

CBCGS-H ESE ATKT (September 2020)

Mobile Communication System (MCS)

ECC702

1. Spectrum Efficiency of a cellular network is (2M)

- a. The traffic carried by whole network
- b. The traffic carried per cell divided by the bandwidth of the system and the area of a cell
- c. Expressed in Erlang /MHz /km²
- d. Both b and c
- e. Both a and c

2. What are Pseudo-Random noise sequences, or P/N Sequences? (2M)

- a..P/N Sequences are known sequences which exhibit the properties or characteristics of random sequences
- b. P/N Sequences can be used to logically isolate users on the same physical (frequency) channel
- c. P/N Sequences appear as random noise to everyone else, except to the transmitter and intended receiver
- d. All of the above

3. In Mobile Assisted Handoff (MAHO), the handoff takes place when (2M)

- a. The power received by the mobile station from other base station is more than the serving base station
- b. The channel allocated is not available
- c. The mobile station has no signal
- d. All of the above

4. In MIMO, which factor has the greatest influence on data rates? (2M)

- a. The size of the antenna
- b. The height of the antenna
- c. The number of transmit antennas
- d. The number of receive antennas

5. Grade of service refers to (2M)

- a. Accommodating large number of users in limited spectrum
- b. Ability of a user to access trunked system during busy hour
- c. Two calls in progress in nearby mobile stations
- d. High speed users with large coverage area

6. For cluster size 7, what is frequency reuse factor? (2M)

- a. 1
- b. 7
- c. 1/7
- d. None of the above

7. If $i=2$ and $j=1$, what is the cluster size in that cellular system? (2M)

- a. 4
- b. 2
- c. 1
- d. 7

8. If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex channels, compute the number of channels available per cell if a system uses 4-cell reuse. (2M)

- a. 95
- b. 55
- c. 165
- d. 125

9. Determine the distance from nearest cochannel cell for a cell having a radius of 0.64 km and a cochannel reuse factor of 12. (2M)

- a. 5.42 km
- b. 7.68 km
- c. 12.39 km
- d. 8.13 km

10. Determine signal to co-channel interference ratio (S/I), for 4 cell reuse with $n=4$ and 6 interfering co-channel cells. (2M)

- a. 12
- b. 18
- c. 24
- d. 30

11. A cellular communication service area is covered with 12 clusters having 7 cells in each cluster and 16 channels assigned in each cell. Find the number of channels per cluster. (2M)

- a. 84
- b. 60
- c. 120
- d. 112

12. In a cellular system, if each user averages 2 calls per hour at an average call duration of 3 minutes, what is traffic intensity per user? (2M)

- a. 0.1 Erlangs
- b. 0.2 Erlangs
- c. 0.5 Erlangs
- d. 1 Erlangs

13. Consider Global System for Mobile, which is a TDMA/FDD system that uses 25 MHz for the forward link, which is broken into radio channels of 200 kHz. If 8 speech channels are supported on a single radio channel, and if no guard band is assumed, find the number of simultaneous users that can be accommodated in GSM. (2M)

- a. 125
- b. 1000
- c. 500
- d. 750

14. Which of the following is not true for TDMA? (2M)

- a. Single carrier frequency for single user
- b. Discontinuous data transmission
- c. No requirement of duplexers

d. High transmission rates

15. What is the time duration of a bit if data is transmitted at 270.833 kbps in the channel? (2M)

- a. 270.833 s
- b. 3 μ s
- c. 3.692 μ s
- d. 3.692 s

16. If a normal GSM time slot consists of 6 trailing bits, 8.25 guard bits, 26 training bits, and 2 traffic bursts of 58 bits of data, find total number of bits in a timeslot. (2M)

- a. 144.25 bits
- b. 98.25 bits
- c. 156.25 bits
- d. 148 bits

17. If total traffic intensity is 12 Erlangs and traffic intensity per user is 0.1 Erlangs, how many users can be supported by the system? (2M)

- a. 12
- b. 120
- c. 1200
- d. 1000

18. When a fraction of assigned channel is reserved for handoffs, it is (2M)

- a. Guard channel concept
- b. Fixed channel assignment
- c. Dynamic channel assignment
- d. None of the above

19. Spectrum efficiency and MIMO rely on a system called beamforming. What does this term refer to? (2M)

- a. A connectivity system that identifies the closest base station for each user
- b. A traffic-signalling system that breaks down data into smaller packets for transport
- c. A connectivity system that caps the number of users utilizing the network at once

d. A traffic-signalling system that identifies the route of least interference to deliver data to a user

20. Function of 4G LTE Advanced relay technology using relay nodes is (2M)

- a. Enables improved capacity and coverage
- b. Reduces Interference
- c. Increases infrastructure requirements
- d. Increases bandwidth requirements

21. Which of the following leads to the 3G evolution of GSM, IS-136 and PDC systems?

(1M)

- a. W-CDMA
- b. GPRS
- c. EDGE
- d. HSCSD

22. Which of the following leads to evolution of 3G networks in CDMA systems? (1M)

- a. IS-95
- b. IS-95B
- c. CdmaOne
- d. Cdma2000

23. Each IS-95 channel occupies _____ of spectrum on each one-way link. (1M)

- a. 1.25 MHz
- b. 1.25 kHz
- c. 200 kHz
- d. 125 kHz

24. _____ are used to resolve and combine multipath components. (1M)

- a. Equalizer
- b. Registers
- c. RAKE receiver
- d. Frequency divider

25. GSM is an example of

(1M)

- a. TDMA cellular systems
- b. FDMA cellular systems
- c. CDMA cellular systems
- d. SDMA cellular systems

ANSWER: TDMA cellular systems

26. UMTS uses which multiple access technique?

(1M)

- a. CDMA
- b. TDMA
- c. FDMA
- d. SDMA

27. If coherence time of the channel is smaller than the symbol period of the transmitted signal, it is

(1M)

- a. Fast fading
- b. Slow fading
- c. Frequency selective fading
- d. Frequency non selective fading

28. Hybrid ARQ is part of the _____ layer.

(1M)

- a. PDCP
- b. RLC
- c. MAC
- d. PHY

29. What are advantages of LTE relay?

(1M)

- a. Increase network density
- b. Network coverage extension
- c. Rapid network roll-out
- d. All of the above

30. _____ problem occurs when many mobile users share the same channel. (1M)

- a. Near-far
- b. Activation
- c. Line of sight
- d. Windowing