Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 20553

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Fifth Semester

Electronics and Communication Engineering

CEC 365 – WIRELESS SENSOR NETWORK DESIGN

(Common to : Electronics and Instrumentation Engineering/ Electronics and Telecommunication Engineering and Instrumentation and Control Engineering)

(Regulations – 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the challenges of designing and deploying WSNs.

2. Compare the Adhoc networks with WSN.

3. Show the working principles of TDMA-based MAC protocols.

4. Identify the parameters required for evaluating MAC protocols.

5. Discuss the security considerations in 6LoWPAN networks.

6. Explain the techniques used to manage large-scale deployments and optimize network performance.

7. Describe a scenario where the end-to-end paradigm is highly relevant.

8. Define SNMP.

9. Define TinyOS, and what sets it apart from other operating systems in the context of wireless sensor networks (WSNs).

10. Show how Contiki handle inter-process communication.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss the key challenges in the design and deployment of wireless sensor networks. Discuss considering the factors like energy efficiency, scalability, and reliability impact WSNs.

Or

(b) WSNs often interact with external systems and applications. Describe the service interfaces used to connect WSNs with other systems, and how do they facilitate data exchange and control.

12. (a) Explain the key differences between MAC protocols for wired networks and wireless networks. What challenges do wireless MAC protocols address that are not present in wired networks?

Or

(b) In the context of wireless sensor networks, what specific challenges do MAC protocols need to address, and how do protocols like S-MAC and T-MAC optimize energy consumption and data Communication?

13. (a) Describe the relationship between IPv6 and 6LoWPAN. How does 6LoWPAN extend IPv6 to address the unique requirements of low-power wireless networks?

Or

(b) 6LoWPAN is commonly used in mesh networks. Describe the advantages and challenges of building mesh networks with 6LoWPAN, and how it supports sell-organizing and self-healing capabilities.

14. (a) Explain the role of Real-time Transport Protocol (RTP) and Session Initiation Protocol (SIP) in enabling real-time communication and sessions in networks.

Or

(b) Discuss the core components and messaging patterns used in MQTT-S, and provide examples of applications or scenarios where it is commonly deployed.

15. (a) Discuss the advantages and limitations of using TOSSIM for simulating sensor network applications compared to real-world deployments.

Or

(b) Discuss the Contiki support framework to both low-power wireless technologies, like 6LoWPAN and RPL, and traditional Internet protocols, such as TCP/IP and UDP, within its communication stack in detail.

PART C — (1 × 15 = 15 marks)

16. (a) Design a common structure of transceivers for the Radio Frequency (RF) front end and the baseband with Transceiver operational states.

Or

(b) Develop an architecture and identify a suitable method available for implementing Geographic routing without positions.

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