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Question Paper Code : 40398

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Computer Science and Engineering

CS 8601 – MOBILE COMPUTING

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate mobile computing and wireless networking.

2. Why "MAC protocol designed for infrastructure based wireless network may not work satisfactory in infrastructure less environment" – Justify.

3. Describe IMSI and TMSI.

4. Distinguish between HLR and VLR.

5. What is triangular routing?

6. List down the differences between infrastructure based and ad-hoc networks regarding roaming.

7. What are the primary goals of the WAP Forum efforts and how are they reflected in the initial WAP protocol architecture?

8. What problems of HTTP can WSP solve? Why are these solutions especially needed in wireless mobile environments?

9. Enumerate special constraints and requirements of mobile OS.

10. Explain the Pros and Cons of M-Commerce.

PART B — (5 × 13 = 65 marks)

11. (a) Explain hidden and exposed terminal problem and near and far terminal problem with an example. (13)

Or

(b) (i) Explain different types of spread spectrum techniques used in cellular systems? (7)

(ii) Describe the three-tier structure of mobile computing application. (6)

12. (a) (i) What are the functions of authentication and encryption in GSM? (7)

(ii) Explain in detail about the handovers of GSM (6)

Or

(b) (i) Discuss GPRS and its protocol architecture. (7)

(ii) Explain in detail about UMTS architecture and its services. (6)

13. (a) (i) Explain packet flow if two mobile nodes communicate and both are in foreign networks. What additional routes do packets take if reverse tunneling is required? (7)

(ii) What is the basic purpose of DHCP? Name the entities of DHCP. How can DHCP be used for mobility and support of mobile IP? (6)

Or

(b) Discuss route discovery and route maintenance mechanisms in DSR with illustrations. List its merits and demerits. (13)

14. (a) With neat sketches and illustrations, discuss the Wireless Application Protocol architecture in detail. (13)

Or

(b) (i) How does Indirect TCP work? Discuss its advantages and disadvantages. (7)

(ii) Explain Transaction-oriented TCP with example. (6)

15. (a) Illustrate the process of mobile payment. Compare and contrast mobile payment schemes. (13)

Or

(b) Illustrate the process mobile payment. Compare and contrast mobile payment schemes. (13)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Assume a fixed Internet connection with a round trip time of 20 ms and an error rate of 10^{-10} . Calculate the upper bound on TCP's bandwidth for a maximum segment size of 1,000 byte. Now two different wireless access networks are added. A WLAN with 2 ms additional one-way delay and an error rate of 10^{-3} and a GPRS network with an additional RTT of 2 s and an error rate of 10^{-7}. Redo the calculation ignoring the fixed network's error rate. Compare these results with the ones derived from the second formula (use RTO = 5 RTT). Why are some results not realistic? (8)

(ii) Consider the handoff procedure in GSM system that is based on relative signal strength with threshold that is. a mobile switches from one cell to another if

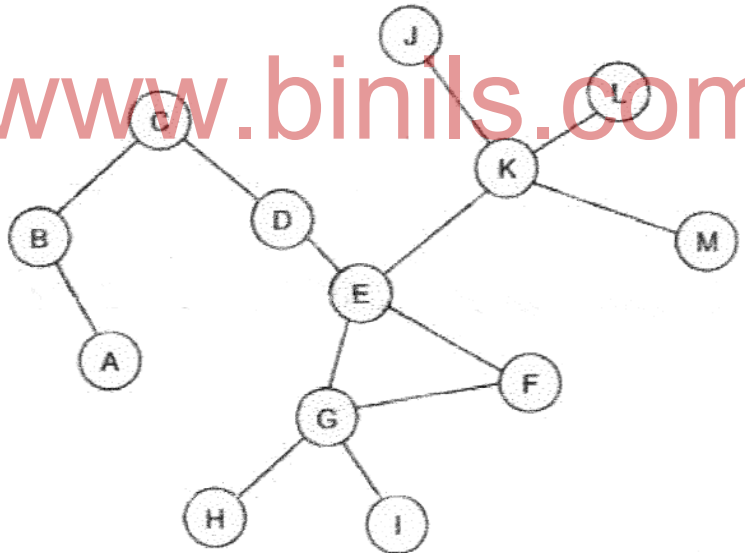
(1) The signal at the current BS is sufficiently weak (less than a predefined threshold and

(2) The other signal is stronger than the two. What are the drawbacks of this scheme, when the threshold is too low or too high? (7)

Or

(b) (i) Think of ad-hoc networks with fast moving nodes, e.g., cars in a city. What problems arise even for the routing algorithms adapted to ad-hoc networks? How is the situation changed on highways? (7)

(ii) Given is an ad-hoc network which has initially the following topology: (8)



Connected nodes are in transmission range and can forward messages along the edges. For routing, DSR should be used. The caches of all nodes are empty. Now, D wants to send some packets to H. Give the sequence of messages exchanged for finding a path (also the "unnecessary" messages). For each message, describe sender, receiver, and the list of used nodes as written in the header by the routing protocol. Assume that the paths are symmetrically. What happens if the connection between E and G breaks down?