Hall Ticket Number:

Code No. : 17532 S (A)

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

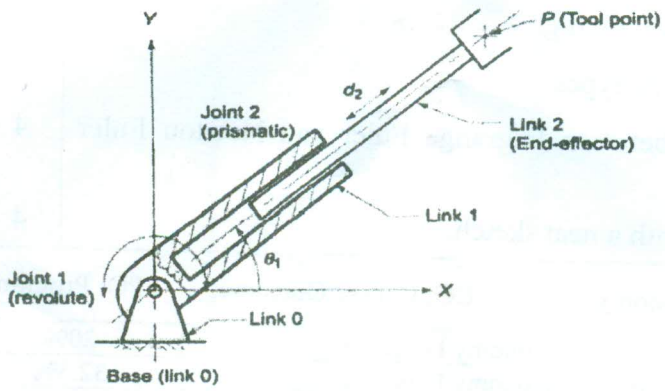
B.E. (Mech. Engg.) VII-Semester Supplementary Examinations, July-2022

Robotics (PE-II)

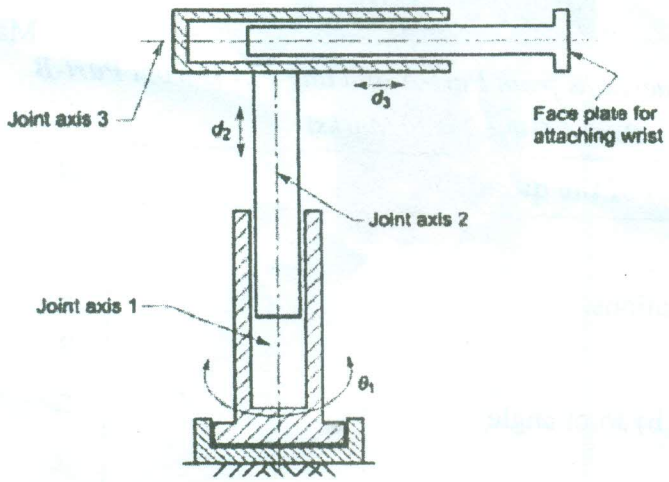
Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Define Resolution.	2	1	1	1
2.	List some Robotic specifications.	2	2	1	1
3.	What is RPY representation?	2	1	2	1
4.	Explain (a) Joint distance (b) Joint angle	2	2	2	1
5.	Define Trajectory.	2	1	3	1
6.	Explain the term redundancy.	2	2	3	2
7.	Explain the necessity of dynamics in robotics.	2	1	4	2
8.	Explain Lagrangian.	2	2	4	1
9.	Write the applications of proximity sensor.	2	1	5	1
10.	What is Tactile sensor.	2	1	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	Do the forward kinematics for cylindrical manipulator shown below.	6	4	1	3
					
	Fig.1. RP manipulator				
b)	Explain the word "ompliance".	2	2	1	1
12. a)	A cartesian robot move from (0, 0, 1200) to (2000, 1500, 0). The default speeds along x and y are 1000 mm/sec. The speed along z is 500 mm/sec. What are the trajectory and the travel time in the following? a) one axis at a time b) slew motion	5	3	2	3

Contd... 2

b)	Explain Denavit Hartenberg (D-H) parameters.	3	3	2	3
13. a)	Determine the Jacobian for following RPP manipulator.	6	3	3	3
					
b)	Explain the term redundancy in robotics.	2	1	3	1
14. a)	Determine the Lagrangian for RP manipulator shown in Fig.1	6	3	4	3
b)	What is inertia of tensor?	2	1	4	1
15. a)	Differentiate capacitive and resistive touch sensor.	3	3	5	3
b)	Explain any one proximity sensor with neat sketch.	5	3	5	3
16. a)	With neat sketches differentiate accuracy and precision.	4	3	1	3
b)	Differentiate forward and inverse kinematics.	4	2	2	3
17.	Answer any ***two*** of the following:				
a)	Explain singularity and its types.	4	2	3	3
b)	Write the differences between Lagrange Euler and Newton Euler method.	4	2	4	3
c)	Explain range sensor with a neat sketch.	4	2	5	3

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	32.5%
iii)	Blooms Taxonomy Level – 3 & 4	47.5%

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