CE1.5-R4: MOBILE COMPUTING

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Looking at the HLR/VLR database approach used in GSM-how does this architecture limit the scalability in terms of users, especially moving users?
b) Explain Data Delivery Mechanisms.
c) Explain Fast Retransmit/Fast Recovery.
d) Explain limitations of mobile devices with respect to the following:
   i) Quality and security of service: accessibility constraint
   ii) Energy constraints in device: Mobile computing strategy constraint
e) Explain Tunnelling and Encapsulation.
f) Differentiate between WML and XML.
g) Explain with an example security issue in Mobile Computing.

(7x4)

2.

a) Assume that a high-speed data transfer segment of 10,004,020 B has the sequence numbers from 1025-100,005,044. Assume that the window-size field is specified by the other end as 10,000 B. Since, the transmitter supports high-speed data transfer, the window is scaled up by a shifting number of 8. How is the window scaled? How does the TCP_A transmit?
b) Compare and contrast I-TCP, Snooping TCP, and Mobile TCP.
c) What is the reaction of standard TCP in case of packet loss? In what situation does this reaction make sense and why it is quite problematic in the case of wireless networks and mobility?

(4+8+6)

3.

a) Explain with a diagram the overall GSM architecture. Name the main elements of GSM system architecture and describe their functions in detail.
b) Explain WCDMA protocol with diagram.

(9+9)

4.

a) What is the need to have Mobile Databases? Explain the ACID properties of transaction like request to mobile host.
b) Explain the packet delivery and handover management with respect to mobile internet protocol, for the following cases:
   i) Case1: CN a fixed node and MN1 at the home network
   ii) Case2: CN a fixed node and MN1 is at a foreign network

(9+9)

5.

a) Differentiate between Wi-fi, ZigBee and Bluetooth along with their frequency bands.
b) With respect to Bluetooth networks, explain what is a Piconet? Explain the terms master and slave in a Piconet. Explain the following states the device in a Piconet can have.
   i) Stand by state
   ii) Active state
   iii) Park state
   iv) Hold sate
   v) Sniff state

c) A Bluetooth device B0 discovers a device B1 within 10 m. Then the devices B2, B3, B6, and B8 also reach within 10 m and join the network. After some time, since B2 and B3 are not exchanging objects, they go to park state to save the power. After sometime the devices B7, B5, B4, B9, and B10 move in sequence within 10 m but they have to discover the network. Describe the states and devices in the Piconet. What can be the active members address (AMAs) and parked member address (PMAs) assigned by the master in the Piconet?

(6+6+6)

6.

a) How an operating system for a mobile differs from a desktop operating system? What are various features of a mobile operating system?

b) Differentiate between Palm OS and Symbian OS.

(9+9)

7.

a) Discuss selective tuning and indexing.

b) Describe TORA and compare its features of TORA with DSR and ADOV protocols.

c) What is J2ME? How J2ME addresses Personal, mobile, connected information devices and Shared, fixed, connected information devices.

(6+6+6)