Question Bank for Multiple Choice Questions

Program: Diploma in E & Tc engineering	**Program Code:- EJ**
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01 –Wireless Communication Systems	**Marks:-12**

Content of Chapter:-

1.1 Wireless network generations
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1.5 Mobile Phone Unit : Block diagram , working, features, of transmitter, and receiver section, Frequency Synthesizer, Control unit and Logic Unit of Mobile phone, sensors: speakers, camera, touch screen, motion sensors and other common sensors

1. Which of the following multiple access techniques are used by second generation cellular systems?
(A) FDMA/FDD and TDMA/FDD (B) TDMA/FDD and CDMA/FDD
(C) FDMA/FDD and CDMA/FDD (D) FDMA/FDD
Answer: - Option B
Explanation: - First generation cellular system used FDMA/FDD techniques. Second generation standards uses TDMA/FDD and CDMA/FDD multiple access techniques. 2G networks are digital.

2. Which of the following is a CDMA standard of second generation network?
(A) IS-95 (B) IS-136
(C) ETACS (D) EDGE
Answer: - Option A
Explanation: - Interim Standard 95 (IS-95) is the most popular CDMA standard of second generation networks. IS-136 is a TDMA standard of 2G. EDGE is a standard of 2.5G and ETACS is a 1G standard.

3. Which one is not a TDMA standard of second generation networks?
((A) GSM ((B) IS-136
((C) AMPS ((D) PDC
Answer: - Option C
Explanation: - GSM (Global System Mobile), IS-136 (Interim Standard 136) and PDC (Pacific Digital Cellular) are the three most popular TDMA standards of second generation. AMPS is a first generation standard.

4. Popular 2G CDMA standard IS-95 is also known as _____

(A) CdmaOne (B) CdmaTwo

(C) IS-136 (D) IS-95B

Answer: - Option A

Explanation: - The popular 2G CDMA standard, Interim Standard (IS-95) is also known as CdmaOne. The 2.5G CDMA standard, IS-95B is called CdmaTwo. And IS-136 is a TDMA standard for 2G.

5. How many users or voice channels are supported for each 200 KHz channel in GSM?

(A) Eight (B) Three

(C) Sixty four (D) Twelve

Answer: - Option A

Explanation: - Explanation: GSM is a circuit switched system that divides each 200 KHz channel into eight 25 KHz time slots, i.e. each radio channel is divided into eight voice channels..

6. How many voice channels are supported for each 30 KHz radio channel in IS-136?

(A) Eight (B) Thirty

(C) Three (D) Sixteen

Answer: - Option C

Explanation:- Interim Standard 136 (IS-136) was popularly known as North American Digital Cellular (NAD(C) system. It divides each 30 KHz radio channel into three time slots, each of 10 KHz.

7. How many users are supported in IS-95 for each 1.25 MHz?

(A) Eight (B) Sixty four

(C) Sixteen (D) Twenty five

Answer: - Option B

Explanation: - IS-95 supports upto 64 users which are orthogonally coded and simultaneously transmitted on each 1.25 MHz. The services of IS-95 standard are short messaging service, slotted paging, over-the-air activation, enhanced mobile station identities etc.

8. Which modulation technique is used by GSM?

(A) GMSK (B) BPSK

(C) QPSK (D) GFSK

Answer:-Option A

Explanation:- GSM uses a form of modulation known as GMSK (Gaussian Minimum Shift Keying). It is a form of modulation with no phase discontinuities and provides data transmission with efficient spectrum usage.

9. IS-95 uses which modulation technique?

(A) GMSK (B) BPSK

(C) QAM (D) AFSK

Answer: - Option B

IS- 95 uses BPSK (Binary Phase Shift Keying) with quadrature spreading. It is regarded as one of the most robust digital modulation technique and is used for long distance wireless communication

10. Which is one of the disadvantages of 2G standards?
(A) Short Messaging Service (SMS) (B) Digital modulation
(C) Limited capacity (D) Limited Internet Browsing

Answer: Option D
Explanation: - 2G technologies use circuit switched data modems that limits data users to a single circuit switched voice channel. The advantages of 2G network are that they are digital in nature and supports SMS service.

11. GSM (Global System for Mobile) was earlier also known as _____
(A) Group System Mobile (B) Global Special Meaning
(C) Group Special Mobile (D) Global Special Mobile
Answer: - Option C
Explanation: - GSM was earlier known as Group Special Mobile. As it became more global, the meaning of acronym was changed to Global System for Mobile.

12. 2G CDMA standard, IS-95, was proposed by which company?
(A) Nippon Telephone and Telegraph (NTT) (B) Qualcomm
(C) Bellcore and Motorola (D) AT&T Bell Laboratories
Answer: - Option B
Explanation: - IS-95 was proposed by Qualcomm in early 1990s. Later it was adopted as a standard by Telecommunications Industry Association in TIA/EIA/IS-95 release published in 1995.

13. Which one of the following 2G standard is used in Japan?
(A) IS-136 (B) GSM
(C) PDC (D) AMPS

Answer: - Option C
Explanation:- PDC (Personal Digital Cellular) was standardized by Japanese Ministry of Posts and Telecommunication in 1991. It is similar to IS- 136, but with 25 KHz voice channels to be compatible with the Japanese analog channels.

14. The 2G GSM technology uses a carrier separation of _____
(A) 1.25 MHz (B) 200 KHz
(C) 30 KHz (D) 300 KHz

Answer: - Option C
Explanation: - No power is consumed in the circuit.

15. Which of the following is not a characteristic of 3G network?
(A) Communication over VoIP (B) Unparalleled network capacity
(C) Multi-megabit Internet access (D) LTE based network

Answer: - Option D
Explanation: - Multi-megabit Internet access, communication using Voice over internet Protocol (VoIP),

voice activated calls, unparalleled network capacity are some of the characteristics of 3G network. 3G systems promise unparalleled wireless access which is not possible in 2G systems. LTE (Long term Evolution) is a standard of 4G systems.

16. What is the term used by ITU for a set of global standards of 3G systems?
(A) IMT 2000 (B) GSM
(C) CDMA (D) EDGE

Answer: - Option A
International Telecommunications Union (ITU) used the term IMT-2000 in 1998. It is used for a set of global standards for third generation (3G) mobile telecoms services and equipment.

17. Which of the following leads to evolution of 3G networks in CDMA systems?
(A) IS-95 (B) IS-95B
(C) CdmaOne (D) Cdma2000
Answer: Option D
Explanation: - 3G evolution of CDMA system leads to cdma2000. It is based on the fundamentals of IS-95 and IS-95B. IS-95 is a 2G standard for CDMA systems. IS-95B is a CDMA system for 2.5G networks.

18. Which of the following leads to the 3G evolution of GSM, IS-136 and PDC systems?
(A) W-CDMA (B) GPRS
(C) EDGE (D) HSCSD
Answer: - Option A
Explanation: - The 3G evolution for GSM, IS-136 and PDC systems leads to W-CDMA (Wideband CDM(A). It is based on the network fundamentals of GSM, as well as merged versions of GSM and IS-136 through EDGE. GPRS, EDGE and HSCSD are 2.5G networks.

19. Which of the following is not a standard of 3G?
(A) UMTS (B) Cdma2000
(C) TD-SCDMA (D) LTE
Answer: - Option D
UMTS (Universal Mobile Telecommunication System), TD-SCDMA (Time Division Synchronous Code Division Multiple Access), Cdma2000 are the standards defined for 3G networks. LTE (Long Term Evolution) is a 4G standard for high speed wireless communication.

20. Which of the following 3G standard is used in Japan?
(A) Cdma2000 (B) TD-SCDMA
(C) UMTS (D) UTRA
Answer: C
Explanation: Japan uses UMTS (W-CDM(A) standard for its 3G network. The standards used are UMTS 800, UMTS 900, UMTS 1500, UMTS 1700 and UMTS 2100. They are standardized by ARIB (Association of Radio industries and Business).

21. What does the number 2000 in IMT-2000 signifies?

(A) Year (B) Number of subscribers per cell

(C) Number of cells (D) Area (Km)

Answer: - Option A

Explanation: The International Telecommunication Union (ITU) defined the third generation (3G) of mobile telephony standards, IMT-2000 to facilitate growth, increase bandwidth, and support more diverse applications. The number 2000 in IMT-2000 indicates the start of the system (year 2000) and the spectrum used (around 2000 MHz).

