of degrees of freedom (DOF) in robot manipulators and the challenges that arise with limited DOF.	L3	1	10
	b	What is a singularity in robotics, and how does it affect the movement of a robotic arm?	L2	1	10
OR					
Q.6	a	List the components involved in a teleoperation system. Describe each component's function and significance in remote robot control.	L2	1	10
	b	Explain why is inverse kinematics particularly challenging?	L3	1	10
Module-4					
Q.7	a	Discuss the three main advantages of using the World Wide Web as a foundation for building robotic systems. Explain how these benefits enhance web-based robotics.	L2	1	10

	b	Describe the role and capabilities of VRML97 in online robotics, particularly its use of sensor nodes for interactive input. How could these sensors be improved to handle six-dimensional inputs?	L1	1	10
OR					
Q.8	a	Write comparison between the direct and indirect types of teleoperation systems in online robotics providing examples of applications for each type, and explain why one might be preferred over the other in certain scenarios.	L2	1	10
	b	Explain software architecture of a networked robot system on the Web. How are VRML, HTML, Java, and CORBA integrated to enable teleoperation of robots?	L2	1	10
Module-5					
Q.9	a	Explain how the "Xavier" project managed autonomous navigation in a dynamic environment and allowed remote users to interact with the robot.	L4	1	20
OR					
Q.10	a	Describe the objectives, features, and challenges of "The Telegarden" project and how it allowed users to interact with a physical environment remotely.	L4	1	20

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