



(3 Hours)

[Total Marks: 80]

NB: 1) Question no. 1 is compulsory.

- 2) Solve any three from remaining five questions.
- 3) Draw neat sketches wherever require.
- 4) Assume suitable data if required.

1. A) Explain Softer and soft handoff in CDMA. 5
- B) Define open loop closed loop and outer loop power control. 5
- C) Explain concept of HSDPA w.r.t. WCDMA. 5
- D) What is the role of GPRS in GSM? 5
2. A) What is localization in wireless sensor network? Explain with examples centralized and Distributed schemes in localization algorithms. 10
- B) Give the distributed radio access network overview. Explain in detail functions of node 3 and RNC also draw UTRAN logical architecture. 10
3. A) What is UMTS? List important features & UMTS air interface. 10
- B) Explain middleware architecture. 10
4. A) Draw and explain CDMA 2000 evolution path. 10
- B) Using traffic data per cell for a GSM/GPRS network, calculate (a) data Erlangs, (b) time slot (TS) utilization, and (c) TS capacity. 10

Use the following data :

No of BTS: 40

- Subscriber usage per month: 150 minutes
- Days per month: 24
- Busy hours per day: 6
- Allocated spectrum: 4.8 MHz
- Frequency reuse plan: 4/12
- RF channel width: 200 kHz (full rate)
- Present number of subscribers in a zone: 50,000
- Subscriber growth per year: 5%
- Network roll-over period: 4 years
- Number of packet calls per session (NPCS): 5
- Number of packets within a packet call (NPP): 25
- Reading time between packet calls (T_r): 120 s
- Packet size (NBP): 480 bytes

- Time interval between two packets inside a packet call (T_{int}): 0.01 s
 - Total packet service holding time during one hour (T_{tot}): 3000 s
 - Busy hour packet sessions per subscriber: 0.15
 - Average call holding time during busy hour: 120 seconds
 - No. of transceivers (TXs) per cell: 3
 - No. of TSs per cell for signalling: 3
 - Radio link control (RLC) efficiency: 80%
 - Total numbers of transmitted radio blocks: 9000
 - TSs allocated for data traffic c per cell: 3
 - Data throughput per cell: 15.5 kbps
 - Voice traffic per cell: 8.82 Erlangs
5. A) Describe the model of wireless sensor networks. What are the factors influencing design of wireless sensor network. 10
- B) Explain back off algorithm why is CSMA-CD not used in WLAN 10
6. Write short note on (any two): 20
- A) IEEE 802.16
- B) UWB technology.
- C) ZigBee Technology.