Ref. No. : Ex/CSE/T/414B/2019

B.E. COMPUTER SCIENCE AND ENGINEERING

FOURTH YEAR

FIRST SEMESTER EXAM 2019

Subject: MOBILE COMPUTUNG

Full Marks 100

(Answer any five questions)

1. a) In one or two sentences explain the following principles of mobile computing: *portability, connectivity, interactivity, individuality.*
   b) Low bandwidth and bandwidth variability are challenges in Wireless Communication. How can these challenges be handled?
   c) Explain the hidden terminal problem.
   d) What are the challenges of routing in wireless ad-hoc network? How is the self-organising capability used in wireless ad-hoc network?

   6+5+3+6=20

2. a) Explain frequency reuse in cellular networks and its advantages. What is a reuse factor? Give an example with 7-cell reuse pattern.
   b) What would be the minimum distance between the centers of two cells with the same band of frequencies if cell radius is 5 km and reuse factor is 12?
   c) Discuss the different techniques for increasing capacity in a cellular network when the cells have non uniform traffic.

   9+3+8=20

3. a) What are the different types of handoffs in cellular networks?
   b) Briefly describe how the different generations of mobile wireless technologies evolved? (only mention the main features of each generation).
   c) Give an overview of GSM architecture.
   d) What are the main components for providing location services in a GSM network? How are these components used to support the movement of a mobile station from one location area to another location area?

   4+4+5+(3+4)=20

4. a) What do you mean by multipath propagation? What are the causes of multipath propagation?
   b) How is communication improved in UMTS technology in comparison with GSM?
   c) How does UMTS operate in packet switched mode?
   d) What are the components of IEEE 802.11 architecture? How do they operate in two modes?

   (2+3)+5+5=20

5. a) Why are the routing protocols in MANET required to be different from the traditional routing protocols? What are the goals of routing in MANET
   b) Explain how route discovery is done in Dynamic Source Routing? Why is route caching important?
   c) With an example explain how collision avoidance is implemented in an 802.11-based ad hoc network.

   4+(6+3)+7=20

6. a) Why are Wireless Sensor Networks different from MANET?
   b) What are the different deployment options in WSN?
   c) What are the problems with flooding in WSN? Discuss the SPIN-BC routing protocol in WSN. How does SPIN-RL improve SPIN-BC?
   d) What are the main sources of energy consumption in WSN?

   3+3+(3+5+3)+3=20

7. a) Discuss a sink initiated routing protocol in WSN.
   b) What are the different types of messages in SPIN protocol?
   c) Explain how sleep schedules of the nodes are maintained in S-MAC protocols for WSN.
   d) How adaptive listening is implemented in WSN? What is preamble sampling?

   6+2+6+6=20

8. a) Discuss multilateration and iterative multilateration techniques for localization.
   b) With an example explain how the DV-hop propagation technique can be used to estimate the locations of the nodes.
   b) How is hidden terminal problem handled in IEEE 802.11-based ad-hoc network?
   c) With at least 4 mobile stations, show how polling is done in infrastructure mode of a IEEE 802.11-based network using PCF mechanism.

   4+6+5+5=20