

**M.TECH/ECE/3<sup>RD</sup> SEM/ECEN 6132/2018**  
**AD-HOC AND SENSOR NETWORKING**  
**(ECEN 6132)**

**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) Which of the following protocols is appropriate for an ad hoc wireless network with large number of nodes?  
 (a) DSDV (b) any reactive protocol (c) DSR (d) either b or c .
- (ii) AODV protocol is based on:  
 (a) DSDV (b) DSR (c) MACAW (d) noneofthese.
- (iii) Which of the following is a pro-active routing protocol for MANETS?  
 (a) DSR (b) DSDV (c) AODV (d) all of these.
- (iv) Sources are said to be of primary type if they satisfy the following.  
 (a) high TX power (b) more than one channel  
 (c) allocated fixed BW (d) all of these.
- (v) Which one of the following is an example of passive attack in MANETS?  
 (a) Blackhole (b) Wormhole (c) Jamming (d) Snooping.
- (vi) Flooding has the following disadvantages:  
 (a) Overlap (b) Implosion  
 (c) Resource blindness (d) All of these .
- (vii) In DSDV routing table, the 'distance' representation is in:  
 (a) Metres (b) Feet (c) Kms (d) pure number without unit
- (viii) Sensor networks are:  
 (a) Address centric (b) Data centric  
 (c) Location centric (d) None of these.
- (ix) RAS mechanism is applied for :  
 (a) QoS improvement (b) Reduction of power  
 (c) Hidden terminal detection (d) none of these

**M.TECH/ECE/3<sup>RD</sup> SEM/ECEN 6132/2018**

- (x) In DSDV routing table, the gaps in the sequence numbers are necessary to accommodate:  
 (a) an updated sequence (b) an invalid sequence  
 (c) a new nod (d) none of these

**Group – B**

- 2.(a) How many types of contention based protocols are there? State the basic difference among them.
- (b) How does packet transfer take place using MACA-BI protocol? Explain with a suitable diagram.  
 How does it try to overcome the hidden node problem?  
 What are the differences between MACA and MACA-BI?  
**(2+2) + (3+2+3) = 12**
- 3. (a) What are the basic differences between pro-active and on-demand routing protocols? Give suitable examples for each protocol.  
 Show how the route is established in DSR protocol for an Ad Hoc wireless network consisting of 10 nodes.
- (b) What are the functions of 'broadcast identifier' and 'time to live' packets in AODV? Explain.  
**(3 + 5) + 4 = 12**

**Group – C**

- 4. (a) Explain the term 'desensitization' of a radio receiver. Show how this phenomenon may occur in a micro-controller based radio receiver.
- (b) In a multi-channel radio receiver, the SINAD for channel A is 16 dB at the given RF input signal strength. For the same RF input, the SINAD for channel B is 10 dB.  
 Assuming that the degradation of SINAD is only due to platform noise of the radio, design a circuit so that the interference is eliminated for channel B. Explain the operation of the circuit.  
**(2 + 4) + 6 = 12**
- 5.(a) Why is power aware routing important for Ad Hoc networks? What are the classifications for power aware routing in Ad Hoc wireless networks? Establish the expression for MTPR.
- (b) Describe briefly the main approaches used to reduce power consumption in the nodes.  
**(2 + 2 + 3) + 5 = 12**

**Group - D**

6. (a) Give a few reasons as to why the spectrum is under-utilized. How can cognitive radios improve the utilization? Express mathematically (i) spectrum utilization and (ii) spectrum utilization efficiency.
- (b) What are the different techniques applied to improve spectrum utilization? Explain how GAN helps to improve spectrum efficiency.

**6 + 6 = 12**

- 7.(a) What do you mean by underlay and overlay networks in relation to Cognitive Radio Networks? Which is better in terms of efficiency? Explain.
- (b) What are the four main security requirements of Ad Hoc wireless networks? Explain the differences between Wormhole Attack and Blackhole attack.

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

**Group - E**

- 8.(a) What are the differences between ad hoc and sensor wireless networks? Describe some of the challenges of a well-designed sensor network.
- (b) Explain clustered architecture. What is LEACH? How is the cluster-head selected?

**6 + 6 = 12**

9. (a) What are the weaknesses of flooding? What is rumor routing? Explain.
- (b) What is PEGASIS? Describe the goals and explain the construction of this chain.

**(3 + 4) + 5 = 12**