

Instructions to candidates

Answer any **FIVE FULL** questions.

Missing data, if any, may be suitably assumed.

1A. Write the rules according to which the lower or higher frequency is chosen to generate the MSK signal. Using the defined rules generate a MSK signal for the data 1011010.

1B. Illustrate and explain how Mobile IP deals with the problem of dynamic IP addresses?

1C. Calculate the number of times the cluster of size 4 have to be replicated in order to approximately cover the entire area of 1765 km² with the adequate number of uniform-sized cells of 7 km² each.

[5+3+2]

2A. Diagrammatically show and explain the flow of commands while the mobile system changes to new foreign agent with an optimized mobile IP.

2B. Explain with an example how 120 degree sectoring helps in reducing co-channel interference.

2C. Explain the three different basic schemes that are used for analog modulation.

[5+3+2]

3A. Consider a 7-cell system covering an area of 3100 km². The traffic in the 7-cells is as follows:

Cell number	1	2	3	4	5	6	7
Traffic in Erlangs	30.8	66.7	48.6	33.2	38.2	37.8	32.6

Each user generates an average of 0.03 Erlangs of traffic per hour with a mean holding time of 120 seconds. The system consists of a total of 395 channels and is designated for a GOS of 0.02.

- Determine the number of subscribers in each cell.
- Determine the number of calls per hour per subscriber.
- Determine the number of calls per hour in each cell.
- Determine the total number of subscribers.
- What is the radius of each cell?

3B. Assume that there are two stations exchanging data using IEEE 802.11 DCF. Calculate the MAC layer throughput for the following scenario with and without RTS/CTS transaction.

802.11 physical layer transmission rate = 54Mbps, MAC layer data payload = 1452 bytes,

MAC header = 28 bytes, ACK Frame Size = 14 bytes, RTS length = 20 bytes, CTS length = 14 bytes.

Slot Time = 9 μs, SIFS Time = 16 μs, DIFS Time = 34 μs.

3C. With a neat diagram explain DSSS and FHSS PHY packet formats.

[5+3+2]

4A. What are the different messages formulated during a call setup using SS7? Explain the stages at which they get formulated with suitable illustrations.

4B. Explain in detail about the hybrid spread spectrum techniques.

4C. Illustrate with a neat diagram the typical signal flow during an Inter-BSC Intra- MSC handover.

[5+3+2]

5A. Draw the system architecture of IEEE 802.11 and explain in detail.

5B. With a neat diagram explain the GSM radio interface, GSM TDMA frame, GSM Slots and GSM bursts.

5C. Which are the two lower layer protocols used in CDPD. Explain.

[5+3+2]

6A. Discuss the concept of a piconet and scatternet with suitable illustrations and example scenarios.

6B. Identify and explain the entities classified under Networking Switching Subsystem (NSS) and Operation Sub System (OSS) in the functional architecture of a GSM system.

6C. A telephony connection has duration of 23 minutes. This is the only connection made by this caller during the course of an hour. How much is the amount of traffic, in Erlangs, of this connection?

[5+3+2]