22. What is the full form of UMTS?

(A) Universal Mobile Telephone System

(B) Ubiquitous Mobile Telephone System

(C) Ubiquitous Mobile Telemetry System

(D) Universal Machine Telemedicine System

Answer: A

Explanation: UMTS (Universal Mobile Telephone System) is a visionary air interface standard that was introduced in 1996. European carriers, manufacturers, and government regulators collectively developed the early version of UMTS as an open air interface standard for third generation wireless telecommunication.

23. UMTS use which multiple access technique?

(A) CDMA (B) TDMA

(C) FDMA (D) SDMA

Answer: A

Explanation: Although UMTS is designed to operate on evolved GSM core networks, it uses code division multiple access (CDM(A) for its air interface. The majority of the 3G systems in operation employ CDMA, while the rest use TDMA. CDMA allows various users to share a channel at the same time, while TDMA allows users to share the same channel by chopping it into different time slots.

24. UMTS does not has backward compatibility with _____

(A) GSM

(B) IS-136

(C) IS-95

(D) GPRS

Answer: C

Explanation: UMTS assures backward compatibility with the second generation GSM, IS-136 and PDC TDMA technologies. It is also compatible with all 2.5G TDMA techniques like GPRS and EDGE. But it does not provide compatibility to CDMA technologies of 2G and 2.5 G. IS-95 is a CDMA standard of 2G.

25.UMTS is also known as _____

(A) IS-95

(B) GPRS

(C) CdmaOne

(D) W-CDMA

Answer: D

Explanation: UMTS uses Wideband CDMA (W-CDM(A) to carry the radio transmissions. Therefore, it is

also referred as W-CDMA. W-CDMA offers greater spectral efficiency and bandwidth to mobile network operators.

26. W-CDMA works in FDD mode only.
(A) True
(B) False
Answer: B
Explanation: W-CDMA works in both FDD and TDD mode. W-CDMA developed for wide area cellular coverage uses FDD. And TDD is used by W-CDMA for indoor cordless type applications

27. What is the minimum spectrum allocation required by W-CDMA?
(A) 5 MHz
(B) 20MHz
(C) 1.25 MHz
(D) 200 KHz
Answer: A
Explanation: W-CDMA/UMTS requires a minimum spectrum allocation of 5 MHz Using this bandwidth, it has the capacity to carry over 100 simultaneous voice calls. It is able to carry data at speeds up to 2 Mbps in its original format. 20 MHz is the bandwidth defined for LTE. Cdma One uses a bandwidth of 1.25 MHz . GSM's bandwidth is 200 KHz.

28. How much increase in spectral efficiency is provided by W-CDMA in comparison to GSM?
(A)Two times
(B)Three times
(C) No increase
(D) Six times
Answer: D
Explanation: W-CDMA can provide at least six times an increase in spectral efficiency over GSM at system level. Such a wider bandwidth is chosen to higher data rates as low as 8 kbps to as high as 2 Mbps on a single 5 MHz W-CDMA radio channel.

29. What is frequency reuse?
(A)Process of selecting and allocating channels
(B)Process of selection of mobile users
(C) Process of selecting frequency of mobile equipment
(D) Process of selection of number of cells
Answer: A
Explanation: Frequency reuse is the process of using the same radio frequencies on radio transmitter sites within a geographic area. They are separated by sufficient distance to cause minimal interference with each other.

30. Which of the following has no backward compatibility with 3G Cdma2000?
(A)IS-95
(B)GPRS
(C) IS-95A
(D) IS-95B
Answer: B

Explanation: 3G Cdma2000 is based on the original IS-95 and IS-95A CDMA standards, as well as the 2.5G IS- 95B air interface. While upgrading, Cdma2000 maintains backward compatibility with existing IS-95, IS-95A and IS-95B equipment's. Thus, Cdma2000 allow wireless carriers to introduce a family of new high data rate Internet access capabilities within existing systems.

31. Which of the following the first 3G CDMA air interface?
(A)IS-95
(B)IS-95B
(C) Cdma2000 1xRTT
(D) CdmaOne

Answer: C
Explanation: Cdma2000 1xRTT is the first 3G air interface. Here, RTT stands for Radio Transmission Technology and 1x indicates that the bandwidth is one times that of the original CdmaOne channel. It is modulated on a single carrier.

32. What is the name of the internet micro browser technology used by NTT DoCoMo in Japan?
(A)Wireless Application Protocol
(B)I - Mode
Answer: B
Explanation: I-mode is a wireless data service and Internet micro browser technology introduced by NTT DoCoMo on its PDC network in 1998. It is currently used by other wireless services throughout the world.

33.2.5G upgrade path for a particular wireless carrier does not match the original 2G technology choice made earlier by the same carrier.
(A)True
(B)False
Answer: B
Explanation: As 2.5G is the up gradation of 2G technology, 2.5G up gradation path must match the original 2G Technology. For example, 2.5G upgrade solution designed for GSM must dovetail with original GSM interface so that change of hardware is not required.

34. What is the name of the web browsing format language supported by 2.5G technology?
(A) Wireless Application Protocol
(B) Hypertext Markup Language
(C) Extensible Markup Language
(D) Hypertext Transfer Protocol
Answer: A
Explanation: 2.5G technology supports a new web browsing format language, which is called Wireless Application Protocol (WAP). It allows standard web pages to be viewed in a compressed format specifically designed for small, portable hand held wireless devices.

35. Which of the following is not a TDMA standard of 2.5G network?
(A) HSCSD
(B) GPRS
(C) EDGE
(D) GSM
Answer: D
Explanation: GSM (Global System for Mobile) is a TDMA standard for 2G network. HSCSD (High Speed Circuit Switched Dat(A), GPRS (General Packet Radio Service) and EDGE (Enhanced Data rates for GSM Evolution) are TDMA standards of 2.5G technology.

36. Which of the following is a 2.5G CDMA standard?
(A) IS-95
(B) Cdma2000
(C) IS-95B
(D) CdmaOne
Answer: C
Explanation: IS-95B (Interim Standard 95(B) is code division multiple access standard for 2.5G. It is an upgradation of IS- 95 which is a second generation standard of CDMA.

37. GPRS and EDGE supports which 2G standard?
(A) GSM only
(B) IS-136 only
(C) GSM and IS-136 both
(D) PDC
Answer: C
Explanation: GPRS (General Packet Radio Service) network provides a packet network on dedicated GSM or IS-136 radio channels. EDGE (Enhanced Data rates for GSM Evolution) is also developed keeping in desire both GSM and IS-136 operators.

38. What changes GPRS need to acquire while upgrading itself from GSM?
(A) A whole new base station
(B) New transceiver at base station
(C) New channel cards
(D) New packet overlay including routers and gateways
Answer: D
Explanation: GPRS requires a GSM operator to install new routers and Internet gateways at the base station along with new software upgrade. New base station RF hardware is not required.
39. Which new modulation technique is used by EDGE?
(A)BPSK
(B)8- PSK
(C) DQPSK
(D) AFSK
Answer: B
Explanation: EDGE uses a new digital modulation format, 8- PSK (Octal Phase Shift Keying). It is used in

addition to GSM's standard GMSK (Gaussian Minimum Shift Keying) modulation.

40. Various air interface formats used by EDGE are also known as ___
(A) Modulation and coding schemes
(B) Coding schemes
(C) Modulating air interface
(D) Air interface coding schemes
Answer: A
Explanation: EDGE allows nine different air interface formats known as multiple modulation and coding schemes (MCS). Each MCS state may use either GMSK or 8- PSK modulation for network access, depending upon the instantaneous demands of the network and the operating conditions.

41. EDGE is sometimes also referred as ____
(A) HSCSD
(B) 3GPP
(C) EGPRS
(D) EGSCSD
Answer: C
Explanation: EDGE is sometimes also referred as Enhanced GPRS (EGPRS). It is an enhancement of a GSM network in which EDGE is introduced on top of the General Packet Radio Service (GPRS). It is used to transfer data in a packet switched mode on various time

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02-Fundamentals of Cellular systems	**Marks:-12**

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2.1 Wireless network generations
2.2 Mobile Radio standards- AMPS, N- AMPS, IS -95, GSM, UMTS, CDMA 2000
2.3 Mobile wireless systems
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2.5 Mobile Phone Unit

1. Which of the following is not a characteristic of cellular telephone system?
a) Accommodate a large number of users
b) Large geographic area
c) Limited frequency spectrum
d) Large frequency spectrum
Answer: d
Explanation: Cellular systems accommodate a large number of users within a limited frequency spectrum over a large geographic area.

