Model Question Paper-1/2 with effect from 2022-23 (CBCS Scheme)

USN | | | | | | | | | | |

Fourth Semester B.E. Degree Examination
Subject Title: Robot Operating System

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

Note: 01. 02. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module -1	*Bloom's Taxonomy Level	CO's	Marks
Q.01	a	How does the concept of ROS reflect various philosophical perspectives	L2	CO1	10
	b	Illustrate the ROS graph depicting the interaction between nodes in a fetch-an-item robot system,	L2	CO1	10
		OR			
Q.02	a	Describe the concepts of Names, Namespaces, and Remapping in ROS	L2	CO1	10
	b	Elaborate on ROS catkin, Workspaces, and Packages, using an illustrative example to demonstrate how these components streamline the development and organization of robotic software projects.	L2	CO1	10
		Module-2			
Q. 03	a	Describe the components of robot subsystems and how ROS manages them. Additionally, discuss actuation as it pertains to mobile platforms.	L2	CO2	10
	b	Design a program to ROS node that prints the distance to an obstacle directly in front of the robot.	L3	CO2	10
		OR			
Q.04	a	Explain the process of creating packages within the ROS environment. Additionally, design programs for a robot in ROS to control red and green lights.	L3	CO2	10
	b	Explain the different robots which used in ROS environment	L2	CO2	10
		Module-3			
Q. 05	a	Describe the maps in ROS and how to edit the maps and record the data.	L2	CO3	10
	b	How to Build maps in ROS what are the different algorithms to build maps in ROS	L2	CO3	10
		OR			
Q. 06	a	How does a map server function within the context of ROS, and what role does it play in robot navigation?	L2	CO3	10
	b	How does ROS facilitate the process of localizing a robot within a map, and what strategies are employed to achieve accurate initial localization?	L2	CO3	10

Module-4					
Q. 07	a	Write a program for keyboard-Teleop-bot that listens for keystrokes and publishes it console	L3	CO3	10
	b	What is velocity Ramp explain with example	L3	CO3	10
OR					
Q. 08	a	Discuss the implementation of line-finding algorithms and the integration of sensor data for line detection	L3	CO4	10
	b	What is proportional Controller and explain how it is useful in follower robot navigation	L3	CO4	10
Module-5					
Q. 09	a	List the steps involved in ROS to control a TortoiseBot. Explain the importance of ROS message interface	L2	CO4	10
	b	Explain the steps involved in modeling robot in ROS environment. Also write a program to buildTortoiseBot chassis	L3	CO4	10
OR					
Q. 10	a	Explain the two tags that need to be added to simulate a TortoiseBot in Gazebo environment	L2	CO4	10
	b	Write the code for the TortoiseBot front caster and joint	L3	CO4	10

*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.