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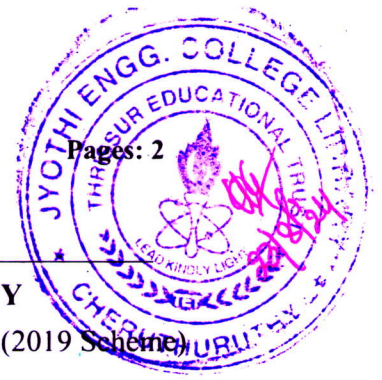
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Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Eighth Semester B.Tech Degree Supplementary Examination August 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  | Describe about mechanical switches                                                                       | (3)   |
| 2  | What is a strain gauge? Discuss its working principles                                                   | (3)   |
| 3  | What do you mean by the Geneva wheel? Explain                                                            | (3)   |
| 4  | Describe about cams and followers                                                                        | (3)   |
| 5  | List the Merits and Demerits of FDI                                                                      | (3)   |
| 6  | Mention and explain the different learning methods available in ANN                                      | (3)   |
| 7  | Write notes on Validation methodology                                                                    | (3)   |
| 8  | Explain how components-based modular design is integrated into a conveyor-based material handling system | (3)   |
| 9  | Describe the four layers of automation services in the design of a control system                        | (3)   |
| 10 | Give a brief on prognostics                                                                              | (3)   |

**PART B**

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

**Module I**

- 11 a) What is photovoltaic cell? Describe its working principle using a suitable diagram. (7)  
b) Discuss the construction and working of the bourdon tube pressure gauge. (7)

**OR**

- 12 a) What is actuator? Explain in detail about DC motor type electric actuator (14)

**Module II**

- 13 a) Explain with the neat sketch in detail about Fluid power actuators and piezoelectric actuators (14)

**OR**

- 14 a) Discuss in detail about belt and chain mechanism (7)  
b) Describe about cams and followers with relevant sketch (7)

**Module III**

- 15 a) Explain the architectural concept of the artificial neural network (ANN) and list out the three advantages and disadvantages of the ANN. (14)

**OR**

- 16 a) Discuss in detail about the different approaches of FDI. (14)

**Module IV**

- 17 a) Explain in detail about system validation with its scheme also explain in detail about the fusion technique with the relevant sketch (14)

**OR**

- 18 a) What are the issues faced in the design of conveyor-based material handling system? Propose a solution to address any one of the concerns discussed. (14)

**Module V**

- 19 a) What is a realisation study? Discuss the parameters that are monitored and controlled in the context of remote monitoring and control. (7)

- b) Discuss in detail about the dynamic modelling of HSSS (7)

**OR**

- 20 a) What is Sea scheme? Explain in detail with relevant diagram. (14)

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