2. What is the responsibility of MSC in cellular telephone system?
a) Connection of mobile to base stations
b) Connection of mobile to PSTN
c) Connection of base station to PSTN
d) Connection of base station to MSC
Answer: b
Explanation: Mobile Switching Center (MSC) is responsible for connecting all mobiles to the PSTN (Public Switched Telephone Network) in a cellular system.

3. Who has the responsibility of billing and system maintenance function in cellular system?
a) Base Station
b) PSTN
c) MSC
d) Mobile system
Answer: c
Explanation: Mobile switching center (MSC) accommodates 100,000 subscribers and 5,000 simultaneous conversations at a time and handles all billing and system maintenance functions.

4. What is the function of FVC (Forward Voice Channel)?
a) Voice transmission from base station to mobiles
b) Voice transmission from mobile to base station
c) Initiating mobile calls
d) Broadcast all traffic request for all mobile

Answer: a

Explanation: FVC (Forward Voice Channel) and RVC (Reverse Voice Channel) are responsible for voice transmission. FVC is used for voice transmission from base station to mobile and RVC is used for voice transmission from mobile to base station.

5. Which two channels are responsible for initiating mobile calls?
a) FVC and FCC
b) FVC and RVC
c) FCC and RCC
d) FCC and RVC

Answer: c

Explanation: FCC (Forward Control Channel) and RCC (Reverse Control Channel) are control channels responsible for initiating mobile calls.

6. Of the total channels present in the cellular system, what is the percentage of voice and control channels?
a) 95% voice channels, 5% control channels
b) 5% voice channels, 95% control channels
c) 50% voice channels, 50% control channels
d) 25% voice channels, 75% control channels

Answer: a

Explanation: In each cellular system, control channels are 5% of the total channels available and remaining 95% are dedicated to voice and data traffic.

7. What is MIN?
a) Subscriber's telephone number
b) Paging message
c) Traffic request number
d) Mobile Internet

Answer: a

Explanation: MIN (Mobile Identification Number) is a 10 digit unique number which represents the telephone number of subscriber.

8. What is transmitted along with the call initiation request during the origin of call by a mobile?
a) MIN
b) ESN
c) ESN and SCM
d) MIN, ESN and SCM

Answer: d

Explanation: When a mobile originates the call, it sends the MIN (mobile identification number), ESN

(electronic serial number) and SCM (station class mark) along with the call initiation request.

9. What does SCM indicates?
a) Maximum receiver power level for a particular user
b) Maximum transmitter power level for a particular user
c) Minimum receiver power level for a particular user
d) Minimum transmitter power level for a particular user

Answer: b

Explanation: SCM (Station Class Mark) indicates the maximum transmitter power level for a particular user.

10. What is the shape of the cell present in the cellular system?
a) Circular
b) Square
c) Hexagonal
d) Triangular

Answer: c

Explanation: The shape of the cell present in the cellular network is hexagonal since it can cover the entire geographical area without any gap and overlapping.

11. Why the size of the cell is kept small in cellular network?
a) Increase capacity
b) Decrease capacity
c) Increased size of base station electronics
d) Slow process of handoffs

Answer: a

Explanation: The size of the cells in cellular network is kept small because of the need of high capacity in areas with high user density and reduced size and cost of base station electronics.

12. What is handoff?
a) Forward channel
b) Switching technique
c) Roamer
d) Guard channel

Answer: b

Explanation: Handoff is a switching technique which refers to the process of transferring an active call or data session from one cell in a cellular network to another.

13. Which one is not an advantage of using frequency reuse?
a) Increased capacity
b) Limited spectrum is required
c) Same spectrum may be allocated to other network
d) Number of base stations is reduced

Answer: d

Explanation: Frequency reuse is a technique of reusing frequencies and channels within a cellular system to improve capacity and spectral efficiency.

14. The process of transferring a mobile station from one base station to another is _____
a) MSC
b) Roamer
c) Handoff
d) Forward channel

Answer: c

Explanation: Handoff is the process of changing the channel associated with current connection while a call is in progress.

15. The interference between the neighbouring base stations is avoided by _____
a) Assigning different group of channels
b) Using transmitters with different power level
c) Using different antennas
d) Using different base stations

Answer: a

Explanation: The interference between the neighbouring base stations is avoided by assigning different group of channels and reusing the same channel after a certain amount of distance.

16. Cellular concept replaces many low power transmitters to a single high power transmitter.
a) True
b) False

Answer: b

Explanation: Cellular concept is a system level idea that replaces a single high power transmitter to many low power transmitters. High power transmitters lead to large cell, and thus it was impossible to use the same frequencies throughout the systems. But, it is possible with low power transmitter.

17. Why neighbouring stations are assigned different group of channels in cellular system?
a) To minimize interference
b) To minimize area
c) To maximize throughput
d) To maximize capacity of each cell

Answer: a

Explanation: Neighbouring base stations are assigned different group of channels. It minimizes the interference between base stations and the users under their control.

18. What is a cell in cellular system?
a) A group of cells
b) A group of subscribers
c) A small geographical area
d) A large group of mobile systems

Answer: c

Explanation: Cell is a small geographic area in a cellular system. Each cellular base station within a cell is allocated a group of radio channels that could be used in another cell.

19.What is frequency reuse?
a) Process of selecting and allocating channels
b) Process of selection of mobile users
c) Process of selecting frequency of mobile equipment
d) Process of selection of number of cells

Answer: a

Explanation: Frequency reuse is the process of using the same radio frequencies on radio transmitter sites within a geographic area. They are separated by sufficient distance to cause minimal interference with each other.

20.Which of the following is a universally adopted shape of cell?
a) Square
b) Circle
c) Triangle
d) Hexagon

Answer: d

Explanation: Hexagonal cell shape is a simplistic model of radio coverage for each base station. It has been universally adopted since the hexagon permits easy and manageable analysis of a cellular system.

21.Actual radio coverage of a cell is called _____
a) Fingerprint
b) Footprint
c) Imprint
d) Matrix

Answer: b

Explanation: Actual radio coverage of a cell is known as the footprint. It is determined from field measurements or propagation prediction models. Although the real footprint is amorphous in nature, a regular cell shape is needed for systematic system design.

22.Why the shape of cell is not circle?
a) Omni directionality
b) Small area
c) Overlapping regions or gaps are left
d) Complex design

Answer: c

Explanation: Circle is the first natural choice to represent the coverage area of a base station. But while adopting this shape, adjacent cells cannot be overlaid upon a map without leaving gaps or creating overlapping regions.

23.What is the main reason to adopt hexagon shape in comparison to square and triangle?
a) Largest area
b) Simple design
c) Small area
d) Single directional

Answer: a

Explanation: For a given distance between the center of a polygon and its farthest perimeter points, the hexagon has the largest area. Thus, by using the hexagon geometry, the fewest number of cells can cover a geographic region.

24.Which type of antenna is used for center excited cells?
a) Dipole antenna
b) Grid antenna
c) Sectored antenna
d) Omnidirectional antenna
Answer: d
Explanation: For center excited cells, base station transmitters are used at the center of cell. To cover the whole cell, omnidirectional antenna is the best choice for base station transmitters.

25.Which type of antenna is used for edge excited cells?
a) Omnidirectional antenna
b) Grid antenna
c) Sectored directional antenna
d) Dipole antenna
Answer: c
Explanation: For edge excited cell, mostly base station transmitters are placed on three of the six cell vertices. To cover the assigned portion of a cell, sectored directional antenna is the best choice.

26.What is a cluster in a cellular system?
a) Group of frequencies
b) Group of cells
c) Group of subscribers
d) Group of mobile systems
Answer: b
Explanation: Cluster is group of N cells. These cells use the complete set of frequency available for the cellular system at that location.

27.What is a frequency reuse factor for N number of cells in a system?
a) N
b) N2
c) 2*N
d) 1/N
Answer: d
Explanation: The frequency reuse factor is defined as 1 over the number of cells in the cluster of the system (N). It is given by 1/N since each cell within a cluster is only assigned 1/N of the total available channels in the system.

28. Capacity of a cellular system is directly proportional to _____
a) Number of cells
b) Number of times a cluster is replicated
c) Number of Base stations
d) Number of users

Answer: b

Explanation: The capacity of a cellular system is directly proportional to the number of times a cluster is replicated in a fixed area. If the cluster size N is reduced while the cell size is kept constant, more clusters are required to cover a given area, and hence more capacity is achieved.

