**M.TECH/ECE/1ST SEM/ECEN 5131/2021**

# WIRELESS AD HOC AND SENSOR NETWORKS
## (ECEN 5131)

**Time Allotted : 3 hrs** **Full Marks : 70**

***Figures out of the right margin indicate full marks.***

***Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.***

***Candidates are required to give answer in their own words as far as practicable.***

## Group – A
## (Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Ad Hoc Mode of Wireless Network is also known as-
(a) Router (b) Roaming
(c) Infrastructure (d) Digital

(ii) RAS mechanism is applied for
(a) QoS improvement (b) Reduction of power
(c) Hidden terminal detection (d) none of these

(iii) The layer who protecting the Ad Hoc routing and forwarding protcols?
(a) Transport Layer (b) Network Layer
(c) Application Layer (d) Link Layer

(iv) Multichannel Protocols are example for
(a) Contention Based Protocol
(b) Contention Based Protocol with Reservation Mechanism
(c) Contention Based Protocol with Scheduling Mechanism
(d) Other MAC protocol)

(v) Sources are said to be of Primary Type if they have the following:
(a) High TX power (b) More than One Channel
(c) Allocated Fixed BW (d) All of These

(vi) Which of the following is an on-demand routing protocol for MANETS?
(a) DSR (b) DSDV
(c) AODV (d) all of these

(vii) Sensor networks are
(a) Address centric (b) Data Centric
(c) Location Centric (d) None of These

(viii) Primary emulation attack affects
(a) Cognitive Users (b) Primary Users
(c) Cellular Networks (d) Fusion Centres

(ix) Which of the following network is using ISM band
(a) WLAN (b) Zigbee
(c) Ad Hoc (d) All of these

(x) Which is the control traffic attack?
(a) Corporative Black hole (b) Jellyfish
(c) Dos Attack (d) Man in the Middle Attack.

## Group- B

2. (a) How does packet transfer take place using MACA-BI protocol? State with a suitable diagram. [(CO2, CO5) (Understand/LOCQ)]
(b) How many types of contention based protocols are there? What is the difference between them? [(CO2) (Remember/LOCQ)]
(c) Outline the issues of designing a MAC protocol for Ad-hoc networks. [(CO1, CO2) (Evaluate/HOCQ)]

**4 + 3 + 5 = 12**

3. (a) Analyze the design challenges associated with the ad hoc routing protocols. [(CO2) (Analysis/IOCQ)]
(b) Explain DSDV protocol with suitable example. [(CO3) (Analysis/IOCQ)]

**6 + 6 = 12**

## Group - C

4. (a) What is TCP? State with an example how TCP works over ad hoc wireless network. [(CO3) (Understand/LOCQ)]
(b) State the RAS approach for power saving in nodes. Show the schematic diagram for a circuit using RAS solution. [(CO1, CO3)(Create/HOCQ)]

**(2 + 3) + (3 + 4) = 12**

5. (a) State the term 'desensitization' of a radio receiver.[(CO4) (Understand/LOCQ)]
(b) Why is battery power saving critical for Ad Hoc networks? [(CO2) (Analyze/IOCQ)]
(c) TCP with explicit link failure notification improves performance of Ad Hoc network. Justify. [(CO2, CO5) (Evaluate/HOCQ)]

**2 + 5 + 5 = 12**

## Group - D

6. (a) Distinguish between absolute and relative localization in Ad Hoc wireless network. [(CO2) (Understand/LOCQ)]

(b) What are the security aspects of Ad Hoc Wireless Network? State Denial of Service and Primary User Emulation Attack? [(CO6) (Analyze/IOCQ)]

(c) State the performance enhancement techniques for spectrum utilization. [(CO2)(Analyze/IOCQ)]

**2 + (3 + 4) + 3 = 12**

7. (a) Derive test static for primary user signal localization. Briefly explain weighted centroid localization method. [(CO2, CO3) (Apply/IOCQ)]

(b) What are the difference between collaborative and non-collaborative localization of a primary radio source. [(CO2) (Apply/IOCQ)]

(c) Why location awareness is an essential feature in Ad Hoc Wireless Network? [(CO2)(Analyze/IOCQ)]

**(2 + 4) + 3 + 3 = 12**

## Group - E

8. (a) What are the important features of sensor wireless networks? Describe some of the differences with respect to standard ad hoc wireless networks? [(CO4) (Remember/LOCQ)]

(b) Explain the importance of clustered architecture for sensor networks.. What is LEACH? How is the cluster head selected? [(CO3) (Apply/ IOCQ)]

**6 + 6 = 12**

9. (a) How many kinds of sensor network architecture can be found. Differentiate between them. [(CO2) (Analyze/IOCQ)]

(b) What are the weaknesses of flooding? Explain Implosion and Overlap disadvantages. [(CO2, CO3) (Analyze/IOCQ)]

**(2 + 4) + (3 + 3) = 12**

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| Cognition Level | LOCQ | IOCQ | HOCQ |
|---|---|---|---|
| Percentage distribution | 23% | 64% | 13% |

**Course Outcome (CO):**

After the completion of the course students will be able to

CO1. Students will develop the ability to apply knowledge of mathematics, science and engineering in the areas of communication engineering.

CO2. They will be able to analyze a situation and interpret a data in ad hoc networks.

CO3. Students will acquire knowledge to learn and apply modeling based approach through the extensive use of simulator tools.

CO4. Students will be able to understand and develop ability to participate in research work.

CO5. They will be able to apply suitable algorithm for a route.

CO6. The students will understand the security requirements for networks.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

| Department & Section | Submission Link |
|---|---|
| **ECE** | https://classroom.google.com/u/1/w/NDYzMjgzODU5NzQ4/tc/NDc3MzIwMTQ1MDQ3 |