

**M.TECH/ECE/1<sup>ST</sup> SEM/ECEN 5131/2018**  
**WIRELESS AD HOC & 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) 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) RTR – command is generated in:  
(a) sender initiated protocol (b) receiver initiated protocol  
(c) any one (d) generated never.
- (iii) In DSDV protocol, the final route is determined by:  
(a) The number of hops (b) the next node  
(c) the destination (d) the sequence no.
- (iv) Which of the following is a pro-active routing protocol for MANETS?  
(a) DSR (b) DSDV (c) AODV (d) all of these.
- (v) 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.
- (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.

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- (ix) Which of the following is the first command in a handshake protocol?  
(a) CTS (b) RTS (c) ACK (d) none of these
- (x) The transmit power level is controlled to:  
(a) reduce interference (b) to save battery  
(c) to reduce pollution of data (d) all of these

**Group – B**

2. (a) Explain exposed and hidden terminals in Ad Hoc networks. Show how hidden terminals create serious problem.  
(b) How does MACAW protocol improve the synchronization with respect to MACA protocol? Explain it with a suitable example.  
(c) How does packet transfer take place using MACA protocol? Explain with a diagram.
- (2+2) + 4 + 4 = 12**
3. (a) What is the difference between pro-active and on-demand routing protocols? Give suitable examples for each types of protocols. Show how a route is established using DSDV protocol for an Ad Hoc wireless network consisting of 8 nodes. Use node 1 as the source and node 8 as the destination.  
(b) What are the function of ‘Route Reply’ packets in DSR? Explain in brief.
- (3 + 6) + 3 = 12**

**Group – C**

4. (a) Explain the term ‘desensitization’ of a radio receiver. Can the microcontroller clock cause this problem? Explain in brief.  
(b) Differentiate between cellular networks and Ad Hoc wireless networks. What is meant by scalability?
- (2 + 4) + 6 = 12**
5. (a) Why is battery power saving critical for Ad Hoc networks? Explain how clock shape can influence power consumption in a controller.  
(b) Define a ‘critical’ node in respect of MANETS. Show how the life of such nodes can be lengthened with the help of RAS and other approaches.
- (2 + 3) + 7 = 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 the differences between underlay and overlay approaches.

**6 + 6 = 12**

7. (a) What is meant by non-collaborative localization of a primary radio source? What is RSSI? Where is it available in a radio? How does RSSI help the process of localization in a radio network?
- (b) What are the four main security requirements of Ad Hoc wireless networks? Explain the integrity and non-repudiation features.

**(2 + 6) + 4 = 12**

**Group - E**

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

**(3+2+2) + 5 = 12**

9. (a) What are the features of sensor wireless networks? Describe some of the differences with respect to standard Ad Hoc wireless networks.
- (b) What are the types of MAC protocols used in sensor networks? Explain the operations using suitable example.

**6 + 6 = 12**