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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree Regular and Supplementary Examination June 2023 (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	Are sensors and actuators same? Justify with an example.	3
2	State two properties of a stepper motor and its application in mechatronic system.	3
3	Mention the applications of magnetic sensor.	3
4	List the limitations of magnetic speed sensor.	3
5	Recall the factors to be considered for selecting solenoids.	3
6	State the requirements of selecting a transmission solenoid.	3
7	List out the types of rotary actuators used in the design of mechatronics system.	3
8	Point out the advantages and disadvantages of the cylindrical rotary actuator.	3
9	Justify the use of stepper motors in the NC machines.	3
10	Recall the advantages and disadvantages of Coanda effect.	3

PART B

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

Module -1

11	a)	Briefly discuss about the following: a. Range and Span b. Repeatability and Reproducibility c. Error d. Linearity and Sensitivity	14
12	a)	Illustrate the construction of the stepper motor with a neat sketch and explain its working principle and uses in positioning applications.	14

Module -2

13	a)	Explain the relationship between tooth height and signal received from VR sensor.	14

14	a)	Explain the construction and working principle of magnetic speed sensor in detail.	14

Module -3

15	a)	Compare and contrast disk, ball, and plunger solenoids. Appraise its advantages and disadvantages.	14
16	a)	With a neat sketch, explain the construction and working principle of transmission spool valve solenoid.	14

Module -4

17	a)	Compare and contrast the different rotary actuators used in the design of mechatronic system and explain how the toothed magnetic part used in the disk rotary actuator produces the actuator torque.	14
18	a)	With a neat sketch, explain the construction and working principle of Claw Pole actuator and appraise the relationship between torque vs displacement when it is used in the system design.	14

Module -5

19	a)	With a neat sketch, explain the construction and working principle of an Inductosync and point out the significance and limitations of the same.	14
20	a)	Explain the construction and working principle of OR and NOR gates that are used to regulate the flow of fluid in the typical fluidic system	14

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