JHARKHAND UNIVERSITY OF TECHNOLOGY

Diploma 5th Semester Sample Paper (DIPLOMA WALLAH)

MOBILE WIRELESS COMMUNICATION

Time: 3 Hours **Full Marks: 70** **SET: 1**

INSTRUCTIONS:

1. Question No. 1 is Compulsory.
2. Answer any **FOUR** questions from the remaining (Q.2 to Q.7).
3. **Note regarding Diagrams:** Where diagrams are required, please refer to standard textbooks or search on Google/YouTube for the specific topic (e.g., "GSM Architecture Diagram").

Q.1. Multiple Choice Questions [2 × 7 = 14]

(i) The process of transferring a call from one base station to another is called:

(a) Roaming (b) Handoff
(c) Switching (d) paging

(ii) In GSM, the uplink frequency is _____ the downlink frequency.

(a) Higher than (b) Lower than
(c) Equal to (d) Unrelated to

(iii) Which of the following is NOT a part of the GSM Network Subsystem (NSS)?

(a) HLR (b) VLR
(c) BTS (d) AUC

(iv) CDMA technology uses:

(a) Frequency Hopping (b) Time Slots
(c) Spread Spectrum (d) Narrowband

(v) The basic unit of a cellular system is:

(a) Cell (b) Cluster
(c) Region (d) Zone

(vi) GPRS stands for:

(a) Global Packet Radio Service (b) General Packet Radio Service
(c) Global Positioning Radio Service (d) Group Packet Radio Service

(vii) 3G technology typically offers data rates in the range of:

(a) 10-20 Kbps (b) 144 Kbps - 2 Mbps
(c) 1 Gbps (d) 100 Mbps

SECTION B (Long Answer Type)

Q.2. (a) [Theory/Diagram] Explain the **GSM Architecture** in detail. Describe the role of MS, BSS (BTS, BSC), and NSS (MSC, HLR, VLR). [7]

[Important: Draw the GSM Architecture Block Diagram here. Refer to Google images for "GSM Architecture Block Diagram".]

Q.2. (b) [Theory] Differentiate between **FDDI, CDPD, and WLL** (Wireless Local Loop). **[7]**

Q.3. (a) [Theory] Explain the concept of **Frequency Reuse**. Define 'Cluster Size' and 'Reuse Factor'. Why is the hexagonal cell shape preferred? **[7]**

[Important: Draw the Hexagonal Cell Structure/Cluster Diagram here. Refer to Book/Google.]

Q.3. (b) [Theory] What is **Interference**? Explain Co-channel Interference and Adjacent Channel Interference. How can they be reduced? **[7]**

Q.4. (a) [Theory] Compare **TDMA, FDMA, and CDMA**. Which one is used in 2G (GSM) and which one in 3G? **[7]**

Q.4. (b) [Theory/Diagram] Explain the **Call Routing** process when a landline user calls a mobile user (PSTN to Mobile). **[7]**

[Important: Draw the Call Routing/Flow Diagram (PSTN -> GMSC -> HLR -> MSC -> VLR -> BSC -> BTS -> MS). Refer to Google.]

Q.5. (a) [Theory] What is **Handoff** (Handover)? Explain the different types of Handoff strategies (Soft, Hard, Mobile-Assisted). **[7]**

Q.5. (b) [Theory] Write a note on **Bluetooth Architecture** (Piconet and Scatternet). Mention its applications. **[7]**

Q.6. [Detailed Long Answer] **[14]**

Explain the Evolution of Mobile Communication Generations (1G to 4G/5G).

Your answer must cover:

- **1G (AMPS):** Analog signals, FDMA, limitations.
- **2G (GSM/CDMA):** Digital signals, SMS, Encryption, Introduction of SIM.
- **2.5G (GPRS/EDGE):** Introduction of Packet Switching/Internet.
- **3G (UMTS/WCDMA):** High-speed data, Video calling.
- **4G (LTE):** IP-based network, OFDMA, High throughput.

[Important: Draw a timeline or comparative table/chart for 1G vs 2G vs 3G vs 4G. Refer to standard notes.]

Q.7. Write Short Notes on (Any FOUR): **[3.5 × 4 = 14]**

a. WAP (Wireless Application Protocol)

b. IMEI vs IMSI

c. Concept of Roaming

d. Near Field Communication (NFC)

e. Cell Splitting and Sectoring

Diploma Wallah: Solution Key

MCQ: (i) b, (ii) b, (iii) c (BTS is part of BSS), (iv) c, (v) a, (vi) b, (vii) b.

Q2(a) Hint: Ensure you explain the interfaces (Um, Abis, A interface) in the diagram.

Q6 Hint: Focus on the transition from Circuit Switching (1G/2G) to Packet Switching (3G/4G).
