

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION – 2026

B.Tech–V Semester (ECE/ECS/EE-VLSI)

COURSE CODE (CREDITS): 25B1WEC541 (2)

MAX. MARKS: 15

COURSE NAME: Autonomous Mobile and Manipulator Robotics

COURSE INSTRUCTORS: Dr. Vikas Baghel

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.

(c) Use of calculators is allowed.

Q.No	Question	CO	Marks
Q1	(a) Explain the basic architecture of ROS 2 and describe the role of each layer in the architecture.	CO1	[3]
	(b) What are the purposes of <code>package.xml</code> and <code>CMakeLists.txt</code> in a ROS 2 package? Explain the role of each file and how they work together to build and manage a ROS 2 package.		[3]
	(c) Create a ROS 2 C++ node named <code>status_publisher</code> that publishes the message "Robot is running" every 2 seconds on the topic <code>/robot_status</code> .		[4]
Q2	(a) Create a Xacro file for a two-link robot in which <code>base_link</code> is a box of size $0.8 \times 0.8 \times 0.2$ m and <code>link1</code> is a box of size $0.2 \times 0.2 \times 0.8$ m, connected by a fixed joint located at <code>xyz="0 0 0.5"</code> , and use Xacro properties to define the dimensions of both links.	CO1	[3]
	(b) A point $P = (0, 1, 0)$ is rotated 180° about the Y-axis. Find the new coordinates using quaternion representation.		[2]