

Mobile & Wireless Communication (315339)

MSBTE Diploma · K-Scheme · Electronics & Telecommunication (EJ) Sem 5 · Important Questions (unit-wise)

Note: Based on MSBTE papers S-2024...S-2026 available on msbte.ac.in — for this K-scheme course only **two papers (W-2025 and S-2026)** exist so far — and the K-scheme syllabus. Practice guidance only — not a prediction of the exam.

Probability: High = asked in both papers · **Medium** = asked in one paper · **Low** = in syllabus, not asked yet. Two papers are a very small sample, so these ratings are only a rough guide — study every unit.

Exam pattern (both papers): 3 hours, 70 marks · Q.1 any 5 of 7 (2 M) · Q.2, Q.3 any 3 (4 M) · Q.4 any 3 (4 M) · Q.5, Q.6 any 2 (6 M). Unit weightage (syllabus): I – 12, II – 18, III – 10, IV – 18, V – 12 marks.

Unit I — Wireless Communication System (12 M)

Question / topic	Marks	Asked in	Probability
Mobile phone unit — block diagram, transmitter blocks (directional coupler, power sensor), frequency synthesizer, sensors <i>Identify blocks A and B in given transmitter block diagram and state their function. / Draw block diagram of frequency synthesizer and explain each block. / List the sensors used in mobile phone unit. / Draw set up of mobile phone unit. State function of each block.</i>	2, 4, 6	W-25 Q4b, W-25 Q5a, S-26 Q1a, S-26 Q2a	High
Cluster and frequency reuse (definitions, reuse pattern N = 7) <i>Define: i) Cluster ii) Frequency reuse. / Define frequency reuse and draw frequency reuse pattern for N = 7.</i>	2, 4	W-25 Q1a, S-26 Q4a	High
Comparison of mobile radio standards (GSM vs N-AMPS, GSM vs IS-95) <i>Compare GSM with NAMPS: generation, channel bandwidth, analog/digital, data rate. / Compare GSM and IS-95: forward channel frequency, channel bandwidth, multiple access, SIM card.</i>	4	W-25 Q2a, S-26 Q2b	High
Function of base station and MSC in a cellular network <i>Explain the function of base station and mobile switching center.</i>	2	W-25 Q1f	Medium
Types of wireless communication systems (paging, cordless, cellular ...) <i>State different wireless communication systems and explain any one in detail.</i>	4	S-26 Q3a	Medium
3G — features and 3G standards (TDMA / CDMA based)	6	S-26 Q5a	Medium

List four features of 3G; state various 3G standards (TDMA and CDMA used).			
Radio spectrum bands; reuse distance $D = R\sqrt{3N}$ numericals; channel assignment; forward/reverse channels	—	— (not asked yet)	Low

Unit II — Basics of Mobile Communication System (18 M)

Question / topic	Marks	Asked in	Probability
GSM architecture (diagram, working, NSS functions, HLR/VLR) <i>State the function of HLR, VLR. / Draw the architecture of GSM. State the function of network switching. / Draw neat labelled diagram of GSM architecture. / Draw GSM architecture and describe how it works in detail.</i>	2, 6	W-25 Q1b, W-25 Q5b, S-26 Q1f, S-26 Q5b	High
Co-channel and adjacent channel interference (types, reduction) <i>Define adjacent channel interference. State method to reduce it. / Define co-channel and adjacent channel interference. / State types of interference in cellular system; explain any one.</i>	2, 4, 6	W-25 Q4c, S-26 Q1b, S-26 Q6a	High
Mobile-originated call procedure (steps / diagram) <i>Explain step by step procedure of a mobile originated call. / Describe mobile originated call procedure with diagram.</i>	4	W-25 Q2b, S-26 Q3b	High
Microcell zone concept (improving coverage & capacity) <i>Draw and explain microcell zone concept.</i>	4	W-25 Q3a	Medium
Radio aspects of GSM <i>State any 8 radio aspects of GSM.</i>	6	W-25 Q6a	Medium
GSM channels — traffic and control channels <i>Describe the function of GSM and control channels.</i>	4	S-26 Q4b	Medium
Cell splitting, sectoring, repeaters; mobile-terminated call; GSM services; call processing / handoff	—	— (not asked yet)	Low

Unit III — Fundamentals of 4G Communication (10 M)

Question / topic	Marks	Asked in	Probability
Comparison of generations (3G / 4G / 5G) <i>Compare 3G and 4G (any four points). / Compare 4G and 5G: generation, data speed, architecture, modulation. / Compare 3G, 4G and 5G: data rate, spectrum, services, bandwidth.</i>	4	W-25 Q3b, W-25 Q4d, S-26 Q3c	High
MIMO and beamforming <i>Define MIMO in wireless communication. / Explain beamforming and its significance in 5G. / Describe beam forming process in MIMO.</i>	2, 4	W-25 Q1c, W-25 Q4a, S-26 Q2c	High