29. Which of the following is not an objective for channel assignment strategies?
a) Efficient utilization of spectrum
b) Increase of capacity
c) Minimize the interference
d) Maximize the interference

Answer: d

Explanation: The objective of channel assignment strategy is to utilize the spectrum efficiently. And for efficient utilization, a frequency reuse scheme consistent with the objective of increasing capacity and minimizing interference is required.

30. The choice of channel assignment strategy does not impact the performance of the system.
a) True
b) False

Answer: b

Explanation: The choice of channel assignment strategy impacts the performance of the system. Particularly as to how calls are managed, when a mobile user is handed off from one cell to another.

31. In fixed channel assignment strategy, each cell is allocated a predetermined set of _____
a) Voice channels
b) Control channels
c) Frequency
d) base stations

Answer: a

Explanation: In a foxed channel strategy, each cell is allocated a predetermined set of voice channels. Any call attempt within the cell can only be served by the unused channels in that particular cell.

32. What happen to a call in fixed channel strategy, if all the channels in a cell are occupied?
a) Queued
b) Cross talk
c) Blocked
d) Delayed

Answer: c

Explanation: As any call attempt within a cell can be served by unused channels in fixed channel strategy. If all the channels in that cell are occupied, the call is blocked and subscriber does not receive any service.

33. What is a borrowing strategy in fixed channel assignments?
a) Borrowing channels from neighbouring cell
b) Borrowing channels from neighbouring cluster
c) Borrowing channels from same cell
d) Borrowing channels from other base station in same cell

Answer: a

Explanation: In borrowing strategy, a cell is allowed to borrow channels from a neighbouring cell if all of its own channels are already occupied. The MSC supervises such borrowing procedure and ensures that the borrowing of channel does not interfere with any call in progress.

34. In dynamic channel assignment strategy, voice channels are allocated to different cells permanently.
a) True
b) False

Answer: b

Explanation: In a dynamic channel strategy, voice channels are not allocated to different cells permanently. Instead, serving base station requests a channel from MSC each time a cell request is made.

35. In dynamic channel assignment strategy, base station requests channel from _____
a) MSC
b) Neighbouring cell
c) Neighbouring cluster
d) Neighbouring base station

Answer: a

Explanation: Each time a call request is made, the serving base station requests a channel from the MSC. The switch then allocates a channel to the requested cell following an algorithm that takes into account the likelihood of future blocking within the cell.

36. Dynamic channel assignment reduces the likelihood of blocking in comparison to fixed channel assignment.
a) True
b) False

Answer: a

Explanation: Dynamic channel assignment reduces the likelihood of blocking. Accordingly, the MSC only allocates a given frequency if that frequency is not presently in use in the cell or any other cell which falls within the minimum restricted distance of frequency reuse.

37. RSSI stands for _____
a) Received Signal Strength Indicator
b) Restricted Signal Strength Indicator
c) Radio Signal Strength Indication
d) Restricted System Software Indicator

Answer: a

Received signal strength indicator (RSSI) is a measurement of the power present in a received radio signal. RSSI is usually invisible to a user of a receiving device.

38. What is the drawback of dynamic channel assignment?
a) Decrease channel utilization
b) Increase probability of blocked call
c) Cross talk
d) Increase storage and computational load on system
Answer: d
Explanation: Dynamic channel assignment requires the MSC to collect real time data on channel occupancy, traffic distribution and RSSI of all channels on continuous basis. This increases the storage and computational load on the system but provides the advantage of increased channel utilization and decreased probability of blocked call.

39. What is the condition for handoff?
a) A mobile moves into a different cell while in conversation
b) A mobile remains in the same cell while in conversation
c) A mobile moves to different cell when idle
d) A mobile remains in the same cell and is idle
Answer: a
Explanation: Handoff occurs when a mobile moves into a different cell while a conversation is in progress. The MSC automatically transfers the call to a new channel belonging to the new base station.

40. Handoff does not require voice and control channel to be allocated to channels associated with the new base station.
a) True
b) False
Answer: b
Explanation: Handoff operation involves identifying a new base station. It also requires that the voice and control signal be allocated to channels associated with the new base station.

41. The time over which a call can be maintained within a cell without handoff is called _____
a) Run time
b) Peak time
c) Dwell time
d) Cell time
Answer: c
Explanation: The time over which a call is maintained within a cell without handoff is called as dwell time. Dwell time vary depending on speed of user and type of radio coverage.

42. Dwell time does not depend on which of the following factor?
a) Propagation
b) Interference
c) Distance between subscriber and base station
d) Mobile station
Answer: d
Explanation: Dwell time of a particular user is governed by a number of factors. They include propagation, interference, distance between the subscriber and the base station, and other time varying effects.

43. Which of the following is associated with the handoff in first generation analog cellular systems?
a) Locator receiver
b) MAHO
c) Cell dragging
d) Breathing cell

Answer: a

Explanation: Locator receiver is a spare receiver in each base station. It is used to scan and determine signal strengths of mobile users which are in neighbouring cells.

44. MAHO stands for _____
a) MSC assisted handoff
b) Mobile assisted handoff
c) Machine assisted handoff
d) Man assisted handoff

Answer: b

Explanation: MAHO stands for mobile assisted handoff. In 2G systems, handoff decisions are mobile assisted. In MAHO, every mobile station measure the received power from surrounding base station and continuously reports the results to serving base station.

45. A handoff is initiated when the power received from the base station of a neighbouring cell falls behind the power received from the current base station by certain level.
a) True
b) False

Answer: b

Explanation: MAHO measures the power received from the surrounding base station. And a handoff is initiated when the power received from the base station of a neighbouring cell begins to exceed the power received from current base station.

46. What is the condition for intersystem interference?
a) Mobile moves from one cell to another cell
b) Mobile remains in the same cell
c) Mobile moves from one cellular system to another cellular system
d) Mobile remains in the same cluster

Answer: c

Explanation: An intersystem handoff is initiated when a mobile moves from one cellular system to another during a course of a call. An MSC engages in an intersystem interference when a mobile becomes weak in a given cell and MSC cannot find another cell to which call can be transferred.

46. What is the disadvantage of guard channel?
a) Efficient utilization of spectrum
b) Cross talk
c) Near far effect
d) Reduce total carried traffic

Answer: d

Explanation: Guard channel is a concept for handling priority in handoff. Here, a fraction of the total available channels in a cell is reserved exclusively for handoff requests from ongoing calls. This method has the disadvantage of reducing the total carried traffic, as fewer channels are allocated to originating calls.

47. Which of the following priority handoff method decrease the probability of forced termination of a call due to lack of available channels?
a) Queuing
b) Guard channel
c) Cell dragging
d) Near far effect

Answer: a

Explanation: Queuing of handoff requests is a method to decrease the probability of forced termination of a call due to lack of available channels. Queuing of handoff is possible due to the fact that there is a finite time interval between the time the received signal level drops below the handoff threshold and the time the call is terminated.

48. Umbrella cell approach is possible by using _____
a) Antenna of same heights
b) Antenna of different heights
c) Different voice channels
d) Different control channels

Answer: b

Explanation: Umbrella cell approach is possible by using different antenna heights and different power levels. By using this approach, it is possible to provide large and small cells which are co-located at a single location.

49. Cell dragging is a problem occur due to _____
a) Pedestrian users
b) Stationary users
c) High speed mobile systems
d) Base stations having same frequency

Answer: a

Explanation: Cell dragging is a practical handoff problem in microcell system. It results from pedestrian users that provide a very strong signal to the base station.

50. What was the typical handoff time in first generation analog cellular systems?
a) 1 second
b) 10 seconds
c) 1 minute
d) 10 milliseconds

Answer: b

Explanation: In first generation analog cellular system, the typical time to make a handoff once the signal level is below the threshold, is about 10 seconds. This requires the value for threshold to be 6 dB to 12 dB.

51.How much time it takes for handoff in digital cellular systems like GSM?
a) 1 second
b) 10 seconds
c) 1 minute
d) 10 milliseconds
Answer: a
Explanation: In digital cellular systems, the mobile assista with the handoff procedure by determining the best candidate. Once the decision is made, it typically requires 1 to 2 seconds for handoff.

