QPC: RN20BTECH647 AR 20 Reg. No

# GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2023

## BPEEC7011 - Mobile Communication

(ECE)

Time: 3 hrs Maximum: 70 Marks

**Answer ALL Questions**

**The figures in the right hand margin indicate marks.**

**PART – A: (Multiple Choice Questions)** **(1 x 10 = 10 Marks)**

| Q.1. Answer ***ALL*** questions | | [CO#] | [PO#] |
|---|---|---|---|
| a. | In cellular design, the D/R ratio is used to characterize the<br>(i) cell splitting (ii) frequency reuse<br>(iii) cell sector (iv) sectorized antenna | 1 | 1 |
| b. | The interference received from co-channel cells is called ____<br>(i) co-channel interference (ii) ) frequency reuse<br>(iii) handoff (iv) cell splitting | 1 | 1 |
| c. | Doppler shift is directly proportional to _____<br>(i) Velocity (ii) Height of antenna<br>(iii) Power of receiving antenna (iv) Power of transmitter | 2 | 1 |
| d. | The two directions, mobile station to base station and vice versa are separated using different frequencies, called _____.<br>(i) Frequency division simplex. (ii) Frequency division duplex.<br>(iii) Frequency division full duplex. (iv) Frequency division full simplex. | 2 | 1 |
| e. | Training and tracking are the operating modes of _____<br>(i) Diversity techniques (ii) Channel coding techniques<br>(iii) Equalization techniques (iv) Demodulation techniques. | 3 | 1 |
| f. | SIM in the GSM network stands for _____.<br>(i) Subscriber Identity Module (ii) Subscriber Investigation Mobile<br>(iii) Subscriber Identification Mobile (iv) Smart Identification Module | 3 | 1 |
| g. | In a piconet, there can be up to _____ parked nodes in the network.<br>(i) 63 (ii) 127<br>(iii) 255 (iv) 511 | 4 | 1 |
| h. | Which IEEE standard implies ZigBee?<br>(i) 802.11.4 (ii) 802.15.4<br>(iii) 802.15.1 (iv) 802.11 | 4 | 1 |
| i. | Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?<br>(i) CDMA (ii) CSMA/CA<br>(iii) ALOHA (iv) CSMA/CD | 4 | 1 |
| j. | The mobile technology using general packet radio service (GPRS) standard has been termed as<br>(i) 1G (ii) 2G<br>(iii) 3G (iv) 2.5G | 1 | 1 |

**PART – B: (Short Answer Questions)** **(2 x 10 = 20 Marks)**

| Q.2. Answer ***ALL*** questions | | [CO#] | [PO#] |
|---|---|---|---|
| a. | What is cell splitting? Explain with suitable diagram. | 1 | 1 |
| b. | Consider an AMPS system in which SNR =18dB is required for accepted voice quality. What should be the reuse factor? | 1 | 2 |

| | | | | |
|---|---|---|---|---|
| c. | Write the expression of received power as a function of distance from the transmitter for free space propagation model in dB. | 2 | 2 | |
| d. | Derive the expression of DS-CDMA capacity. | 2 | 2 | |
| e. | Describe the function of HLR and VLR. | 3 | 1 | |
| f. | Briefly explain about linear and non-linear equalizers. | 3 | 1 | |
| g. | Mention advantages of wireless LANs over wired LANs. | 4 | 1 | |
| h. | What is the advantage of infra-red technology? | 4 | 1 | |
| i. | Explain the advantages of 2G over 1G. | 1 | 1 | |
| j. | What are the features of TDMA? | 2 | 1 | |

**PART – C: (Long Answer Questions)** **(10 x 4 = 40 Marks)**

| Answer ***ALL*** questions | | Marks | [CO#] | [PO#] |
|---|---|---|---|---|
| 3. a. | Consider an AMPS system in which S/I ratio of 18 dB is required for accepted voice quality. What should be the reuse factor for the system if n=4.What will be the reuse factor pf GSM system in which S/I is 12 dB. | 5 | 1 | 2 |
| b. | Explain briefly the evolution of cellular system from 1G to 4G. | 5 | 1 | 1 |
| | (OR) | | | |
| c. | Prove that for a hexagonal geometry, the co-channel reuse ratio is given by $Q=\sqrt{3N}$, where $N= i^2 +ij+j^2$ using cosine law and the hexagonal cell geometry? | 5 | 1 | 2 |
| d. | Explain in detail the different techniques used to improve coverage & capacity of cellular System. | 5 | 1 | 1 |
| 4. a. | Compare FDMA, TDMA & CDMA. | 5 | 2 | 1 |
| b. | Consider GSM-TDMA system with following parameters: Nr=2,Nt=24 frames of 120mseach with 8 timeslots per frame, number of reference bit =148 bits in each slot, preamble bit =34 bits with the separation of guard time bit 8.25 ,bit rate=270.833kbps.Calculate frame efficiency. | 5 | 2 | 2 |
| | (OR) | | | |
| c. | Prove that in the two ray ground reflected model $\Delta$ = 2ht*hr/d. Write down path difference in terms of wavelength. | 5 | 2 | 2 |
| d. | Explain the types of small-scale fading with fading channel characteristics. | 5 | 2 | 1 |
| 5. a. | Explain a simplified communication system using adaptive equalizer at the receiver. | 5 | 3 | 1,2 |
| b. | Explain base station system and network switching system in GSM network. | 5 | 3 | 1 |
| | (OR) | | | |
| c. | Explain GSM architecture with neat diagram. | 10 | 3 | 1 |
| 6. a. | Write short notes of any two<br>(i) Comparison of Wimax and LTE technology<br>(ii) Zigbee technology<br>(iii) Bluetooth | 5*2 =10 | 4 | 1 |
| | (OR) | | | |
| b. | Explain WLAN technologies with suitable diagram. | 5 | 4 | 1 |
| c. | Explain the features of Wi-Max. | 5 | 4 | 1 |

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