EC8702 - AD HOC AND WIRELESS SENSOR NETWORKS

IMPORTANT QUESTIONS AND QUESTION BANK

UNIT I AD HOC NETWORKS – INTRODUCTION AND ROUTING PROTOCOLS

2-Marks

1. What is an ad hoc wireless network?
2. Outline the challenging issues in ad hoc network maintenance?
3. Classify the security attack in ad hoc wireless networks and specify its features?
4. Explore the importance of a Gateway in a wireless network?
5. List the applications of ad hoc networks?
6. Generalize the concept of hidden terminal problem?
7. Illustrate the issues in Ad Hoc networks?
8. Broadly Categorize the routing protocols of ad hoc wireless networks?
9. Differentiate proactive and reactive routing protocols. Write examples for each?
10. Mention the significance of power aware routing in ad hoc wireless networks?

Part-B

1. Differentiate between cellular Network and Ad Hoc Network? Examine the major advantages of ad hoc wireless Internet?
2. Describe the issues and challenges in Ad hoc wireless networks?
3. Assess the importance of multicasting in an ad hoc wireless network applications? Summarize the security threats in an adhoc wireless networks?
4. Draw the schematic diagram of an ad hoc wireless Internet and discuss the issues to be considered for the successful ad hoc wireless Internet?
5. Demonstrate the benefits of the commercial ad hoc wireless networks? Why is power management important for ad hoc wireless networks?
6. Interpret the concept of Self Organizing in an adhoc wireless networks? What role does the routing protocol play in the BTL 2 Understanding provisioning of QoS guarantees for ad hoc wireless networks?
7. Outline the major challenges that a routing protocol designed for ad hoc wireless networks faces? Write about the types of ad hoc network routing BTL 1 Remembering protocols based on routing information update mechanism?
8. How is the loop free property ensured in an on demand routing protocol and in table driven routing protocol?
9. Explore the issues related to routing protocol for ad hoc wireless networks?

10. Analyze the destination sequenced distance-vector routing protocol with an example?
11. List the advantages of hierarchical topology-based protocols over protocols that use flat topologies? Explain the characteristics that the routing protocol for ad hoc wireless networks should poses for transfer of data from source node to destination node?
12. Devise the significance of each field in the table maintained at each node in an ad hoc wireless networks using Table driven protocol? Formulate the changes in the table on addition and deletion of a node in a network?
13. Demonstrate how route is established and maintained in an ad hoc network using AODV routing protocol?
14. Discriminate the topology organization in DSDV and AODV routing protocols with a sample network?
15. Design an ad hoc wireless network with nodes and demonstrate the process of route establishment and route maintenance using the ondemand routing protocol?

UNIT II SENSOR NETWORK INTRODUCTION & ARCHITECTURES

2-Marks

1. What is a wireless sensor network?
2. Illustrate the characteristic requirements of a wireless sensor network?
3. Examine how address centric network differ from with data centric network?
4. Differentiate between active and passive sensors?
5. Outline the event detection approaches in WSN?
6. Interpret the term energy scavenging in Wireless Sensor Network?
7. Summarize the Collaborative processing?
8. Name the hardware components of a Wireless sensor network?
9. Define self-organization of network?
10. Identify the key characteristics of a microcontroller which makes it possible to use in wireless sensor node?

Part-B

1. Illustrate the challenges and the required mechanisms of a Wireless Sensor network?
2. What are the various applications of wireless sensor networks and explain any two with an example each? Explain how the sensor networks are deployed for various applications?

3. Sketch the RF front end of a transceiver and outline the behavior of operational states?
4. Explore the transceiver tasks and characteristics in a sensor node in a wireless sensor network?
5. Demonstrate the enabling technologies of the wireless sensor networks? Apply the innovative mechanisms to realize the characteristic requirements of WSN?
6. Interpret the Transceiver characteristics and structure used in the sensor node?
7. Analyze how Energy Scavenging is realized in wireless sensor network? Distinguish sensor networks from the mobile ad hoc network?
8. Model the energy consumption during the transmission and reception of a transceiver with the supporting equations?
9. Is spread spectrum modulation schemes are followed in WSN - justify your answer? Discuss the energy consumption of sensors and actuators?
10. Deduce the energy consumption in a node with an appropriate diagram?
11. Brief the energy consumption in discrete operational states of an embedded microcontroller in a sensor node? Describe the relationship between computation and communication?
12. Draw the sensor network architecture and describe the components in detail?
13. Categorize the sensor network scenario and illustrate with diagram also explain how mobility can appear in WSN??
14. Express how optimization goals and figure of merits achieved in WSN? Examine the factors playing major role in optimizing a wireless sensor network?
15. Evaluate the nonradio frequency communication available for communication in a wireless sensor network?

UNIT III WSN NETWORKING CONCEPTS AND PROTOCOLS

2-Marks

1. What are the performance requirements for a MAC protocol?
2. Discuss the concept of wake up radio?
3. List the factors that are essential for PHY design in WSNs?
4. Illustrate the difference between contention based protocols and schedule based protocols?
5. Define dynamic modulation scaling?
6. Write about the energy efficient routing in WSN?
7. Devise a method for duplicate address detection?

8. Interpret the salient feature of location based routing?
9. Determine how flooding is different from gossiping?
10. Compare on-demand protocols with proactive protocols?

