

Mobile & Wireless Communication (315339)

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

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 cell and cluster. Write the formula for cluster size in terms of shift parameters i and j .
- b) State the functions of AuC and EIR in GSM.
- c) Define beamforming.
- d) List the three usage scenarios of IMT-2020.
- e) State any four features of Bluetooth.
- f) Define co-channel interference. State one method to reduce it.
- g) State the frequency range of 5G low band and mid band with one example band used in India.

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

- a) Draw the block diagram of a mobile phone unit and state the function of any four blocks.
- b) Compare AMPS and GSM on the basis of: i) Generation ii) Multiple access iii) Channel bandwidth iv) Modulation.
- c) Draw the GSM architecture and explain the function of the Base Station Subsystem (BSS).
- d) Draw the architecture of IEEE 802.11 (infrastructure mode) and explain BSS, ESS and distribution system.

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

- a) Find the cluster size for shift parameters $i = 2, j = 1$. Draw the frequency reuse pattern and calculate the co-channel reuse distance for a cell radius of 1.5 km.
- b) Describe the procedure of a mobile-originated call in GSM with a signalling diagram.

- c) Compare 3G and 4G on the basis of: i) Data rate ii) Multiple access iii) Switching technique iv) Channel bandwidth.
- d) With a neat sketch, explain network slicing in 5G.

Q.4 Attempt any THREE of the following:

12

- a) Draw the LTE network architecture and explain the function of eNodeB, MME and HSS.
- b) Explain adjacent channel interference. State any three methods to reduce it.
- c) Explain handoff in a cellular system with a neat sketch of signal level. Differentiate hard and soft handoff.
- d) List any four applications of vehicular communication. Describe forward collision warning using V2V.
- e) Explain the challenges in allocation and management of 5G spectrum in India.

Q.5 Attempt any TWO of the following:

12

- a) Draw the block diagram of a PLL frequency synthesizer used in a mobile unit and explain each block. If the reference frequency is 200 kHz ($R = 1$), find the divider ratio N required to generate a carrier of 890.2 MHz.
- b) Explain the vision of IMT-2020 with its three usage scenarios and any six key technical requirements.
- c) Explain GSM logical channels — traffic channels and control channels — with a classification chart.

Q.6 Attempt any TWO of the following:

12

- a) Draw the 5G system architecture. State the functions of gNB, AMF, SMF and UPF. List four advantages of 5G over 4G.
- b) Explain MIMO with a neat diagram. Describe the beamforming process and state its significance in 5G.
- c) Explain Bluetooth piconet and scatternet with neat diagrams. State any four applications of Bluetooth.

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