



**M.E. DEGREE EXAMINATIONS: APRIL / MAY 2023**

(Regulation 2018)

Second Semester

**COMMUNICATION SYSTEMS**

P18COT2001: Wireless Sensor Networks

**COURSE OUTCOMES**

**CO1:** Interpret the basics concepts of Wireless Sensor Network architecture and its principles.

**CO2:** Classify and examine the various communication protocols in WSN stack.

**CO3:** Illustrate the concepts of localization and time synchronization.

**CO4:** Analyze the design challenges in various Sensor Networks.

**CO5:** Implementation of WSN using open source tools.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Assertion (A): In WSN nodes are deployed redundantly. CO1 [K<sub>3</sub>]  
Reason (R): Redundant nodes helps in energy efficient operation
- a) Both A and R are Individually true and R is the correct explanation of A      b) Both A and R are Individually true but R is not the correct explanation of A
- c) A is true but R is false      d) A is false but R is true
2. Which of the following statements are correct CO1 [K<sub>2</sub>]
1. Multihop networks are used for long distance communication
  2. Multihop networks improves energy efficiency
  3. Multihop network helps in autoconfiguration
  4. Nodes in WSN need not communicate with other nodes
- a) 1,2      b) 1,2,3
- c) 1,2,3,4      d) 1,3
3. Deallocation of address, when a node in a WSN crashes is known as \_\_\_\_\_ CO2 [K<sub>1</sub>]
- a) Graceful deallocation      b) Abrupt deallocation
- c) Forced deallocation      d) Network deallocation



10. Assertion (A): In Underwater Wireless Sensor Networks acoustic signals are used instead of RF signals CO4 [K<sub>3</sub>]  
Reason (R): Acoustic signals can propagate for longer distance in water.
- a) Both A and R are Individually true and R is the correct explanation of A      b) Both A and R are Individually true but R is not the correct explanation of A  
c) A is true but R is false      d) A is false but R is true

**PART B (10 x 2 = 20 Marks)**

11. Name the different operation modes with power consumption that are supported by the WSN node to have energy efficient operation. CO1 [K<sub>1</sub>]  
12. Differentiate between WSN and adhoc network. CO1 [K<sub>2</sub>]  
13. What is addressing overhead? What are the factors influences this overhead? CO2 [K<sub>2</sub>]  
14. Differentiate between Proactive and on-demand routing protocols. CO2 [K<sub>3</sub>]  
15. Compare Lateration with angulation. CO2 [K<sub>2</sub>]  
16. What is Networkwide time synchronization? CO3 [K<sub>2</sub>]  
17. Name the address management tasks used in WSN. CO3 [K<sub>2</sub>]  
18. How actor nodes are different from sensor nodes? CO3 [K<sub>2</sub>]  
19. What is Receiver/ Receiver synchronization? Name the algorithms used for Receiver/ Receiver Synchronization. CO3 [K<sub>2</sub>]  
20. What is Event driven Programming? CO5 [K<sub>2</sub>]

**PART C (10 x 5 = 50 Marks)**

21. Describe the components of a sensor node with neat block diagram. CO1 [K<sub>2</sub>]  
22. Discuss the transceiver structure of WSN with different operational states. CO1 [K<sub>2</sub>]  
23. With neat diagram, describe the superframe structure of IEEE 802.15.4. CO2 [K<sub>2</sub>]  
24. What is data aggregation? What are the metrics used to measure the efficacy of data aggregation? CO2 [K<sub>2</sub>]  
25. Discuss the different methods used in single hop localization. CO3 [K<sub>2</sub>]  
26. With a neat diagram describe the Lightweight Time Synchronization protocol used in WSN. CO3 [K<sub>2</sub>]  
27. Discuss the physical architecture of Wireless Sensor and Actor Networks. CO4 [K<sub>2</sub>]  
28. Briefly discuss how WSN is used in health monitoring. CO4 [K<sub>2</sub>]  
29. Describe the use of Wireless Sensor Networks in indoor light control. CO4 [K<sub>3</sub>]  
30. Discuss how Carrier Sense Multiple Access Protocol avoids collision when multiple transmitters use the same channel. CO3 [K<sub>2</sub>]

**Answer any TWO Questions**

**PART D (2 x 10 = 20 Marks)**

31. Discuss the low duty cycle protocols and wakeup concepts with necessary diagrams. 10 CO2 [K<sub>2</sub>]
32. Brief the architecture and application of WSN in underwater environment. 10 CO4 [K<sub>3</sub>]
33. With Illustration discuss the components of TinyOS architecture. 10 CO5 [K<sub>2</sub>]

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