THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF COMPUTER SCIENCE
BSC DEGREE PROGRAMME 2023/2024
FINAL EXAMINATION
CSU 5312- WIRELESS AND CELLULAR NETWORKS
DURATION: TWO HOURS ONLY (02 HOURS)

DATE: 10.04.2024 **TIME: 1.30 pm – 3.30 pm**

Answer **FIVE (05) Questions ONLY.** All questions carry equal marks.

Q1.

i. Explain TDMA in GSM using a diagram.

ii. A cellular network has a total bandwidth of 50 MHz. If each channel has a bandwidth of 200 kHz, how many channels can be accommodated in the network?

iii. The transmission rate of a cellular network is 2 Mbps. If each user requires 100 kbps for voice communication, how many users can be supported simultaneously in a cell?

Q2.

i. Explain 4G architecture with the support of a diagram.

ii. Identify the functions of at least three components of the 4G architecture.

iii. The data rate of a cellular network is 10 Mbps, and the average spectral efficiency is 2bps/Hz. What is the total bandwidth required to achieve this data rate?

Q3.

i. Explain the satellite internet technology using a diagram and describe the function of two components of satellite internet.

ii. Discuss the advantages and disadvantages of satellite communications.

iii. State the applications of satellite communication.

Q4.

i. Describe the concept of Digital Baseband Signals. How do they differ from analog baseband signals in terms of representation?

ii. What are the key characteristics of digital baseband signals, and how is their information represented?

iii. Discuss the importance of modulation in wireless communication.

Q5.

i. What are the significant types of interference in wireless communication, and how can they be mitigated?

ii. Discuss the significance of redundancy in error detection and correction. Provide examples of redundancy-based error-checking techniques.

iii. Discuss the challenges of spectrum allocation and management in the context of wireless communication.

Q6.

i. Describe the significance of directivity in antenna performance, including its effects on communication range and signal strength.

ii. What are the different types of polarization in antennas, and how does polarization matching optimize signal reception?

iii. Discuss the trade-off between bandwidth and antenna size and why achieving a balance is vital in antenna design.

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