

### B3.5-R3: NETWORKING AND MOBILE COMMUNICATIONS

**NOTE:**

1. Answer question 1 and any FOUR questions from 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) How do the layers of the TCP/IP protocol suite correlate to the layers of the OSI?
- b) Compare the performance of slotted aloha with that of pure aloha. What is the limitation of aloha protocol in general?
- c) Explain the concepts of handoff and dropped call rate. What are soft and hard handoffs.
- d) Draw and discuss the conceptual model of DECT (Digital European Cordless Telephone). Give its application areas.
- e) If 20 MHz of total spectrum is allocated for a duplex wireless cellular system, with Simplex channel has 25KHz RF bandwidth, find the number of duplex channels and number of channels per cell site, if N=12 cell reuse is used.
- f) Compare and contrast the various 2.5G technology paths that each of the major 2G standards provide. Which path has the highest Internet access speed?
- g) Draw and explain the wireless LAN architecture and also explain the terms infrastructure mode and Adhoc mode.

**(7x4)**

**2.**

- a) What are connection oriented and connectionless services? What are service primitives? Explain with an example how these are used.
- b) Discuss the role of transport layer and data link layer in the OSI model.
- c) What is spread spectrum communication. Explain the terms processing gain, pseudo random code generator and Walsch code.

**(6+6+6)**

**3.**

- a) What are mobile data communication services and name them. Describe the architecture of HSCSD (High Speed Circuit Switched Data).
- b) Draw the detailed block diagram of a cellular system and explain. Also explain the different strategies implemented to avoid interferences in TDMA, FDMA & CDMA systems.

**(9+9)**

**4.**

- a) Give an account of radio specifications for cordless telecommunication systems such as CT 2 and DECT.
- b) What is VSAT? Give the components of VSAT systems.
- c) Draw and explain the functional architecture for PACS (Personal Access Communications System). Discuss the frame structure and its radio aspects.

**(6+4+8)**

**5.**

- a) Draw CDMA based mobile system architecture and explain, how it provides reliable basic phone services. Write the benefits of CDMA to users.
- b) Draw the basic reference architecture and signaling interfaces for GSM. Why is Smart card needed in GSM, while it is not required in AMPS?

**(9+9)**

**6.**

- a) How do you compare D-AMPS and GSM systems in terms of coverage area, transmitted power and error control system, explain what you can do to address adjacent channel and co-channel interference.
- b) With the help of a neat diagram explain the UMTS (Universal Mobile Telecommunication System) network architecture. Discuss in detail the logical parts: i) user equipment and ii) core network. How is the number of handoffs reduced for the fast moving traffic?

**(9+9)**

**7.**

- a) Draw and explain the WAP network configuration. Also discuss the WAP protocol stack.
- b) What is frequency management? Discuss different fixed channel assignment strategies. What are its limitations are compared to non-fixed channel assignment methods.

**(9+9)**