Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech (Honours) Degree Examination June 2023 (2021 Admission)

Course Code: RAT292

Course Name: SENSORS AND ACTUATORS FOR ROBOTS

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) Marks

1		Mention the applications of Accelerometers.	(3)
2		List the functions of GPS.	(3)
3		Differentiate between Contact and Non Contact Sensors.	(3)
4		Define Proximity Sensing.	(3)
5		List the various steps performed by the vision processing system.	(3)
6		Explain the process of masking in Image processing.	(3)
7		List the advantages of electric actuators.	(3)
8		What is a stepper Motor.	(3)
9		What is the working principle of pneumatic muscles.	(3)
10		Differentiate between electrothermal and piezoelectric actuators	(3)

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Illustrate the measurement of velocity using incremental encoders.	(10)
	b)	Explain the working of a compass sensor with applications.	(4)
12	a)	Illustrate the working of Global Positioning System and its applications.	(10)
	b)	Explain the working of Inertial Measurement Unit.	(4)

Module -2

13	a)	Illustrate the working of Motion Sensors with applications	(10)
	b)	List the applications of tactile sensing in Robotics	(4)
14	a)	Illustrate the working of active range sensors and its applications.	(10)
	b)	Explain the phase shift measurement using laser Range finder.	(4)

Module -3

15	a)	Explain the various performance specifications of Sensors.	(10)
	b)	Explain Stereovision	(4)

16	a)	Illustrate the various techniques used for image processing.	(10)
	b)	Explain Object Recognition with examples.	(4)

Module -4

17	a)	Explain the construction of a DC Motor and its application.	(10)
	b)	List the advantages of AC motor over DC motor.	(4)
18	a)	Illustrate the working of a Switched Reluctance Motor and its applications.	(10)
	b)	What are synchronous motors.	(4)

Module -5

19	a)	Illustrate the various types of transmission mechanisms.	(10)
	b)	Explain cam follower mechanism with neat diagram.	(4)
20	a)	Illustrate the different types of micro actuators.	(10)
	b)	Explain the various mechanism for conversion of rotational to translational motion with examples.	(4)

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