52.Soft handoff is also known as _____
a) MAHO
b) Hand over
c) Break before make
d) Make before break
Answer: d
Explanation: Soft handoff is one in which the channel in the source cell is retained and used for a while in parallel with the channel in the target cell. In this case, the connection with the receiver target is established before the connection to the source is broken, hence this handover is called make-before-break.

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03-Digital cellular mobile standards	**Marks:-16**

Content of Chapter:-

3.1 Global System for Mobile Communication (GSM): Features and services, GSM radio aspects, GSM architecture, GSM channel types, Security aspects

3.2 GSM call routing. : Mobile terminated call mobile originated call sequence , stages of call processing in GSM

3.3 IS-95/CDMA One: features, Radio aspects, comparison with GSM standards

3.4 Signaling System No.7 (SS7): Network services part(NSP), Message transfer Part (MTP), Signaling Correction Control part (SCCP), Services and performance ofSS7

1. _____carries digitally encoded user data.
a) Traffic channels
b) Control channels
c) Signalling channels
d) Forward channels

Answer: a

Explanation: Traffic channels carry digitally encoded user speech or user data. It has identical functions and formats on both the forward and reverse links.

2. _____carries signalling and synchronizing commands.
a) Traffic channels
b) Control channels
c) Signalling channels
d) Forward channels

Answer: b

Explanation: Control channels carry signalling and synchronizing commands between the base station and mobile station. Certain types of control channels are defined for just the forward or reverse link.

3. Which of the following is not a control channel of GSM?
a) BCH
b) CCCH
c) DCCH
d) TCH
Answer: d
Explanation: There are three main control channels in the GSM system. These are the broadcast channel (BCH), the common control channel (CCCH) and the dedicated control channel (DCCH). Each control channel consists of several logical channels.

4. Which of the following is the forward control channel that is used to broadcast information?
a) BCCH
b) CCCH
c) DCCH
d) TCH
Answer: a
Explanation: The broadcast control channel (BCCH) is a forward channel that is used to broadcast information such as cell and network identity, and operating characteristics of the cell.

5. Which of the following channel does not come under CCCH?
a) PCH
b) RACH
c) DCCH
d) AGCH
Answer: c
Explanation: CCCH consists of three different channels. They are paging channel (PCH), which is a forward link channel, the random access channel (RACH) which is a reverse link channel, and the access grant channel (AGCH) which is a forward link channel.

6. Which of the following channel provides paging signals from base station to all mobiles in the cell?
a) RACH
b) AGCH
c) DCCH
d) PCH
Answer: d
Explanation: The PCH provides paging signals from the base station to all mobiles in the cell. It notifies a specific mobile of an incoming call which originates from the PSTN.

7. _____ is a reverse link channel used by a subscriber unit to acknowledge.
a) RACH
b) AGCH
c) DCCH
d) PCH
Answer: a
Explanation: The RACH (Random Access Channel) is a reverse link channel used by a subscriber unit to

acknowledge a page from the PCH. It is also used by mobiles to originate a call.

8. Which of the following channel is used by base station to provide forward link communication to mobile?
a) RACH
b) AGCH
c) DCCH
d) PCH

Answer: b

Explanation: The AGCH (Access Grant Channel) is used by the base station to provide forward link communication to the mobile. It carries data which instructs the mobile to operate in a particular physical channel with particular dedicated control channel.

9. Which of the following burst is used to broadcast the frequency and time synchronization control messages?
a) FCCH and SCH
b) TCH and DCCH
c) RACH and TCH
d) FCCH and DCCH

Answer: a

Explanation: FCCH and SCH burst are used to broadcast the frequency and time synchronization control messages. They are used in TS0 of specific frames.

10. Which of the following burst is used to access service from any base station?
a) TCH
b) RACH
c) SCH
d) FCCH

Answer: b

Explanation: Each user transmits a burst of data during the time slot assigned to it. The RACH burst is used by all mobiles to access service from any base station, and dummy burst is used as filter information for unused timeslots on forward link.

11. Group of superframes in GSM is called multiframe.
a) True
b) False

Answer: b

Explanation: Each of the normal speech frames are grouped into larger structures called multiframes. These multiframes are grouped into superframes and hyperframes.

12. US digital cellular system based on CDMA was standardized as _____
a) IS-54
b) IS-136
c) IS-95
d) IS-76

Answer: c

Explanation: A US digital cellular system based on CDMA was standardized as Interim Standard 95 (IS-95). It was standardized by US Telecommunication Industry Association (TIA) and promised increased capacity.

13.IS-95 was not compatible with existing AMPS frequency band.

a) True
b) False

Answer: b

Explanation: Like IS-136, IS-95 system was designed to be compatible with the existing US analog cellular system (AMPS) frequency band. Hence, mobile and base stations can be economically produced for dual mode operation.

14.Which of the following is used by IS-95?

a) DSSS
b) FHSS
c) THSS
d) Hybrid

Answer: a

Explanation: IS-95 uses a direct sequence spread spectrum CDMA system. It allows each user within a cell to use the same radio channel, and users in adjacent cell also use the same radio channel.

15. Each IS-95 channel occupies___of spectrum on each one way link.

a) 1.25 MHz
b) 1.25 kHz
c) 200 kHz
d) 125 kHz

Answer: a

Explanation: To facilitate graceful transition from AMPS to CDMA, each IS-95 channel occupies 1.25 MHz of spectrum on each one way link, or 10% of the available cellular spectrum for a US cellular provider.

16.IS-95 uses same modulation technique for forward and reverse channel.

a) True
b) False

Answer: b

Explanation: IS-95 uses different modulation and spreading technique for the forward and reverse links. On the forward link, the base station simultaneously transmits the user data for all mobiles in the cell by using different spreading sequence for each mobile.

17.IS-95 is specified for reverse link operation in_____band.

a) 869-894 MHz
b) 849-894 MHz
c) 849-869 MHz
d) 824-849 MHz

Answer: d

Explanation: IS-95 is specified for reverse link operation in the 824-849 MHz band and 869-894 MHz for the forward link. The PCS version of IS-95 has also been designed for international use in the 1800-2000 MHz bands.

18. User data in IS-95 is spread to a channel chip rate of _____
a) 1.2288 Mchip/s
b) 9.6 Mchip/s
c) 12.288 Mchip/s
d) 0.96 Mchip/s

Answer: a

Explanation: User data is spread to a channel chip rate of 1.2288 Mchip/s (a total spreading factor of 128) using a combination of techniques. The spreading process is different for the forward and reverse links in the original CDMA specification.

19. _____ are used to resolve and combine multipath components.
a) Equalizer
b) Registers
c) RAKE receiver
d) Frequency divider

Answer: c

Explanation: At both the base station and the subscriber, RAKE receivers are used to resolve and combine multipath components, thereby reducing the degree of fading. A RAKE receiver exploits the multipath time delays in a channel and combines the delayed replicas of transmitted signal.

20. CT2 was the first generation of cordless telephones.
a) True
b) False

Answer: b

Explanation: CT2 was the second generation of cordless telephones introduced in Great Britain in 1989. It is used to provide telepoint services which allow a subscriber to use CT2 handsets at a public telepoint.

21. CT2 is analog version of first generation cordless telephones.
a) True
b) False

Answer: b

Explanation: CT2 is a digital version of the first generation, analog, cordless telephones. When compared with analog cordless phones, CT2 offers good speech quality and is more resistant to interference.

This set of Wireless & Mobile Communications Multiple Choice Questions & Answers (MCQs) focuses on "Signalling System No. 7 (SS7)".

22. Which of the following is not a service offered by SS7?
a) Touchstar
b) 800 services
c) Alternate billing services
d) 400 services

Answer: d

Explanation: There are three main types of services offered by the SS7 network. They are the Touchstar, 800 services, and alternate billing services.

23. Which of the following service is called CLASS?
a) Touchstar
b) 800 services
c) Alternate billing services
d) 400 services

Answer: a

Explanation: Touchstar is also known as CLASS. It is a group of switch controlled services that provide its users with certain call management capabilities.

24. Which of the following service of SS& provides call return, call forwarding?
a) Touchstar
b) 800 services
c) Alternate billing services
d) 400 services

Answer: a

Explanation: Touchstar is one of the three main type of services offered by SS7. It provides services such as call return, call forwarding, repeat dialling, call block, call tracing and caller ID.

25. Alternating billing service uses CCS network.
a) True
b) False

Answer: a

Explanation: Alternate billing service and line information database use the CCS network to enable the calling party to bill a call to a personal number (third party number, calling card, or collect etc.) from any number.

