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Reg. No. : | | | | | | | | | | |

Question Paper Code: 99402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

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. If a robot has 3 legs, then the number of possible events is CO1-U

   (a) 24 (b) 720 (c) 120 (d) 240

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. Gross motion planning problem is known a? CO4- U

   (a) Fine motion planning problem. (b) Free space motion planning problem.

   (c) Compliant motion planning problem (d) none of the above.

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 meant by robot anatomy? CO1 U

7. What is meant by unit Quaternion CO2 U

8. Define Linear velocity. CO5 U

9.		Define path.	CO3 U	
10.		Mention the need of continuous Trajectory Recording	CO3 U	

PART – C (5 x 16= 80 Marks)

11.	(a)	Explain the different types of robots with neat diagrams	CO1-U	(16)
		Or		
	(b)	Discuss about micro machines in robotics	CO1-U	(16)
12.	(a)	Derive the Denavit- Hartenberg representation of forward kinematic equations of robots	CO2- App	(16)
		Or		
	(b)	Derive the direct kinematics equation of SCARA robot using D H transformation matrix.	CO2- App	(16)
13.	(a)	Express the jacobian matrix for motion of end-effecter generated by a rotary joint and prismatic joint.	CO1-U	(16)
		Or		
	(b)	Explain the following: (i) Wrist and arm singularity (ii) Linear and Angular velocities	CO1-U	(16)
14.	(a)	Implement interpolation function with the help of p-Degree polynomial and discuss its uses.	CO3- Ana	(16)
		Or		
	(b)	Express the time history of position velocity and acceleration for blended trajectory for point-to-point motion with via points.	CO3- Ana	(16)
15.	(a)	Discuss in detail Methods of Robot programming with suitable example.	CO1-U	(16)
		Or		
	(b)	Explain in detail Robot program as a path in space with suitable example	CO1-U	(16)