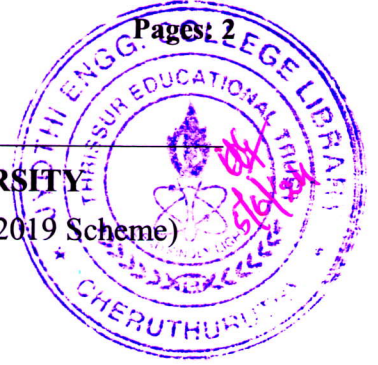Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Eighth Semester B.Tech Degree (R,S) Examination May 2024 (2019 Scheme)

Course Code: RAT418

Course Name: MECHATRONIC SYSTEM DESIGN

Max. Marks: 100   **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks.   Marks

1	Differentiate traditional and mechatronics design approaches.	(3)
2	Discuss the working principle of photodiode.	(3)
3	What is an actuator? Explain the types of actuators on the basis of the motion of the object.	(3)
4	Explain the working principle of an induction motor.	(3)
5	Describe the advantages and disadvantages of artificial neural networks.	(3)
6	With a neat diagram, explain the closed-loop control system.	(3)
7	Explain the conventional centralized fault detection method.	(3)
8	What is an intelligent sensor? Explain how it is different from a traditional sensor.	(3)
9	Define Life Span Value.	(3)
10	Explain the need for interfacing the control network with the data network.	(3)

PART B
Answer any one full question from each module, each carries 14 marks.

Module I

11 a) Explain how bimetallic strip works on the principle of thermal expansion and discuss the properties of bimetallic strip. (7)

   b) What is an inductive transducer? Describe the working principle of the mutual inductance transducer. (7)

OR

12 a) What is a thermistor? Explain the different types of thermistors. (7)

   b) Discuss the working principle of the light emitting diode (LED). (7)

Module II

13 a) What is magnetostrictive effect? Discuss the effect of changes when they are   (7)
acted on a material.

b) With a neat sketch, discuss the working of Electrical actuators.   (7)

OR

14 a) Differentiate hydraulic actuator and pneumatic actuator with the help of a neat   (14)
diagram.

Module III

15 a) Explain three different existing approaches of fault detection and isolation (FDI).   (10)

b) Differentiate analog control from digital control.   (4)

OR

16 a) What is fuzzy logic? Explain the architectural concept of fuzzy logic system.   (14)

Module IV

17 a) With a neat sketch, explain the classification of industrial robots.   (14)

OR

18 a) Discuss conveyor-based material handling systems and list out the advantages   (7)
and disadvantages of them.

b) What is the importance of surgical robots? Explain how they are necessary   (7)
nowadays.

Module V

19 a) Differentiate between centralised versus design of control systems.   (4)

b) What is the Sustainability and Evolution Assessment (SEA)? Discuss the cost   (10)
saving approach at sea.

OR

20 a) With a neat diagram, explain the spindle control realisation using the design of   (14)
control system scheme.

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