



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:IV
Class:SY	Program:B.Tech
Branch Code:ROB	Pattern:2022
Name of Course:Robot Operating System	Course Code:ROB222014
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

- 1a) Define ROS and Write a short note on Meta operating System in detail. (6) CO1, CO5

Question No. 2 Attempt following Question

- 2a) Write Any 6 ROS shell Commands with explanation. (6) CO2, CO5

Question No. 3 Attempt following Question

- 3a)
 - Explain concept of ROS Programming .
 - Write a simple code of publisher and subscriber node to print " XYZ " messege. (8) CO2, CO5

OR

- 3b)
 - Write a short note on Delivery service robots.
 - Write a short note on Gazebo (8) CO2, CO5

- 3c) Why there is need of manipulator ? Explain different programming rules of ROS Programming in detail. (8) CO2, CO5

OR

- 3d) Explain Move It concept in detail with respect to gazebo software. (8) CO2, CO5

Question No. 4 Attempt following Question

4a) Explain Intra-Communication in detail. (8) CO3, CO5

OR

4b) Explain Inter-Communication in Detail. (8) CO3, CO5

4c)

- What is ros serial?
- what is roserial server?
- what is roserial client?
- Explain all steps to install roserial package in ros noetic version.

 (8) CO3, CO5

OR

4d) Explain the terms: (8) CO3, CO5

1. ROS serial
2. Clock stretching
3. turtlebot3
4. Arbitration

Question No. 5 Attempt following Question

5a) Write a short note on : (8) CO4, CO5

1. Robot hardware constraints for SLAM
2. Environment of SLAM

OR

5b) What is mean by ROS navigation? Explain steps involved while navigation of any robot from source to destination. (8) CO4, CO5

5c)

- Explain concept of SLAM
- Explain steps involved in SLAM process

 (8) CO4, CO5

OR

5d) Write a short note on 1. pose of robot 2. coordinate transform (8) CO4, CO5

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