28/5/2025

Elect.: H. Robotics - TE Sem VI Reg. C'scheme Summer 2025

(3 Hours) **Total Marks: 80**

Note:

1. A Question one is Compulsory
2. Attempt any **three** out of the **remaining Five** questions.
3. Assume suitable data if necessary.

Q1. Answer **any FOUR** of the following: (20)

a. Define Mechatronics and explain its key elements.
b. Differentiate between microprocessor and microcontroller.
c. What are the major levels of IoT architecture?
d. List the characteristics of IEEE 802.15.4 protocol.
e. Write a short note on Apache Storm.
f. Explain any two challenges in integrating IoT with cloud.

Q.2 (a) Explain the integrated design issues in Mechatronic systems with suitable examples. (10)
(b) Discuss the architecture and instruction set classification of the 8051 microcontroller. (10)

Q.3 (a) Describe the interfacing of ADC and DAC with 8051 microcontroller. (10)
(b) Explain the use of Raspberry Pi and Arduino in IoT applications. (10)

Q.4 (a) Elaborate on the major wireless protocols used in IoT with a comparison. (10)
(b) Discuss signal conditioning and utility support hardware in the context of mechatronic systems. (10)

Q.5. (a) How is data analytics implemented using Apache Hadoop and Spark in IoT systems? (10)
(b) With examples, explain machine-to-machine communication and its relevance to IoT. (10)

Q. 6 (a) Write the advantages and disadvantages of Mechatronics (5)
(b) Describe the concept of GPIO in Raspberry Pi. (5)
(c) What is the difference between Cloud Computing and Fog Computing? (5)
(d) How can Apache Oozie be used in IoT data management? (5)

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