

Mobile & Wireless Communication (315339)

MSBTE Diploma · K-Scheme · Model Question Paper — Set B

Time: 3 Hours**Max. Marks: 70****Instructions:**

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:**10**

- a) Define: i) Frequency reuse ii) Co-channel reuse distance.
- b) State the functions of MSC and BSC in GSM.
- c) Define MIMO. State any two advantages of MIMO.
- d) Define network slicing. Name any two types of network slices in 5G.
- e) Draw a Bluetooth piconet. State the maximum number of active slaves in it.
- f) List the types of interference in a cellular system.
- g) List any four sensors used in a smartphone and state the use of each.

Q.2 Attempt any THREE of the following:**12**

- a) Draw the transmitter section of a cellular telephone. Explain the function of the directional coupler and the power sensor in it.
- b) Compare GSM and IS-95 on the basis of: i) Modulation ii) Data rate iii) Frequency reuse iv) Type of handoff.
- c) Describe the call set-up procedure when a mobile user calls a landline number (mobile-originated call). Draw the flow diagram.
- d) Differentiate between IEEE 802.11a and IEEE 802.11g. (Any four points)

Q.3 Attempt any THREE of the following:**12**

- a) A cellular system requires a minimum signal-to-interference ratio of 18 dB. Taking path loss exponent $n = 4$ and six co-channel interferers, find the S/I for cluster sizes $N = 4$ and $N = 7$ and state which cluster size should be used.
- b) Draw and explain the microcell zone concept. State its advantages.
- c) Compare 4G and 5G on the basis of: i) Peak data rate ii) Latency iii) Spectrum iv) Antenna technology.
- d) State the vision of IMT-2020 and list any six of its key capabilities.

Q.4 Attempt any THREE of the following:**12**

- a) State the role of MME, S-GW and P-GW in LTE architecture.
- b) Describe beamforming in massive MIMO with a neat sketch.
- c) A total bandwidth of 30 MHz is allotted to a cellular system which uses two 25 kHz simplex channels for each duplex channel. Find the total number of duplex channels and the number of channels per cell for cluster size $N = 4$. Draw the reuse pattern for $N = 4$.
- d) Wi-MAX is preferred over WLAN for covering a large area. Justify with the advantages of Wi-MAX.
- e) Describe the 5G low, mid and high (mmWave) bands with their characteristics.

Q.5 Attempt any TWO of the following:**12**

- a) Draw the GSM network architecture. Explain the functions of the Network Switching Subsystem (NSS) and its databases.
- b) State the significance of 5G technology. Explain any four 5G enabling technologies.
- c) Explain V2X communication (V2V, V2I, V2P, V2N) with a neat diagram. State two technologies used for it.

Q.6 Attempt any TWO of the following:**12**

- a) Explain the radio aspects of GSM (any eight).
- b) Compare LTE and LTE-Advanced on the basis of: i) Generation / 3GPP release ii) Peak data rate iii) Channel bandwidth iv) MIMO v) Carrier aggregation vi) Spectral efficiency.
- c) What is NFC? Explain its operating modes and any four NFC services.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in