

Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560111

Department of Robotics & Artificial Intelligence

Continuous Internal Assessment Test-I

Course: **Drive Systems for Robotics**

Course Code: 22RI34

Semester: III

Maximum marks: **50**

Date:27-9-2024

Duration: 90 Min

Question No.	1		2	3	4	5	6	7	8
	a	b	a	a	a	a	a	a	a
Course Outcome	1	2	2	1	2	1	1	2	1
Program Outcome	1	1	1	2	1	2	1	2	1
Blooms Level	3	1	3	2	2	1	4	2	3

Blooms Level		3	4	5	2	1	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Note: Answer Five full questions, questions 1 and 2 are compulsory, all questions carry equal marks																						Marks																																																																															
1	a) Illustrate the objectives of drive systems.																					06																																																																															
	b) Describe the Fluid power system and mention any two disadvantages of it.																					04																																																																															
2	Illustrate the five advantages of Fluid power systems. List any five typical applications of Fluid power system.																					10																																																																															
3	Explain the configuration of control system for robotic joint actuation with relevant Block diagram.																					10																																																																															
(OR)																																																																																																					
4	Briefly describe the Pascal's law with a neat sketch also mention its governing Equation.																					10																																																																															
5	List the salient features of Power screws. Write the force applied equations of power screws.																					10																																																																															
(OR)																																																																																																					
6	Draw a neat diagram of Gears and illustrate the gear mechanism in robotic systems.																					10																																																																															
7	With a neat sketch explain the operation of a pump. Mention the theoretical flow rate equation of the pump with abbreviations.																					10																																																																															
(OR)																																																																																																					
8	Interpret the Proportional Controller with Mathematical equations. In a high pressure hydraulic cylinder, a force of 7000N is applied on a piston. The diameter of the piston is 165mm. What is the pressure acting on the fluid in the cylinder?																					10																																																																															

USN 1DS23RL052



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(An Autonomous Institute Affiliated to VTU, Belagavi, Accredited by NAAC with 'A' Grade)
Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560111
Department of Robotics & Artificial Intelligence
Continuous Internal Assessment Test-II

Course: Drive Systems for Robotics
Course Code: 22RI34
Semester: III

Maximum marks: 50
Date: 29-10-2024
Duration: 90 Min

Question No.	1		2	3	4	5	6	7	8
	a	b	a	a	a	a	a	a	a
Course Outcome	3	2	2	3	2	3	2	3	3
Program Outcome	1	1	3	2	3	2	3	2	1
Blooms Level	1	2	1	2	2	1	4	2	3
Note: Answer Five full questions, questions 1 and 2 are compulsory, all questions carry equal marks									Marks
1	a) Describe the Pneumatic system. List the typical advantages of it.								06
	b) Interpret the Hydraulic linear actuators. List the types of Linear actuators.								04
2	With a neat sketch describe the Direction Control Valve (DCV) of hydraulic drive system.								10
3	With a neat sketch describe the components of pneumatic power system								10
	(OR)								
4	With a neat sketch explain the operation of Pressure Relief Valves (PRV) in fluid power systems.								10
5	With a neat block diagram describe the production of compressed air.								10
	(OR)								
6	With a neat circuit diagram of double acting hydraulic cylinder, describe its controlling process								10
7	With a neat sketch explain the working of turbine type of air motor.								10
	(OR)								
8	List and explain the design parameters of Pneumatic power systems. Mention any three advantages of air motor.								10



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Department of Robotics & Artificial Intelligence

Continuous Internal Assessment Test-III

Course: **Drive Systems for Robotics**

Course Code: **22RI34**

Semester: **III**

Maximum marks: **50**

Date: **02-12-2024**

Duration: **90 Min**

Question No.	1		2	3	4	5	6	7	8
	a	b	a	a	a	a	a	a	a
Course Outcome	4	5	4	5	4	5	4	5	4
Program Outcome	1	2	1	2	1	3	2	1	2
Blooms Level	1	1	2	2	2	1	2	2	4
Note: Answer Five full questions, questions 1 and 2 are compulsory, all questions carry equal marks									Marks
1	a) Describe any six good requirements of Servo motor.								06
	b) Analyze the Discrete control and list its two types.								04
2	Briefly explain the Switch Reluctance Motor (SRM).								10
3	Explain with a neat Electric circuit diagram of Logic AND gate and write its truth table.								10
	(OR)								
4	Describe the important features of Brushless DC Motor and list any three typical applications of it.								10
5	Define the Programmable Logic Controller (PLC) and with neat block diagram describe the components of PLC.								10
	(OR)								
6	With a neat sketch describe the Synchronous motor.								10
7	Explain with a neat Electric circuit diagram of Logic OR gate and write its truth table.								10
	(OR)								
8	Briefly describe the Variable Frequency Drive (VFD) and illustrate its functions.								10

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Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560111

UG Semester End Examination, January/February - 2025

Course: **Drive Systems for Robotics**
 Course Code: **22RI34**
 Semester: **III**

Maximum marks: **100**Duration: **03 hours**

Note: i) Answer any FIVE full questions. ii) Questions 1 and 2 are compulsory.
 iii) Any missing data should be suitably assumed.
 iv) Verify the course code before answering.

Q. No.		Marks
1	a) Illustrate the objectives of drive systems. List any two typical applications of drive system. b) Briefly describe the proportional plus derivative controller along with equations. c) Explain the configuration of control system for robotic joint actuation with relevant block diagram.	05 07 08
2	a) Interpret the Hydraulic linear actuators. Mention any two advantages of it. b) With the help of neat sketch explain the operation of a pump. Mention the theoretical flow rate equation of the pump with abbreviations. c) With a neat circuit diagram of double acting hydraulic cylinder, illustrate its controlling process.	05 07 08
3	a) Illustrate the Pneumatic power system. Mention any two benefits of it. b) With the help of neat block diagram describe the production of compressed air. c) List and explain the design parameters of Pneumatic power systems. Mention any two advantages of air motor.	05 07 08
OR		
4	a) With a neat sketch mention any two salient features of turbine type of air motor. b) With the help of neat diagram describe the Direction Control Valve (DCV) of pneumatic drive system. Mention any two advantages of it. c) Design the actuation of direct actuation of cylinder and describe it.	05 07 08
5	a) Describe the direct drive actuator. Mention any two benefits of it. b) Briefly explain the Brushless DC Motor (BLDC) and mention any two applications of it. c) Discuss the typical DC Servomotors with governing equations.	05 07 08
OR		
6	a) Describe the Solenoid actuators and mention any two applications it. b) Sketch and explain the Stepper motor working principle. c) Briefly explain the Variable Frequency Drive (VFD). List any two advantages of it.	05 07 08
7	a) Illustrate the steady state stability of motor. b) With a help of neat sketch explain the components of Programmable Logic Controller. c) Illustrate the personal computer (PC) and soft logic control systems.	05 07 08
OR		
8	a) Discuss the Supervisory Control and Data Acquisition system and mention any typical application of it. b) With neat electric circuit diagram explain the logic AND gate along with truth table. c) Develop the Programmable Logic Controller program, truth table and symbolic representation for the following cases. i) Alarm Simulation ii) AND Logic gate.	05 07 08