CBGSTE-ESE-ATKT (September 2020)

Mobile Communication (MC)

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

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 μs

c. 3.692 μs

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. The power delay profile helps in determining (2M)

a. Excess delay

b. Coherence Time

c. Coherence bandwidth

d. Doppler spread

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

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. Dwell time is the time for (1M)

a. A call within the cell

b. Hand off

c. Waiting for channel allocation

d. A call duration

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

a. Near-far

b. Activation

c. Line of sight

d. Windowing