Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S,FE) Examinations May 2026 (2019 Scheme)

Course Code: MRT204
Course Name: SENSORS AND ACTUATORS

Max. Marks: 100 Duration: 3 Hours

PART A

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

1		Define an actuator and state its role in a mechatronic system.	3
2		Distinguish between hard and soft magnetic materials on the basis of coercivity.	3
3		Name any three configurations of Variable Reluctance sensors and state one application of each.	3
4		Explain briefly the principle on which a Hall effect sensor operates.	3
5		Mention any three practical applications of solenoid actuators.	3
6		What factors must be considered while selecting a solenoid for transmission control?	3
7		What is a rotary actuator? Name its major types used in mechatronic systems.	3
8		Identify a few real-life applications of the disk rotary actuator.	3
9		Briefly explain the Coanda effect.	3
10		State any three limitations associated with tachogenerators.	3

PART B

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

Module -1

11	a)	Compare soft and hard magnetic materials, citing suitable examples of each.	7
	b)	Discuss the coating technologies used for magnetic materials and their significance.	7
12	a)	With the help of a neat sketch, describe the construction and working of a stepper motor, and explain its role in positioning applications.	14

Module -2

13	a)	With appropriate diagrams, explain the construction and working of a Variable Reluctance sensor.	8

	b)	Explain the terms sensor sensitivity and flux sensitivity, bringing out their significance.	6
14	a)	Using a neat sketch, describe the construction and working principle of a Hall effect sensor.	7
	b)	Discuss the merits, limitations and applications of the Hall effect sensor.	7

Module -3

15	a)	Explain in detail the. disk-type and plunger-type solenoid actuator configurations.	14
16	a)	Describe the construction and working of a long-stroke solenoid fuel pump.	7
	b)	Give a brief account of gasoline injectors used in automotive systems.	7

Module -4

17	a)	Using a neat sketch, discuss the construction and working principle of a cylindrical rotary actuator.	14
18	a)	With the aid of a neat sketch, explain the construction and operating principle of a claw-pole rotary actuator.	14

Module -5

19	a)	Describe the construction and working of a resolver with a neat diagram, and discuss its advantages and disadvantages.	8
	b)	Explain the operating principle of an interruptible jet sensor and a cone-jet proximity sensor.	6
20	a)	Discuss the working of encoders along with their merits, limitations and applications.	7
	b)	Explain the construction, working and truth table of a bistable fluidic flip-flop.	7

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