Part-B

1. Explain any three schedule based MAC protocols of WSN? Illustrate the duty cycle and demonstrate how it is calculated in WSN?
2. Analyze the energy efficient routing protocol? Exhibit the features of the IEEE 802.15.4 MAC protocol?
3. Depict the importance of the Mediation device protocols with relevant diagrams in wireless sensor networks?
4. Determine the impact of S-MAC protocol in a network with suitable diagrams?
5. Describe the low duty cycle protocols and explain any two protocols? How address and name management take place in WSN?
6. Write about SMAC and mediation device protocol in a network with a neat sketch?
7. Assess the working principle of CSMA protocol used in 802.15.4 for medium access in WSN with the help of State diagram? Summarize the requirements and design considerations for a MAC protocols in wireless sensor networks?
8. Explain the LEACH routing with the help of neat diagram. Give its advantages and disadvantages?
9. Demonstrate the SPIN and PEGASIS routing with the help of neat diagram. Give its advantages and disadvantages?
10. Express how the scheduled based MAC protocol differs from the contention based MAC protocol?
11. List the difference between proactive and reactive routing? Which routing is more suitable for WSN? Explain the reasons?
12. Interpret a suitable routing technique more suitable for WSN. Narrate the reasons for it?
13. Explore the functional diagram which depicts the issues in addressing and naming of WSN?
14. Inspect the distributed assignment of network wide unique MAC address for WSN?
15. Evaluate the performance of MAC protocols for Wireless Sensor Networks and estimate the duty cycle?

UNIT IV SENSOR NETWORK SECURITY

2-Marks

1. Define Network Security?
2. List out the requirements of Network security?
3. Write about the issues in Security provisioning?
4. Formulate the methods to minimize the security attacks?
5. Categorize the various types of attacks in a wireless sensor network?
6. Mention the challenges involved in security provisioning?
7. Explore the methods to minimize the attacks in WSN?
8. Interpret the key idea of Security provisioning in WSN?
9. Exhibit the different layer wise attacks in a sensor network?
10. Illustrate how Jamming affects the performance of wireless sensor network?

Part-B

1. Analyze the different security attacks with suitable parameters?
2. Explain how the security can be improved by minimizing the attacks in sensor networks? Discuss the challenges in security provisioning?
3. Describe in various types of attacks and explain its characteristics?
4. Compile the various issues in security provisioning in WSN and also write about the solutions to avoid it?
5. Identify the layer wise attacks in wireless Sensor networks and explain its impact on networks?
6. Explain about Jamming and write the possible solutions for jamming in WSN?
7. Examine how the security attacks affect the performance of the Wireless sensor networks?
8. List the possible solutions to mitigate the denial-of-service attacks in sensor networks and explain how it improves the performance of the system?
9. Summarize about the impacts of physical-layer jamming attacks on radio communication. How it distorts the signals in the sensor network's frequency band?
10. Define Tampering attack. Describe how it recovers cryptographic keys used for ciphering in sensor networks?
11. Analyze about the flooding attack and its Countermeasures in wireless sensor networks in detail?
12. Generalize the Active and passive attacks with suitable examples. Also explain how these attacks differ from each other?
13. Evaluate how the jamming affects the functional characteristics of Wireless sensor networks in real time environment?

14. Develop the reliability requirements in sensor networks in order to achieve an end-to-end communication and also discuss about the reliability bottleneck of the network?
15. Validate the importance of Security Protocols for Sensor Networks. also explain about the building blocks of SPINS protocols in Security Provisioning?

UNIT V SENSOR NETWORK PLATFORMS AND TOOLS

2-Marks

1. List the challenges of sensor network programming?
2. Write the three categories of sensor node hardware?
3. What are the characteristics of Berkeley mote family?
4. Point out the two-CPU design of MICA motes?
5. Outline the transmission characteristics of MICA motes?
6. Name the features of Node-Level Software Platforms?
7. Create the two representative examples of node-level programming tools?
8. How does TinyOS support Berkeley mote?
9. Develop the application example of TinyOS?
10. Express the need for nesC language for sensor network programming?

Part-B

1. Define sensor node hardware and explain in detail about three categories of sensor node hardware with examples?
2. Summarize about the characteristics of embedded sensor nodes family with the help of MICA note architecture?
3. List the drawbacks of traditional programming technologies in sensor network design? What are the Challenges of Sensor Network Programming?
4. Write short notes on node-centric programming? Explain about the node level programming tools with examples?
5. Explore the TinyOS operating system support resource does constrained hardware platforms. Discuss in detail?
6. Demonstrate about the interface and configuration of nesC language? Justify that nesC supports the components and applications of TinyOS?

7. Develop the components and implementation models of Timer functions in nesC?
8. Analyze the characteristics and components of node-level simulator with necessary functions?
9. Examine how an open-source network simulator can be used to simulate wireless/mobile networks and sensor networks?
10. Evaluate the design methodologies and frameworks supported by state-centric programming tools?
11. Determine the role of Collaboration Groups and its abstractions in the design of state-centric programming tools?
12. Formulate the traditional embedded system programming interface with neat diagram and also explain the characteristics of sensor network programming with its challenges?
13. Evaluate the layers of operating system TinyOS that supports sensor network applications on Berkeley motes hardware platforms and demonstrate its Field Monitor application for sensing and sending measurements?
14. Develop the execution models of Node-Level Simulators. Formulate the characteristics of cycle-driven and discrete event simulators In terms of timing behavior?
15. Validate the issues to be addressed using abstractions during the design of sensor network to ensure the correctness and efficiency of the system?