# GURU NANAK INSTITUTE OF TECHNOLOGY
## An Autonomous Institute under MAKAUT
## 2022
## WIRELESS AND MOBILE COMMUNICATION
## MCE202

**TIME ALLOTTED: 3 Hrs** **FULL MARKS: 70**

*The figures in the margin indicate full marks.*
*Candidates are required to give their answers in their own words as far as practicable*

### GROUP – A
### (Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

| | | | Marks | CO No |
|---|---|---|---|---|
| 1. | (i) | The visitors' nodes in mobile communication are registered in –<br>a) HLR<br>b) EIR<br>c) VLR<br>d) AUC | 1 | CO1 |
| | (ii) | Which type of modulation technique is used in GSM ?<br>a) PSK<br>b) ASK<br>c) MSK<br>d) GMSK | 1 | CO1 |
| | (iii) | The first generation mobile cellular system is<br>a) GSM<br>b) AMPS<br>c) IS-95<br>d) Pagers | 1 | CO2 |
| | (iv) | X.25 protocol is an example of-<br>a) Circuit switching<br>b) Packet Switching<br>c) Message switching<br>d) none of these | 1 | CO2 |
| | (v) | GPRS stands for –<br>a) Global Packet Radio System<br>b) Global Packet Radio Service<br>c) General Packet Radio System<br>d) General Packet Radio Service | 1 | CO3 |
| | (vi) | Near-far problem occurs in<br>a) TDMA<br>b) CDMA<br>c) FDMA<br>d) CSMA | 1 | CO2 |

| | | | |
|---|---|---|---|
| (vii) | Frequency factor of a cellular system is given by<br>a) 1 / 2N<br>b) 1 / $N^2$<br>c) 1 / N<br>d) 2N | 1 | CO3 |
| (viii) | In 2G GSM systems handoff decisions are<br>a) mobile assisted<br>b) judged by channel<br>c) automatic<br>d) cell independent | 1 | CO4 |
| (ix) | What is frequency reuse?<br>a) process of using the same radio frequencies on radio transmitter sites within a geographic area<br>b) Process of selection of mobile users<br>c) Process of selecting frequency of mobile equipment<br>d) Process of selection of number of cells | 1 | CO3 |
| (x) | For the hexagonal cell geometry of seven cells cluster the co-channel reuse ratio Q= D/R is-<br>a) 3<br>b) 4.58<br>c) 5.20<br>d) 6 | 1 | CO3 |
| (xi) | The interface between MSC and BSC is<br>a) Radio interface<br>b) Abis interface<br>c) A-interface<br>d) SS7 | 1 | CO4 |
| (xii) | GSM up-link frequency band is<br>a) 824 – 849 MHz<br>b) 915 – 935 MHz<br>c) 895 – 915 MHz<br>d) 935 – 960 MHz | 1 | CO3 |

## GROUP – B
### (Short Answer Type Questions)
Answer any ***three*** from the following: **3×5=15**

| | | Marks | CO No |
|---|---|---|---|
| 2. | Explain briefly the Radio wave propagation Model for Large Scale and small scale/fading model. | 5 | CO1 |
| 3. | What are the factors influencing Small-Scale fading in Radio wave propagation. | 5 | CO2 |
| 4. | What is the procedure of hand off in terms of power management? Explain in brief. | 5 | CO3 |
| 5. | Explain IEEE 802 Cognitive Radio related activities. | 5 | CO4 |
| 6. | Explain GSM architecture and signal processing. | 5 | CO4 |

## GROUP – C
### (Long Answer Type Questions)
Answer any ***three*** from the following: **3×15=45**

| | | | Marks | CO No |
|---|---|---|---|---|
| 7. | (a) | Explain Practical Link Budget Design using Path Loss Model. | 8 | CO1 |
| | (b) | Discuss different factors effecting the link budget design issues. | 7 | CO2 |
| 8. | (a) | Explain the difference between TDMA and FDMA. | 8 | CO4 |
| | (b) | Explain why we can increase the number of subscribers in CDMA freely | 5 | CO4 |
| | (c) | Give one example application for TDMA and FDMA. | 2 | CO4 |
| 9. | (a) | Draw and Explain GPRS architecture. | 7 | CO3 |
| | (b) | Explain the signal processing technique in GPRS | 8 | CO3 |
| 10. | (a) | Find the equation free space propagation model received power. | 5 | CO2 |
| | (b) | A transmitter produces 50W of power. Express the transmit power in dBW and dBm. Assume that the transmit and receive antennas have unity gains. | 5 | CO2 |
| | (c) | If d0 is 100m and the received power at that distance is 0.0035mW, then find the received power level at a distance of 10km. | 5 | CO2 |
| 11. | | Write Short notes on any three of the following | 3x5=15 | |
| | (a) | Physical and logical channels of IS 95 | 5 | CO1 |
| | (b) | Hand-off procedure | 5 | CO3 |
| | (c) | Point-to-point MIMO | 5 | CO2 |
| | (d) | EIRP | 5 | CO2 |
| | (e) | Indoor Propagation Models | 5 | CO4 |