0100MRT204122501

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S,FE) Examination January 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		Compare hard and soft magnetic materials.	(3)
2		Enlist the applications of magnetic sensor.	(3)
3		Sketch and elucidate about VR sensor components.	(3)
4		Define the term 'sensitivity'.	(3)
5		Calculate the e.m.f produced by a disc rotating at 20 revs per second inside a solenoid of 1000 turns and length 1 m carrying a current of 1 A.	(3)
6		Synopsis the requirements of selecting a transmission solenoid.	(3)
7		Illustrate briefly about cylindrical rotary actuator excitation electromagnetic circuit.	(3)
8		List out the types of rotary actuators used in the design of mechatronics system.	(3)
9		Differentiate between resolvers and encoders.	(3)
10		Explain the concept of cone jet proximity sensor.	

PART B

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

Module -1

11	a)	Suggest an appropriate method for sensing the wheel speed with magnetic sensors for automotive application.	(10)
	b)	Analyse the various methods of magnetic materials used in market.	(4)
12	a)	Differentiate between diamagnetic, paramagnetic and ferromagnetic materials.	(6)
	b)	Discuss on coating technology. Summarize its need and benefits.	(8)

Module -2

13	a)	Discuss about linear solenoids working principle with its types.	(8)
	b)	"E shaped magnetic structure has superior performance than front mounted magnetic structure". Validate the statement and explain with neat figures.	(6)
14	a)	Explain the relationship between tooth height and signal received from VR sensor.	(7)

b) Discuss about conventional VR sensors (7)

Module -3

15 a) Elucidate the need of electronic diesel fuel injectors with neat sketch. (7)

b) Discuss about symmetrical analysis of electromagnetic devices. (7)

16 a) Discuss in detail about disk and plunger type configurations of solenoid actuators. (14)

Module -4

17 a) Enlist the applications of disk rotary actuator (4)

b) Explain in short disk rotary actuator excitation electromagnetic circuit (10)

18 a) With neat sketch, explain the construction and working principle of cylindrical rotary actuator. (14)

Module -5

19 a) Explain about different fluidic logic gates and flip flop with a note on its applications. (6)

b) Explain the construction ,working principle of resolver with diagram. Point out the advantages and disadvantages of resolvers for position measurement. (8)

20 a) Illustrate Coanda effect with neat sketch. (7)

b) Explain about the relevance of numerical control. List some of its applications (7)

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