Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : F 20553

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

Fifth Semester

Electronics and Communications 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.   Draw the Super frame structure of IEEE 802.15.4.

2.   List out the expressibility requirements for WSN service interfaces.

3.   State the need for Low duty cycle protocols. Give example.

4.   How hidden-terminal problem occurs in WSN?

5.   State the functions of an adaptation layer in 6LoWPAN.

6.   Compare stateless header and context based header compression.

7.   List out the application design issues to be considered and where they occur in a LoWPAN.

8.   Name the industry-specific application protocols that can be used over IP, and are relevant for Wireless Embedded Internet applications using 6LoWPAN.

9.   Distinguish between TinyOS and ContikiOs.

10. Define Cooja Simulator. What are the benefits of Cooja simulator?

PART B — (5 × 13 = 65 marks)

11. (a) Describe in detail about physical layer and transceiver design considerations in WSNs. (13)

Or

(b) Outline the basic design principles for WSNs with neat sketch. (13)

12. (a) Explain the following routing protocols with neat sketch.

(i) SPIN (7)

(ii) LEACH. (6)

Or

(b) Explain the following contention and schedule based protocols with neat sketch.

(i) SMAC (6)

(ii) TRAMA. (7)

13. (a) Draw and explain the architecture, link layers of 6LoWPAN and compare IPv6 protocol stack with 6LoWPAN with a typical IP protocol stack.

Or

(b) Define Mobility of 6LoWPAN. Explain the following with neat sketch :

(i) Types of mobilty (4)

(ii) Proxy HomeAgent (4)

(iii) Proxy MIPv6. (5)

14. (a) (i) Outline the commonly used operating systems for sensor management. (6)

(ii) Summarize the basic set of paradigms by which most Internet application protocols function. (7)

Or

(b) Explain the following commonly used highly potential protocol standard for use, over 6LoWPAN.

(i) MQTT-S (6)

(ii) CAP. (7)

F 20553

15. (a) (i) Discuss about the interface and configuration of nesC language. (6)

(ii) Explain how the TinyOS operating system supports resource constrained hardware platforms. (7)

Or

(b) (i) Describe in detail about Contiki OS used in wireless sensor networks. (6)

(ii) Explain the TOSSIM simulator used in wireless sensor networks. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Examine the Challenges, limitations and Constraints to implement Wireless Sensor networks and Summarize any three real time applications of WSN with neat sketch. (15)

Or

(b) Analyze the following Routing Protocol with suitable applications

(i) MANET (8)

(ii) ROLL. (7)