Hall Ticket Number:

Code No. : 15554 H

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (Mech. Engg. : Honours) V-Semester Main Examinations, Jan./Feb.-2024
Industrial Robotics

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 repeatability.	2	1	1	1
2.	What is the work envelope obtained from Cartesian manipulator?	2	2	1	1
3.	Mention what type of end effector i.e. Gripper or tool is used for the following applications. a) Assembly b) Spray painting	2	2	2	2
4.	What is orthogonal joint?	2	1	2	2
5.	Write the formula when the coordinate frame is rotated about Z-axis.	2	1	3	1
6.	What is Yaw?	2	1	3	1
7.	Explain machine vision.	2	1	4	1
8.	List few force sensors.	2	1	4	1
9.	What is task programming?	2	1	5	1
10.	List few robotic programming languages.	2	1	5	1

Part-B (5×8 = 40 Marks)

11. a)	Explain the anatomy of a robot with neat sketch.	4	2	1	2
b)	Discuss cylindrical, polar robot configurations.	4	3	1	2
12. a)	A 4 kg rectangular block is gripped in the two-finger gripper and lifted vertically at a velocity of 1 m/s. if the acceleration is 25 m/s^2 and the coefficient of friction between gripping pads and block is 0.5, Calculate minimum force that would prevent slippage.	4	3	2	4
b)	List robot drive system types and explain its advantages and disadvantages.	4	2	2	2
13. a)	The coordinates of a point 'P' in frame {1} are [4 3 6]^T. The provision vector 'P' is rotated about z-axis by 60°. Find the coordinates of new point 'Q'.	5	3	3	4
b)	Explain any one proximity sensor.	3	2	3	2

			M	L	CO	PO
14.	a)	Compare capacitive and resistive touch sensors.	5	3	4	2
	b)	Discuss on artificial intelligence.	3	2	4	2
15.	a)	Distinguish teach pendant, walk through robotic programming methods.	5	2	5	3
	b)	Explain lead through robotic programming methods.	3	3	5	3
16.	a)	Explain SCARA manipulator with a neat sketch.	4	2	1	2
	b)	List types of robotic joints and explain.	4	2	2	2
17.		Answer any *two* of the following:				
	a)	Explain the characteristics of sensors.	4	3	3	3
	b)	Discuss on range sensors.	4	2	4	3
	c)	Compare offline and online programming methods.	4	2	5	2

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – **2**	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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