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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 60003

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

Seventh Semester

Information Technology

U19IT725 – BUILDING OF INTERNET OF THINGS

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

| | | | |
|--------------------------|--------------------|----------------|-----------------|
| Knowledge Levels (KL) | K1 – Remembering | K3 – Applying | K5 - Evaluating |
| | K2 – Understanding | K4 – Analyzing | K6 - Creating |

PART – A

(10 x 2 = 20 Marks)

| Q.No. | Questions | Marks | KL | CO |
|-------|--|-------|----|-----|
| 1. | List out the various characteristics of IoT along with relevant examples. | 2 | K2 | CO1 |
| 2. | State the primary resource constraints that has to be addressed during the embedded system design. | 2 | K2 | CO1 |
| 3. | Differentiate between IoT and M2M with an example. | 2 | K2 | CO2 |
| 4. | Define a YANG model for a simple bread toaster application which includes attributes such as power status, temperature, and cooking mode. | 2 | K3 | CO2 |
| 5. | Enunciate the key differences between the SPI and I2C protocols. | 2 | K2 | CO3 |
| 6. | Among Arduino and Raspberry Pi, investigate which one will be more suitable for developing a smart home automation system? | 2 | K3 | CO3 |
| 7. | Justify the statement “LoRa’s long-range communication capability makes it more suitable than Wi-Fi for wide-area applications, such as agricultural monitoring or wildlife tracking”. | 2 | K3 | CO4 |
| 8. | Elucidate the role of SCADA in the industrial automation systems. | 2 | K2 | CO4 |
| 9. | How is an IoT based embedded system useful in health fitness monitoring? | 2 | K3 | CO5 |
| 10. | How does cloud computing enhance the capabilities of IoT systems? | 2 | K2 | CO5 |

PART – B

(5 x 13 = 65 Marks)

| Q.No. | Questions | Marks | KL | CO |
|--------|--|-------|----|-----|
| 11. a) | Automatic pill dispensers are programmed to dispense medications according to a pre-set schedule to ensure that the users take right medications at the right time. Caregivers or healthcare professionals can remotely monitor the medication adherence of the patients as well. These automated dispensers can send alerts and reminders to users via smartphones, tablets, or wearable devices, ensuring that they don't miss a dose. When medication is running low, the dispenser can send notifications to caregivers or directly to pharmacies for timely refills. These devices can enhance overall health and well-being of the patients. | | | |
| | i. Suggest a suitable IoT logical design for implementing the above automated pill dispensers. | 13 | K3 | CO1 |
| | ii. Elaborate the chosen IoT logical design model with a neat sketch. | | | |
| | (OR) | | | |
| b) | Brief out the IoT functional block along with a neat sketch. | 13 | K2 | CO1 |
| 12. a) | Compare and contrast the traditional conventional network architecture with the SDN architecture in the IoT environment. | 13 | K2 | CO2 |
| | (OR) | | | |
| b) | Elucidate the NFV architecture with a neat diagram. | 13 | K2 | CO2 |
| 13. a) | Design a basic temperature monitoring system using Arduino and a temperature sensor that displays the current temperature and triggers actions based on temperature thresholds. Also write down the relevant Arduino sketch and the circuit diagram for the same. | 13 | K3 | CO3 |
| | (OR) | | | |
| b) | Connect an RGB LED to the Arduino and write an arduino sketch to cycle through different colors by changing the intensities of the red, green, and blue components. | 13 | K3 | CO3 |
| 14. a) | Discuss how a CoAP protocol can be employed in a disaster management system to gather real-time data from various sensors deployed in the field. Also analyze how CoAP's will operate in low-bandwidth and high-latency environments which makes it suitable for such deployments. | 13 | K3 | CO4 |
| | (OR) | | | |

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|-----|----|---|----|----|-----|
| | b) | Explain the physical and MAC layer protocols in IoT with a suitable architecture diagram. | 13 | K2 | CO4 |
| 15. | a) | Discuss how cloud services can enable real-time analytics and machine learning for IoT based applications. Provide an example of a specific cloud service used in this context. | 13 | K3 | CO5 |
| | | (OR) | | | |
| | b) | What are all the major techniques for writing an efficient embedded code for IoT systems? Explain. | 13 | K2 | CO5 |

PART – C

(1 x 15 = 15 Marks)

| Q.No. | Questions | Marks | KL | CO |
|--------|---|-------|----|-----|
| 16. a) | “Smart shelves are the next-generation retail technology that offers a personalized shopping experience for the customers. Retailers can focus on providing customer-centric retail space to enhance the customer’s in-store shopping experience. These digital shelves can monitor the product load, display product details and prices and other additional information that engages shoppers and allows them to understand more about the product and the company. By monitoring the customer shopping trends, retailers can use the analytics system to improve their services to the customers”. Explain how MQTT can be used to construct the IoT enabled smart shelves for reliable and interactive shopping technology for the customers. | 15 | K3 | CO1 |
| | (OR) | | | |
| b) | A shopping mall wants to implement a smart parking system that detects available parking spots and displays the information on a digital signboard at the entrance. Design and implement a smart parking system using ultrasonic sensors and Arduino along with a neat circuit diagram. | 15 | K3 | CO5 |