26. SS7 was first developed by _____
a) ITU
b) Ericsson
c) CCITT
d) Motorola

Answer: c

Explanation: SS7 is an outgrowth of the out of band signalling first developed by the CCITT under common channel signalling standard, CCS no. 6.

27.Which of the layer of OSI is associated with NSP of SS7?
a) All layers
b) Upper three
c) Lowest three
d) Middle two
Answer: c
Explanation: The lowest three layers of the OSI model are handled in SS7 by the network service part (NSP) of the protocol. NSP is made up of three message transfer parts (MTPs) and the signalling connection control part (SCCP) of the SS7 protocol.

28.The function of_____is to transfer and deliver signalling network.
a) MTP
b) CCS
c) ARDIS
d) CDPD
Answer: a
Explanation: The function of the MTP is to ensure that signalling traffic can be transferred and delivered reliably between the end users and the network. MTP is provided at three levels.

29.Signalling data functions are provided by _____
a) MTP level 1
b) MTP level 2
c) MTP level 3
d) TCAP
Answer: a
Explanation: Signalling data link functions (MTP level 1) provide an interface to the actual physical channel over which communication takes place. Physical channels may include copper wire, twisted pair, fibre, mobile radio and are transparent to the higher layers.

30.Signalling data functions are provided by _____
a) MTP level 1
b) MTP level 2
c) MTP level 3
d) TCAP
Answer: b
Explanation: Signalling data link functions are provided by MTP level 2. They correspond to the second layer in the OSI reference model and provide a reliable link for the transfer of traffic between two directly connected signalling points.

31._____provide procedures that transfer messages between signalling nodes.
a) MTP level 1
b) MTP level 2
c) MTP level 3
d) TCAP
Answer: c

Explanation: Signalling network functions (MTP level 3) provide procedures that ransfer messages between signalling nodes. As in ISDN, there are two types of MTP level 3 functions: signalling message handling and signalling network management.

32. Which of the following does not include in SS7 user part?
a) MTP
b) ISUP
c) TCAP
d) OMAP
Answer: a
Explanation: The SS7 user part includes the ISDN user part (ISUP), the transaction capabilities application part (TCAP) and operations maintenance and administration part (OMAP). The telephone user part (TUP) and the data user part (DUP) are included in the ISUP.

33. The TCAP part in SS7 refers to_____layer of OSI.
a) Physical
b) Network
c) Data Link
d) Application
Answer: d
Explanation: The transaction capabilities application part in SS7 refers to the application layer which invokes the services of the SCCP and the MTP in a hierarchical format. TCAP is concerned with remote operations.

34. The function of_____is to transfer and deliver signalling network.
a) MTP
b) CCS
c) ARDIS
d) CDPD
Answer: a
Explaination: The function of the MTP is to ensure that signalling traffic can be transferred and delivered reliably between the end users and the network. MTP is provided at three levels.

35. Signalling data functions are provided by _____
a) MTP level 1
b) MTP level 2
c) MTP level 3
d) TCAP
Answer: a
Explaination: Signalling data link functions (MTP level 1) provide an interface to the actual physical channel over which communication takes place. Physical channels may include copper wire, twisted pair, fibre, mobile radio and are transparent to the higher layers.

36. Signalling data functions are provided by _____
a) MTP level 1
b) MTP level 2
c) MTP level 3
d) TCAP
Answer: b
Explanation: Signalling data link functions are provided by MTP level 2. They correspond to the second layer in the OSI reference model and provide a reliable link for the transfer of traffic between two directly connected signalling points.

37. _____provide procedures that transfer messages between signalling nodes.
a) MTP level 1
b) MTP level 2
c) MTP level 3
d) TCAP
Answer: c
Explaination: Signalling network functions (MTP level 3) provide procedures that ransfer messages between signalling nodes. As in ISDN, there are two types of MTP level 3 functions: signalling message handling and signalling network management.

38). Which of the following are multiplexing methods used in mobile communication?
a) TDMA
b) FDMA
c) CDMA
d) All the above
Answer: c
Explaination: Mobile communication system uses code division multiple access.

39). In which spectrum available spectrum is divided and further these narrow bands are divided equally into time slots?
a) TDMA
b) FDMA
c) CDMA
d) All the above
Answer: c
Explaination: Mobile communication system uses code division multiple access.

40. What is the full form of UMTS?
a) Universal Mobile Telephone System
b) Ubiquitous Mobile Telephone System
c) Ubiquitous Mobile Telemetry System
d) Universal Machine Telemedicine System
Answer: a
Explanation: UMTS (Universal Mobile Telephone System) is a visionary air interface standard that was introduced in 1996. European carriers, manufacturers, and government regulators collectively developed

the early version of UMTS as an open air interface standard for third generation wireless telecommunication.

41.UMTS use which multiple access technique?
a) CDMA
b) TDMA
c) FDMA
d) SDMA
Answer: a
Explanation: Although UMTS is designed to operate on evolved GSM core networks, it uses code division multiple access (CDMA) for its air interface. The majority of the 3G systems in operation employ CDMA, while the rest use TDMA. CDMA allows various users to share a channel at the same time, while TDMA allows users to share the same channel by chopping it into different time slots.

42.UMTS does not has backward compatibility with _____
a) GSM
b) IS-136
c) IS-95
d) GPRS
Answer: c
Explanation: UMTS assures backward compatibility with the second generation GSM, IS-136 and PDC TDMA technologies. It is also compatible with all 2.5G TDMA techniques like GPRS and EDGE. But it does not provide compatibility to CDMA technologies of 2G and 2.5 G. IS-95 is a CDMA standard of 2G.

43.UMTS is also known as _____
a) IS-95
b) GPRS
c) CdmaOne
d) W-CDMA
Answer: d
Explanation: UMTS uses Wideband CDMA (W-CDMA) to carry the radio transmissions. Therefore, it is also referred as W-CDMA. W-CDMA offers greater spectral efficiency and bandwidth to mobile network operators.

44.What is the chip rate of W-CDMA?
a) 1.2288 Mcps
b) 3.84 Mcps
c) 270.833 Ksps
d) 100 Mcps
Answer: b
Explanation: W-CDMA uses a chip rate of 3.84 Mcps. Chip rate is the product of symbol rate and spreading factor. If the symbol rate is 960 Kbps and spreading factor is 4 for W-CDMA, then the chip rate is 3.84 Mcps. The chip rate for Cdma2000 and GSM are 1.2288 Mcps and 27.0833 Ksps respectively.

45.W-CDMA works in FDD mode only.

a) True

b) False

Answer: b

Explanation: W-CDMA works in both FDD and TDD mode. W-CDMA developed for wide area cellular coverage uses FDD. And TDD is used by W-CDMA for indoor cordless type applications.

46.How much packet data rate per user is supported by W-CDMA if the user is stationary?

a) 2.048 Kbps

b) 100 Mbps

c) 2.048 Mbps

d) 1 Gbps

Answer: c

Explanation: If the user is stationary, W-CDMA supports packet data rates upto 2.048Mbps per user. Thus, it allows high quality data, multimedia, streaming audio video and broadcast type services to consumers. Future version of WCDMA will support stationary user data rates in excess of 8Mbps.

47.What is the minimum spectrum allocation required by W-CDMA?

a) 5 MHz

b) 20MHz

c) 1.25 MHz

d) 200 KHz

Answer: a

Explanation: W-CDMA/UMTS requires a minimum spectrum allocation of 5 MHz. Using this bandwidth, it has the capacity to carry over 100 simultaneous voice calls. It is able to carry data at speeds up to 2 Mbps in its original format. 20 MHz is the bandwidth defined for LTE. CdmaOne uses a bandwidth of 1.25 MHz. GSM's bandwidth is 200 KHz.

48.W-CDMA requires a complete change of RF equipment at each base station.

a) True

b) False

Answer: a

Explanation: W-CDMA is designed to provide backward compatibility and interoperability for all GSM, IS-136/PDC, GPRS and EDGE equipment. But due to a wider air interface bandwidth of W-CDMA, it requires a complete change of RF-equipment at each base station.

49.How much increase in spectral efficiency is provided by W-CDMA in comparison to GSM?

a) Two times

b) Three times

c) No increase

d) Six times

Answer: d

Explanation: W-CDMA can provide at least six times an increase in spectral efficiency over GSM at system level. Such a wider bandwidth is chosen to higher data rates as low as 8 kbps to as high as 2 Mbps on a single 5 MHz W-CDMA radio channel.

