M.E. COMPUTER SCIENCE AND ENGINEERING FIRST YEAR FIRST SEMESTER - 2024

WIRELESS COMMUNICATION & MOBILE COMPUTING

Time: 3 hours Full Marks: 100

Answer ANY FOUR (4) questions
(All parts of the same question must be answered together)

1. [(3+8)+(2+2+5)+5=25]

a. What are the principal challenges that the designers of mobile computing system have to deal with? Briefly describe the problems of one such challenge and provide possible solutions for each such problem.

b. What is *frequency reuse*? Why does it seem to be advantageous? Show how frequency can be reused using seven (7) frequencies allocations in a cellular network.

c. How does a *handoff* take place in cellular system?

2. [(8+5)+(4+3)+5=25]

a. (i) Consider Figure 1. Find route/s between C and F using Adhoc On demand Distance Vector (AODV) routing protocol. Explain the working of AODV as you find the route/s.

(ii) How does the working of Demand Source Routing (DSR) routing protocol differ from AODV protocol?

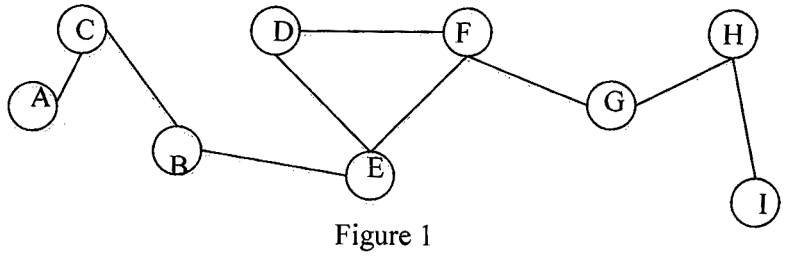

Figure 1

b. Identify any three clusters with respective Clusterheads and Gateway/s in Figure 1. Justify your answer. What routing information would a Clusterhead and a Gateway have?

c. How many tables are used in Wireless Routing Protocol (WRP) and why?

3. [(2+2)+(2+4+3)+12=25]

a. What are the characteristics of GSM technology? What infrastructures are involved in GSM?

b. What are the components of the Network and Operations subsystems of GSM? What tasks do these systems perform? What information does GPRS context contain?

c. Briefly explain the GPRS architecture with a suitable diagram and its components with their functionalities.

4. [3+4+3+(3+5)+(3+4)=25]

a. What is meant by Frequency Hopping Spread Spectrum (FHSS)?

b. What are the *Physical sublayers* (PHY) in MAC? What are their tasks?

c. How is *hidden terminal problem* handled in MAC layer?

d. (i) What is *Timing Synchronization Function* (TSF)?

(ii) Three stations are connected through 802.11 network and using DCF CSMA/CA access method. At the beginning, station 1 becomes ready to transmit. After 6 μs Station 3 becomes ready and Station 2 becomes ready after 12 μs. A DIFS time is 14 μs. With a diagram, explain a possible scenario for the three stations transmitting their data.

e. What are the contents of MAC management frame? How are *roaming* and *scanning* handled in MAC layer?

5. [(3+3)+4+4+6+3+2=25]

a. What is *scatternet*? Can a master in one piconet act as master in another piconet? Justify your answer.

b. Using a suitable diagram show how a Bluetooth slave device communicates with its master.

c. What are the different *access codes* in Bluetooth network? Mention their usages.

d. Which type of device listens for *page*? What is this stage called? What happens thereafter?

e. Differentiate between *hold* mode and *sniff* mode.

f. What are the different addresses used by a Bluetooth device in different modes?

6. [(3+2)+5+4+6+5=25]

a. Why is information delivery problematic for mobile devices? What is meant by *foreign agent*?

b. Why are advertisements published by agents? What do these generally contain?

c. How does *triangular routing* take place? You may cite an example.

d. What are the two types of *encapsulations*? Briefly describe these.

e. How will you compare Mobile IP and IPv6?

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