

# Question Paper

Exam Date & Time: 27-Dec-2022 (02:30 PM - 05:30 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY  
SEVENTH SEMESTER B.TECH (INFORMATION TECHNOLOGY /COMPUTER AND COMMUNICATION ENGG.) MAKEUP  
EXAMINATIONS, NOV. 2022

### Internet of Things [ICT 4050]

Marks: 50

Duration: 180 mins.

A

Answer all the questions.

Instructions to Candidates: Missing data may be suitably assumed

- 1) A weather monitoring system collects data on temperature, pressure, humidity, and light in an area using multiple end nodes. The end nodes send the data to the cloud where the data is aggregated and analyzed. Write the process specification, domain, and information model specification steps for this IoT system. (5)
  - A)
  - B) What are the advantages of using cloud computing for IoT? Describe the services offered by three different cloud service models. (3)
  - C) Give the diagram of ETSI high-level architecture highlighting the various components. (2)
- 2) Illustrate the working of a query tree protocol for an RFID system with tag IDs {010, 100, 110, 101}. Show the content of the stack at each step. Suggest and illustrate a method to reduce the tag identification delay of the query tree protocol. (5)
  - A)
  - B) Discuss any four key features of IoT/M2M data. Discuss the initial four steps in managing the IoT data. (3)
  - C) List the features and applications of underwater sensor networks. (2)
- 3) What is a value chain? With the help of a neat diagram, discuss the various steps in the IoT value chain. (5)
  - A)
  - B) Explain the architecture of a wireless body area network- based IoT solution for a health monitoring system. (3)
  - C) State the need for edge computing. Briefly explain mobile edge computing. (2)
- 4) Explain the various identifiers and control messages in the routing protocol for low power and lossy networks. (5)
  - A)
  - B) Write any two applications for each of supervised, unsupervised, and reinforcement learning algorithms in IoT. (3)
  - C) Describe the design challenges in IoT solution. (2)

- 5) Elaborate the SCADA architecture with the help of neat diagram. Discuss the developments in different SCADA generations. (5)
- A)
- B) List and briefly explain the various serial communications available on Raspberry Pi board? (3)
- C) Provide the IoT application for each of the following : (2)
- a. Structured data b. Unstructured data c. Labelled data
- d. Unlabelled data.

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