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Question Paper Code : 10850

M.C.A. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Third Semester

MC 4302 — INTERNET OF THINGS

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the main Internal components of an IoT device?

2. Mention any four sensors and its usage in IoT applications.

3. Differentiate between 'IoT' and 'M2M' technologies.

4. List any three major factors influencing a WSN (Wireless Sensor Network) design.

5. Compare 'Arduino' and 'Raspberry Pi' boards and investigate which one is the best platform to develop IoT prototypes.

6. How can Raspberry Pi be used to build a baby monitoring system?

7. Whether the IoT devices are always safe? Justify.

8. How security is provided for smart city application in IoT?

9. Transition from prototype to production is not an easy job. Why?

10. Why there is a need for middleware in IoT applications? Compare any three middleware available in the market.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the characteristics of IoT. Visualise the flavor of 'IoT' with five different real-world examples.

Or

(b) (i) State the impact of embedded computing. In what way it has been classified? Mention the applications of embedded computing. (7)

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(ii) Automatic street light system is smart and provides a safe night time environment for all road users including pedestrians. The Street light Automation system can reduce energy consumption and maintenance costs and also helps to reduce crime activities up to certain limit. Identify the sensors needed for this application. Specify the different types of sensors and actuators used for IoT applications. (6)

12. (a) Draw the architecture of Zigbee. Illustrate how a Zigbee Device Profile can be created for a Home Automation appflcation using Zigbee Device Objects (ZDO)?

Or

(b) (i) What is SCADA? Explain the various protocols supported by SCADA? (7)

(ii) Discuss about the BACNET Device Modeling. (6)

13. (a) Write an Rasperry sketch to implement two push buttons, namely, a "gas" button and a "brake" button. The "gas" button should speed up the blinking rate of the LED by one second, and the "brake" button should slow it down by half of a second. Draw the hardware schematic diagram of the same.

Or

(b) Consider a smart home energy management system with smart meters and sensors for ambient sensing. The system should address energy conservation by intelligently scheduling HVAC(Heating, Ventilation and Air Conditioning) appliances with the help of ambient sensing and resident occupancy information. Identify the different components like reading inputs, controlling output for the system and the sensors needed. Clearly state the assumptions made. Use Raspberry Pi and python programming to implement.

14. (a) Analyze the various privacy and security issues in developing IoT applications? Explain the security protocol used in IoT.

Or

(b) What are the characteristics of Smart City? Explain briefly about challenges of Smart City Implementation.

15. (a) An IoT system comprises of a number of functional blocks that provide the system the capabilities for identification, sensing, actuation, communication and management. Including all such features construct a possible architecture for the future IoT.

Or

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(b) (i) Discuss about the various features of Hydra. Also design an IoT application of your choice that satisfy the needs of modern day demands of an industry. (8)

(ii) Explain about various sections in Test Analysis Report Documentation. (5)

PART C — (1 × 15 = 15 marks)

16. (a) Explore the anatomy of IoT including end devices, gateway and cloud platform services. Investigate how IoT differs from traditional internet applications on bandwidth availability, resources, constraints, error rate, reliability and scalability issues. Describe various wireless technologies used in IoT.

Or

(b) Bluetooth and ZigBee are actually quite complimentary to each other. There are times someone would want to use Bluetooth for IoT applications, and there are times when ZigBee is a better choice. What is your best choice for "SmartEnt" application among Zigbee and Bluetooth? Illustrate the architecture of Zigbee and Bluetooth with its working process with respect to "SmartEnt". Also compare the performance behavior of Bluetooth and Zigbee. "SmartEnt" is an entertainment design and production firm uses sensors in entrances of venues to understand the foot traffic of people at events. This "SmartEnt" IoT application visualizes the attendee traffic patterns in real time to help sponsors understand the best places to advertise.

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