C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 99402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Elective

Electronics and Communication Engineering

19UEC902- PRINCPILES OF ROBOTICS

(Regulation 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. During reverse bias, a small current develops known as CO1-U

   (a) temperature (b) pressure (c) feedback (d)signal

2. The unit of linear acceleration is CO2- U

   (a) kg-m (b) m/s (c) m/s2d (d) rad/s22

3. The inertia matrix of a rigid body or a link CO3- U

   (a) is always positive definite

   (b)is always symmetric

   (c)is an orthogonal matrix

   (d) represents the mass distribution in 3D space

4. Which one is the oldest method of solving the find-path problem? CO4- U

   (a) Tangent Graph. (b) Cell decomposition (c) Visibility Graph (d) Voronoi Diagram

5. What is necessity for a lot of sensible mobile robotics funaction CO5- U

   (a) Map discovery (b) Geomatric Maps (c) Perceptul maps (d) Sensorial maps

PART – B (5 x 3= 15 Marks)

6. What is a DDR? What is its advantages? CO2 App

7.		Point out the various types of joints	CO3 Ana	
8.		When Jacobian becomes singular?	CO5 U	
9.		Define path.	CO3 U	
10.		Define motion interpolation?	CO3 U	

PART – C (5 x 16= 80 Marks)

11.	(a)	Describe salient features of robot in different field applications	CO1-U	(16)
		Or		
	(b)	Discuss about micro machines in robotics	CO1-U	(16)
12.	(a)	Derive the direct kinematics equation of PUMA 560 robot using D-H transformation matrix.	CO2- App	(16)
		Or		
	(b)	Derive the Denavit- Hartenberg representation of forward kinematic equations of robots	CO2- App	(16)
13.	(a)	Enumerate with neat schematic diagram Cartesian space moments of a two degree of freedom robot.	CO2- App	(16)
		Or		
	(b)	Write the expressions for linear and angular velocity ofa rigid body and also the linear velocity due to angular motion and combined angular and linear motion.	CO2- App	(16)
14.	(a)	Describe in detail about the control of robot manipulatorsin joint space trajectories.	CO1- U	(16)
		Or		
	(b)	Describe about the various terminology involved in trajectory planning.	CO1- U	(16)
15.	(a)	Analyze the various programming language available for programming Robotics. Also describes 1st and 2nd Generation robot programming languages	CO4- App	(16)
		Or		
	(b)	Compare weight, signal and delay commands in Robot programming	CO4- App	(16)