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**School of Information and Science**  
**Mid - Term Examinations - November 2024**

**Semester:** III

**Date:** 06-11-2024

**Course Code:** CSA4027

**Time:** 11.45am to 01.15pm

**Course Name:** Wireless Sensor Networks

**Max Marks:** 50

**Program:** MCA

**Weightage:** 25%

**Instructions:**

*(i) Read all questions carefully and answer accordingly.*

*(ii) Do not write anything on the question paper other than roll number.*

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**Part A**

**Answer ALL the Questions. Each question carries 2marks.**

**5Qx2M=10M**

- |   |   |         |    |     |
|---|---|---------|----|-----|
| 1 | State the main function of a sensor in a wireless sensor network?                 | 2 Marks | L1 | CO1 |
| 2 | Define 'multicasting' in the context of ad hoc networks.                          | 2 Marks | L1 | CO1 |
| 3 | Name two types of applications where reconfigurable sensor networks are utilized. | 2 Marks | L1 | CO1 |
| 4 | Name two performance requirements of MAC protocols in wireless networks.          | 2 Marks | L1 | CO2 |
| 5 | Outline bandwidth efficiency in the context of MAC protocols for adhoc networks.  | 2 Marks | L1 | CO2 |

**Part B**

**Answer ALL Questions. Each question carries 10 marks.**

**4QX10M=40M**

- |   |  |         |    |     |
|---|--|---------|----|-----|
| 6 | a. Recite the importance of schedule-based protocols in WSN MAC protocols.                               | 4 Marks | L1 | CO1 |
|   | b. Explain how Wireless Sensor Networks are applied in medical monitoring, giving examples of their use. | 6 Marks | L2 | CO1 |

**or**

- |   |   |          |    |     |
|---|---|----------|----|-----|
| 7 | Using the basic architecture of a Wireless Sensor Network, apply the sensor network technology background to propose a solution for monitoring environmental parameters in a wildfire-prone region. | 10 marks | L3 | CO1 |
|---|---|----------|----|-----|

Explain the steps and components involved in the network deployment.

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|-----------|--|----------|----|-----|
| <b>8</b>  | <b>a.</b> Identify the key considerations for designing an efficient routing protocol for Ad hoc networks.   | 4 Marks  | L1 | C01 |
|           | <b>b.</b> Explain how WSNs are used in Civil/Environmental Engineering Applications, emphasizing their significance.   | 6 Marks  | L2 | C01 |
| <b>or</b> |  |          |    |     |
| <b>9</b>  | Using the elements of sensor network architecture, apply the concept of reconfigurable sensor networks to create a flexible monitoring system for industrial automation. Explain how this flexibility improves efficiency in dynamic environments. | 10 marks | L3 | C01 |
| <b>10</b> | <b>a.</b> Define Medium Access Control (MAC) protocols and explain their significance in wireless communication.   | 4 Marks  | L1 | C02 |
|           | <b>b.</b> Compare and contrast free space propagation and multipath propagation models in wireless transmission technology.  | 6 Marks  | L2 | C02 |
| <b>or</b> |  |          |    |     |
| <b>11</b> | Design a mechanism to handle error-prone broadcast channels in an ad hoc network's MAC protocol. Explain how synchronization issues and mobility of nodes can be managed while ensuring reliable data exchange.                                    | 10 marks | L3 | C02 |
| <b>12</b> | <b>a.</b> What is the role of Sensor MAC (S-MAC) in wireless sensor networks? List two key functions.  | 4 Marks  | L1 | C02 |
|           | <b>b.</b> Describe the role of medium access control in regulating communication between nodes in wireless sensor networks.  | 6 Marks  | L2 | C02 |
| <b>or</b> |  |          |    |     |
| <b>13</b> | Create a communication framework for a mobile WSN in a smart transportation system. Apply the concepts of MAC protocols for WSNs to ensure that synchronization, error handling, and mobility management are addressed effectively.                | 10 marks | L3 | C02 |