Question Paper

Exam Date & Time: 17-Nov-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

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

Internet of Things [ICT 4050]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Missing data may be suitably assumed

1) Consider randomly placed sensor nodes in a low power and lossy networks as shown in Figure Q.1A. Construct destination oriented directed acyclic graph using routing protocol for low power and lossy networks assuming R1 as a root node. Node C expires first, followed by Node B, Node D, Node E, and Node F respectively. Explain all the steps clearly. (5)

A)

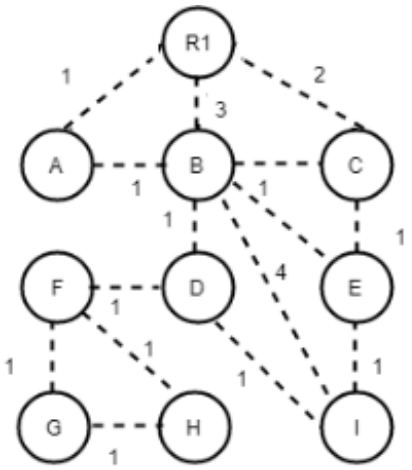

Fig. Q.1A

B) With examples, relate the unsuitability of cloud computing for specific IoT use cases. Discuss the alternative available to overcome this issue. (3)

C) With a neat diagram, highlight the various layers of the IoT architecture and give the functions of the upper two layers. (2)

2) Describe the various steps in the data flow from the point of data generation to the business layer. (5)

A)

B) Explain the significance and types of localization algorithms in RFID systems. Suggest a localization method for monitoring the patients in a hospital and justify the same. (3)

C) What is in-network data aggregation in wireless sensor networks? Give its significance. (2)

3) List the functionalities of the OGC-Sensor Web Enablement (SWE) domain working group. With the help of a neat diagram, discuss the interactions between the OGC-SWE standards. (5)

	A)		
	B)	Illustrate the difference between four different types of data analysis results with an IoT application for each.	(3)
	C)	With the help of neat diagrams, discuss the Level-1, Level-2, and Level-3 IoT deployment models.	(2)
4)		Explain any synchronous serial communication available in Rasberry Pi board. An IoT system for weather monitoring uses 3 sensors: Temperature, Pressure, and light. The sensors output 1 if the readings are outside the normal/acceptable range. Write a python program to configure and read the sensor outputs and then switch on the LED if the readings of all the three sensors are outside the acceptable range. The sensors are connected to GPIO pins 16, 17, and 18 of the BCM, and the LED is connected to GPIO 19.	(5)
	A)		
	B)	Which features of the 6LowPAN protocol will make it more suitable for IoT applications?	(3)
	C)	Describe the need for security in IoT solutions.	(2)
5)		An IoT solution is to be designed for controlling the brightness of a light in a home automation system. The system is connected to an application and the system is operated in two modes: manual and auto. In auto mode, the system measures the light level in the room and switches on the light when it gets dark. In manual mode, the system provides the option of manually and remotely switching on/off the light. Write the process specification and domain model specification steps for this IoT solution.	(5)
	A)		
	B)	Which features of CoAP does make it more suitable for IoT applications? Explain the different message types used in CoAP.	(3)
	C)	List the benefits of using IoT-based SCADA systems.	(2)

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