1. What is a fundamental characteristic of cellular mobile systems?

a) Fixed coverage areas
b) Continuous frequency allocation
c) Limited mobility
d) Shared channel access

Answer: b) Continuous frequency allocation

Explanation: Cellular mobile systems allocate a range of frequencies to each cell, enabling continuous coverage across the service area. This frequency allocation allows for efficient management of resources and accommodates the mobility of users within the system.

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2. What is a key performance criterion for cellular systems?

a) Maximum throughput
b) Minimum latency
c) High spectral efficiency
d) Low mobility

Answer: c) High spectral efficiency

Explanation: Spectral efficiency is crucial in cellular systems to maximize the utilization of available frequency bands, enabling more users to communicate simultaneously within the limited radio spectrum.

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3. What contributes to the uniqueness of the mobile radio environment in cellular systems?

a) Fixed user positions
b) Variable propagation conditions
c) Static channel allocation
d) Homogeneous interference levels

Answer: b) Variable propagation conditions

Explanation: The mobile radio environment in cellular systems is characterized by changing propagation conditions due to factors such as terrain, buildings, and weather, which can affect signal strength and quality.

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4. Which mechanism is employed to mitigate co-channel interference in cellular systems?

a) Frequency hopping
b) Power control
c) Adaptive modulation
d) Channel coding

Answer: b) Power control

Explanation: Power control adjusts the transmission power of mobile devices to minimize interference, especially in cells that share the same frequency channels (co-channel cells), improving overall system performance.

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5. What is the primary purpose of the handoff mechanism in cellular systems?

a) To allocate more frequencies
b) To reduce latency
c) To maintain continuous communication
d) To increase cell coverage

Answer: c) To maintain continuous communication

Explanation: Handoff ensures seamless transition between adjacent cells as mobile users move, preventing call drops and maintaining uninterrupted communication by transferring the connection from one base station to another.

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6. What does cell splitting involve in the context of cellular system planning?

a) Increasing the number of channels per cell
b) Reducing the size of cells
c) Combining adjacent cells

d) Decreasing the frequency reuse factor

Answer: b) Reducing the size of cells

Explanation: Cell splitting divides large cells into smaller ones, reducing the geographic area covered by each cell. This increases capacity and allows for more efficient frequency reuse, improving overall system performance.

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7. Which component is essential for the design of cellular systems to ensure effective frequency utilization?

a) Baseband processor
b) Antenna tower
c) Spectrum analyzer
d) Frequency reuse plan

Answer: d) Frequency reuse plan

Explanation: A frequency reuse plan specifies how available frequency bands are allocated across cells to minimize interference while maximizing capacity and spectral efficiency in cellular systems.

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8. What parameter is targeted to achieve a desired Carrier-to-Interference ratio (C/I) in an omni-directional antenna system?

a) Signal strength
b) Channel bandwidth
c) Modulation scheme
d) Noise level

Answer: a) Signal strength

Explanation: The Carrier-to-Interference ratio (C/I) in an omni-directional antenna system is influenced by the strength of the desired signal relative to the interference from other sources. Adjusting signal strength helps maintain a desired C/I ratio for optimal performance.

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9. Which concept defines the ratio of the signal power to the interference power in a cellular system?

a) Signal-to-Noise ratio (SNR)
b) Carrier-to-Interference ratio (C/I)
c) Bit Error Rate (BER)
d) Forward Error Correction (FEC)

Answer: b) Carrier-to-Interference ratio (C/I)

Explanation: C/I ratio measures the relative strength of the desired signal to the interfering signals within a cellular system. It is a critical parameter for assessing the quality of communication and system performance.

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10. What is the primary function of frequency reuse channels in cellular systems?

a) Increasing interference
b) Enhancing coverage
c) Reducing channel capacity
d) Optimizing spectrum utilization

Answer: d) Optimizing spectrum utilization

Explanation: Frequency reuse channels allow for the efficient allocation of limited frequency bands across different cells, enabling multiple users to communicate simultaneously while minimizing interference and maximizing spectral efficiency.