LTE architecture; role of S-GW and P-GW <i>Draw and explain LTE network architecture with function of each block. / State the role of SGW and PGW in LTE architecture.</i>	4	W-25 Q2c, W-25 Q2d	Medium
4G / LTE features; LTE vs LTE-Advanced <i>List any four features of 4G and 4G LTE. / Compare LTE and LTE-A: generation, BW, data rate, spectrum, carrier frequency, services.</i>	2, 6	S-26 Q1c, S-26 Q6b	Medium
Limitations of 3G and motivation for 4G; massive MIMO (AAS) benefits	—	— (not asked yet)	Low

Unit IV — Introduction to 5G Technology (18 M)

Question / topic	Marks	Asked in	Probability
5G spectrum — low, mid, mmWave bands; spectrum challenges in India <i>Explain the challenges in 5G spectrum allocation and management in India. / Compare 5G low, mid, mmWave bands with advantages and deployment challenges. / State frequency range of 5G mid band and ultra-high band. / Describe 5G radio spectrum and list the services provided by it.</i>	2, 4, 6	W-25 Q3d, W-25 Q5c, S-26 Q1d, S-26 Q2d	High
IMT-2020 (vision, usage scenarios, requirements, features) <i>Explain IMT-2020 with three key usage scenarios and technical requirements. / List features of IMT-2020 standard (any two). / State the vision and services of IMT-2020 with its spectrum requirement.</i>	2, 4, 6	W-25 Q6b, S-26 Q1g, S-26 Q4c	High
Network slicing in 5G <i>Define network slicing in 5G. / With neat sketch, describe network slicing in 5G.</i>	2, 4	W-25 Q1d, S-26 Q3d	High
5G network architecture, enabling technologies, advantages over 4G <i>State significance of 5G; describe 5G enabling technology. / Describe 5G network; list functions used; advantages over 4G.</i>	6	S-26 Q5d, S-26 Q6c	Medium
5G service providers in India; 5G applications	—	— (not asked yet)	Low

Unit V — Recent Wireless Technologies & Applications (12 M)

Question / topic	Marks	Asked in	Probability
Bluetooth (features, applications, piconet / scatternet) <i>State any two features of Bluetooth technology. / Draw piconet, scatternet of Bluetooth. / State any four applications of Bluetooth.</i>	2	W-25 Q1e, W-25 Q1g, S-26 Q1e	High
Wi-Fi IEEE 802.11 (architecture, 802.11a, 802.11a vs 802.11g) <i>State advantages, disadvantages and applications of IEEE 802.11a. / Differentiate IEEE 802.11a and 802.11g (any four). / Draw system architecture of IEEE 802.11; write its features.</i>	4	W-25 Q3c, W-25 Q4e, S-26 Q3e	High

Vehicular communication (V2V / V2X applications) <i>Explain application of wireless communication for V2V communication. / List four applications of vehicular communication; describe one.</i>	4, 6	W-25 Q6c, S-26 Q4d	High
NFC — services <i>What is NFC? State four NFC services; describe one.</i>	6	S-26 Q5c	Medium
WiMAX vs WLAN <i>For large area Wi-MAX is used compared to WLAN — justify with advantages of Wi-MAX.</i>	4	S-26 Q2e	Medium
Bluetooth Low Energy; 3GPP Release 18 services; IoT, smart city, industrial automation applications	—	— (not asked yet)	Low

Most repeated topics (all units)

1. Mobile phone unit — block diagram, transmitter blocks (directional coupler, power sensor), frequency synthesizer, sensors — asked 4 time(s) in 2 paper(s) (W-25, S-26)
2. GSM architecture (diagram, working, NSS functions, HLR/VLR) — asked 4 time(s) in 2 paper(s) (W-25, S-26)
3. 5G spectrum — low, mid, mmWave bands; spectrum challenges in India — asked 4 time(s) in 2 paper(s) (W-25, S-26)
4. Co-channel and adjacent channel interference (types, reduction) — asked 3 time(s) in 2 paper(s) (W-25, S-26)
5. IMT-2020 (vision, usage scenarios, requirements, features) — asked 3 time(s) in 2 paper(s) (W-25, S-26)
6. Comparison of generations (3G / 4G / 5G) — asked 3 time(s) in 2 paper(s) (W-25, S-26)
7. MIMO and beamforming — asked 3 time(s) in 2 paper(s) (W-25, S-26)
8. Wi-Fi IEEE 802.11 (architecture, 802.11a, 802.11a vs 802.11g) — asked 3 time(s) in 2 paper(s) (W-25, S-26)
9. Bluetooth (features, applications, piconet / scatternet) — asked 3 time(s) in 2 paper(s) (W-25, S-26)
10. Vehicular communication (V2V / V2X applications) — asked 2 time(s) in 2 paper(s) (W-25, S-26)

Diagrams to practise: GSM architecture, LTE architecture, 5G architecture, mobile phone block diagram, frequency synthesizer, frequency reuse pattern ($N = 3, 4, 7, 12$), mobile-originated call sequence, microcell zone, piconet/scatternet, IEEE 802.11 architecture, network slicing, MIMO/beamforming, IMT-2020 triangle. **Small numericals:** cluster size $N = i^2 + ij + j^2$, reuse ratio $D/R = \sqrt{3N}$, co-channel S/I, channels per cell, free-space path loss, synthesizer output $f = N \cdot f_{\text{ref}}$. The model papers (Set A, B, C) contain solved examples of each.

Note: This is a list of important questions 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