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04-Advance Wireless standards	**Marks:-18**

Content of Chapter:-

4.1Need of 3G & 4G technology
4.2 IMT2000 global standards: vision compatibility, service and spectrum requirements
4.3 UMTS/W CDMA Standards –features, architecture UMTS-Air interface specification , security procedure.
4.4 CDMA 2000 features and advance version advantages of CDMA 2000 over 3G GSM standards
4.5 Next generation mobile standard

1. Which of the following is not a characteristic of 3G network?
a) Communication over VoIP
b) Unparalleled network capacity
c) Multi-megabit Internet access
d) LTE based network

Answer: d

Explanation: Multi-megabit Internet access, communication using Voice over internet Protocol (VoIP), voice activated calls, unparalleled network capacity are some of the characteristics of 3G network. 3G systems promise unparalleled wireless access which is not possible in 2G systems. LTE (Long term Evolution) is a standard of 4G systems.

2. What is the term used by ITU for a set of global standards of 3G systems?
a) IMT 2000
b) GSM
c) CDMA
d) EDGE

Answer: a

Explanation: International Telecommunications Union (ITU) used the term IMT-2000 in 1998. It is used for a set of global standards for third generation (3G) mobile telecoms services and equipment.

3. Which of the following leads to evolution of 3G networks in CDMA systems?
a) IS-95
b) IS-95B
c) CdmaOne
d) Cdma2000

Answer: d

Explanation: 3G evolution of CDMA system leads to cdma2000. It is based on the fundamentals of IS-95 and IS-95B. IS-95 is a 2G standard for CDMA systems. IS-95B is a CDMA system for 2.5G networks.

4. Which of the following leads to the 3G evolution of GSM, IS-136 and PDC systems?
a) W-CDMA
b) GPRS
c) EDGE
d) HSCSD

Answer: a

Explanation: The 3G evolution for GSM, IS-136 and PDC systems leads to W-CDMA (Wideband CDMA). It is based on the network fundamentals of GSM, as well as merged versions of GSM and IS-136 through EDGE. GPRS, EDGE and HSCSD are 2.5G networks.

5. What is 3GPP?
a) Project based on W-CDMA
b) Project based on cdma2000
c) Project based on 2G standards
d) Project based on 2.5G standards

Answer: a

Explanation: 3GPP is a 3G Partnership Project for Wideband CDMA standards based on backward compatibility with GSM and IS-136. The project was established in December 1998. Its initial scope was to make a globally applicable third generation mobile phone system.

6. What is 3GPP2?
a) Project based on W-CDMA
b) Project based on cdma2000
c) Project based on 2G standards
d) Project based on 2.5G standards

Answer: b

Explanation: 3GPP2 is a 3G Partnership Project for Cdma2000 standards based on backward compatibility with earlier CdmaOne 2G CDMA technology. It was initiated by IMT-2000 to cover high speed, broadband and Internet Protocol (IP) based mobile systems. It mainly focuses on North American and Asian regions.

7. Which of the following is not a standard of 3G?
a) UMTS
b) Cdma2000
c) TD-SCDMA
d) LTE

Answer: d

Explanation: UMTS (Universal Mobile Telecommunication System), TD-SCDMA (Time Division Synchronous Code Division Multiple Access), Cdma2000 are the standards defined for 3G networks. LTE (Long Term Evolution) is a 4G standard for high speed wireless communication.

8. Which of the following 3G standard is used in Japan?
a) Cdma2000
b) TD-SCDMA
c) UMTS
d) UTRA

Answer: c

Explanation: Japan uses UMTS (W-CDMA) standard for its 3G network. The standards used are UMTS 800, UMTS 900, UMTS 1500, UMTS 1700 and UMTS 2100. They are standardized by ARIB (Association of Radio industries and Business).

9. What does the number 2000 in IMT-2000 signifies?
a) Year
b) Number of subscribers per cell
c) Number of cells
d) Area (Km)

Answer: a

Explanation: The International Telecommunication Union (ITU) defined the third generation (3G) of mobile telephony standards, IMT-2000 to facilitate growth, increase bandwidth, and support more diverse applications. The number 2000 in IMT-2000 indicates the start of the system (year 2000) and the spectrum used (around 2000 MHz).

10. Which of the following is not an application of third generation network?
a) Global Positioning System (GPS)
b) Video conferencing
c) Mobile TV
d) Downloading rate upto 1 Gbps

Answer: d

Explanation: 3G applications include GPS (Global Positioning System), MMS (Multimedia Messaging System), video conferencing, location based services, video on demand, wireless voice telephony and high data rates with peak downloading rate of 100 Mbps. For 4G networks, the peak downloading rate is 1 Gbps.

11. What is the full form of UMTS?
a) Universal Mobile Telephone System
b) Ubiquitous Mobile Telephone System
c) Ubiquitous Mobile Telemetry System
d) Universal Machine Telemedicine System

Answer: a

Explanation: UMTS (Universal Mobile Telephone System) is a visionary air interface standard that was introduced in 1996. European carriers, manufacturers, and government regulators collectively developed the early version of UMTS as an open air interface standard for third generation wireless telecommunication.

12.UMTS use which multiple access technique?

a) CDMA
b) TDMA
c) FDMA
d) SDMA

Answer: a

Explanation: Although UMTS is designed to operate on evolved GSM core networks, it uses code division multiple access (CDMA) for its air interface. The majority of the 3G systems in operation employ CDMA, while the rest use TDMA. CDMA allows various users to share a channel at the same time, while TDMA allows users to share the same channel by chopping it into different time slots.

13.UMTS does not has backward compatibility with _____

a) GSM
b) IS-136
c) IS-95
d) GPRS

Answer: c

Explanation: UMTS assures backward compatibility with the second generation GSM, IS-136 and PDC TDMA technologies. It is also compatible with all 2.5G TDMA techniques like GPRS and EDGE. But it does not provide compatibility to CDMA technologies of 2G and 2.5 G. IS-95 is a CDMA standard of 2G.

14.UMTS is also known as _____

a) IS-95
b) GPRS
c) CdmaOne
d) W-CDMA

Answer: d

Explanation: UMTS uses Wideband CDMA (W-CDMA) to carry the radio transmissions. Therefore, it is also referred as W-CDMA. W-CDMA offers greater spectral efficiency and bandwidth to mobile network operators.

15.What is the chip rate of W-CDMA?

a) 1.2288 Mcps
b) 3.84 Mcps
c) 270.833 Ksps
d) 100 Mcps

Answer: b

Explanation: W-CDMA uses a chip rate of 3.84 Mcps. Chip rate is the product of symbol rate and spreading factor. If the symbol rate is 960 Kbps and spreading factor is 4 for W-CDMA, then the chip rate is 3.84 Mcps. The chip rate for Cdma2000 and GSM are 1.2288 Mcps and 27.0833 Ksps respectively.

16.W-CDMA works in FDD mode only.

a) True

b) False

Answer: b

Explanation: W-CDMA works in both FDD and TDD mode. W-CDMA developed for wide area cellular coverage uses FDD. And TDD is used by W-CDMA for indoor cordless type applications.

17.How much packet data rate per user is supported by W-CDMA if the user is stationary?

a) 2.048 Kbps

b) 100 Mbps

c) 2.048 Mbps

d) 1 Gbps

Answer: c

Explanation: If the user is stationary, W-CDMA supports packet data rates upto 2.048Mbps per user. Thus, it allows high quality data, multimedia, streaming audio video and broadcast type services to consumers. Future version of WCDMA will support stationary user data rates in excess of 8Mbps.

18.What is the minimum spectrum allocation required by W-CDMA?

a) 5 MHz

b) 20MHz

c) 1.25 MHz

d) 200 KHz

Answer: a

Explanation: W-CDMA/UMTS requires a minimum spectrum allocation of 5 MHz. Using this bandwidth, it has the capacity to carry over 100 simultaneous voice calls. It is able to carry data at speeds up to 2 Mbps in its original format. 20 MHz is the bandwidth defined for LTE. CdmaOne uses a bandwidth of 1.25 MHz. GSM's bandwidth is 200 KHz.

19.W-CDMA requires a complete change of RF equipment at each base station.

a) True

b) False

Answer: a

Explanation: W-CDMA is designed to provide backward compatibility and interoperability for all GSM, IS-136/PDC, GPRS and EDGE equipment. But due to a wider air interface bandwidth of W-CDMA, it requires a complete change of RF-equipment at each base station.

20.How much increase in spectral efficiency is provided by W-CDMA in comparison to GSM?

a) Two times

b) Three times

c) No increase

d) Six times

Answer: d

Explanation: W-CDMA can provide at least six times an increase in spectral efficiency over GSM at system level. Such a wider bandwidth is chosen to higher data rates as low as 8 kbps to as high as 2 Mbps on a single 5 MHz W-CDMA radio channel.

21.Which of the following has no backward compatibility with 3G Cdma2000?

a) IS-95
b) GPRS
c) IS-95A
d) IS-95B

Answer: b

Explanation: 3G Cdma2000 is based on the original IS-95 and IS-95A CDMA standards, as well as the 2.5G IS-95B air interface. While upgrading, Cdma2000 maintains backward compatibility with existing IS-95, IS-95A and IS-95B equipments. Thus, Cdma2000 allow wireless carriers to introduce a family of new high data rate Internet access capabilities within existing systems.

22.2G and 2.5G CDMA operators may selectively introduce 3G capabilities at each cell without changing entire base stations and reallocate spectrums.

a) True
b) False

Answer: a

Explanation: Cdma2000 does not require change in entire base station or additional RF equipment. All the changes are made in software or in baseband hardware.

23.Which of the following the first 3G CDMA air interface?

a) IS-95
b) IS-95B
c) Cdma2000 1xRTT
d) CdmaOne

Answer: c

Explanation: Cdma2000 1xRTT is the first 3G air interface. Here, RTT stands for Radio Transmission Technology and 1x indicates that the bandwidth is one times that of the original CdmaOne channel. It is modulated on a single carrier.

24.Within ITU IMT-2000 body, Cdma2000 1xRTT is also known as _____

a) Cdma2000 1xEV-DO
b) Cdma2000 1xEV-DV
c) IS-95B
d) G3G-MC-CDMA-1X

Answer: d

Explanation: Cdma2000 1xRTT is also known as G3G-MC-CDMA-1X. The initials MC stand for multicarrier. RTT stand for Radio Transmission Technology, a language suggested by IMT-2000 body. Usually, MC and RTT are omitted for convenience.

25.How many users are supported by Cdma2000 1X in comparison to 2G CDMA standard?
a) Half
b) Twice
c) Six times
d) Ten times

Answer: b

Explanation: Cdma2000 support up to twice as many users as the 2G CDMA standard. It also provides the two times the standby time for longer lasting battery life.

26.Cdma2000 works in TDD mode only.
a) True
b) False

Answer: b

Explanation: Cdma2000 works in both FDD and TDD mode. Cdma2000 developed for wide area cellular coverage uses FDD. And TDD is used by Cdma2000 for indoor cordless type applications.

27.Which of the following is not a characteristic of Cdma2000?
a) Adaptable baseband signalling rates
b) Adaptable baseband chipping rates
c) Multicarrier technologies
d) OFDMA

Answer: d

Explanation: Cdma2000 does not use OFDMA technique. OFDMA is used by 4G networks. Cdma2000 uses rapidly adaptable baseband signalling rates and chipping rates for each user. It also provides multi-level keying within same framework.

28.Cdma2000 1xEV was developed by _____
a) Motorola
b) AT&T Laboratories
c) Qualcomm
d) NTT

Answer: c

Explanation: Cdma2000 is an evolutionary advancement for CDMA. It was developed by Qualcomm Inc. It is a proprietary high data rate (HDR) packet standard that can be overlaid upon existing IS-95, IS-95B and Cdma2000 networks.

29.How is bandwidth increased in Cdma2000?
a) Clubbing adjacent radio channels
b) Changing the hardware of base stations
c) Change of spectrum
d) Change of RF equipment

Answer: a

Explanation: The increase in the bandwidth is achieved through clubbing the adjacent radio channels of CdmaOne and using multicarrier technologies. For example, Cdma2000 3xRTT uses these technologies by combining three adjacent 1.25 MHz bandwidth of CdmaOne channels.

30.What are the two options provided by Cdma2000 1xEV?

a) Cdma2000 1xRTT. Cdma2000 3xRTT
b) Cdma2000 1xEV-DO, Cdma2000 1xEV-DV
c) Cdma2000 1xEV-DT, Cdma2000 1xEV-DO
d) Cdma2000 1xRTT, Cdma2000 1xEV-DV

Answer: b

Explanation: Cdma2000 1xEV is an evolutionary upgrade for Cdma2000. It provides two options, for accessing only data (Cdma2000 1xEV-DO) and for both data & voice (Cdma2000 1xEV-DV).

31.Which of the following is not backward compatible with Cdma2000?

a) Cdma2000 1xRTT
b) Cdma2000 3xRTT
c) Cdma2000 1xEV-DO
d) Cdma2000 1xEV-DT

Answer: c

Explanation: Cdma2000 1xEV-DO option provides data rates of about 2.4 Mbps and supports data traffic only. No voice communication is supported. It relaxes the minimum latency requirement. But this mode is not backward compatible with Cdma2000.

32.Which of the following is not an open standard?

a) Bluetooth
b) WWW
c) HTML
d) VPN

Answer: d

Explanation: An open standard is a standard that is publicly available. It has various rights to use associated with it. Bluetooth is an open standard that has been embraced by over thousand manufacturers of electronic appliances. VPN (Virtual Private Network) is a private network.

33.What is the nominal range of Bluetooth?

a) 1 Km
b) 10 m
c) 1 m
d) 10 Km

Answer: b

Explanation: The power of the transmitter governs the range over which a Bluetooth device can operate. Generally, Bluetooth devices are said to fall into one of three classes. The most common kind is class 2, and it operates in 10 m range.

34.Bluetooth standard is named after _____

a) King Ronaldo Bluetooth
b) Pope Vincent Bluetooth
c) King Herald Bluetooth
d) Pope Francis Bluetooth

Answer: c

Explanation: Bluetooth standard is named after King Harald Bluetooth. He was the 10th century Viking who united Denmark and Norway. The Bluetooth standard aims to unify the connectivity chores of appliances within the personal workspace of an individual.

35.Bluetooth operates in which band?

a) Ka Band
b) L Band
c) Ku Band
d) 2.4 GHz ISM Band

Answer: d

Explanation: Bluetooth is a radio technology operating in 2.4 GHz frequency band. Bluetooth is best suited for low-bandwidth applications like transferring sound data with telephones (i.e. with a Bluetooth headset) or byte data with hand-held computers (transferring files) or keyboard.

36.Which of the following scheme is used by Bluetooth?

a) Frequency hopping TDD scheme
b) Frequency hopping FDD scheme
c) DSSS TDD scheme
d) DSSS FDD scheme

Answer: a

Explanation: Frequency hopping TDD (Time Division Duplexing) scheme is used by Bluetooth. Frequency hopping provides a form of multiple access among co-located devices in different piconets.

37.What is the range of time slot in Bluetooth?

a) 120 milliseconds
b) 625 microseconds
c) 577 microseconds
d) 5.7 seconds

Answer: b

Explanation: Bluetooth uses a timeslot of 625 microseconds. A data channel hops randomly 1600 times per second between 79 RF channels. Thus, each channel is divided into time slots 625 microseconds.

38.Which modulation scheme is used by Bluetooth?

a) DQPSK
b) MSK
c) GFSK
d) BPSK

Answer: c

Explanation: Bluetooth uses GFSK (Gaussian Frequency Shift Keying). When GFSK is used for Bluetooth modulation, the frequency of the carrier is shifted to carry the modulation. By doing this the Bluetooth modulation achieves a bandwidth of 1 MHz with stringent filter requirements to prevent interference on other channels.

39.What is the channel symbol rate in Bluetooth for each user?
a) 270.833 Kbps
b) 1 Gbps
c) 100 Mbps
d) 1 Mbps

Answer: d

Explanation: Each user in Bluetooth uses a radio channel symbol rate of 1 Mbps using GFSK modulation. The frequency hopping scheme of each Bluetooth user is determined from a cyclic code with a length of 1027-1.

40.What is the raw channel bit error rate of Bluetooth?
a) 10-3
b) 10-10
c) 103
d) 10-1

Answer: a

Explanation: Bluetooth has a bit error rate (BER) of 10-3. Bluetooth uses a number of forward error control (FEC) coding and automatic repeat request (ARR) schemes to achieve this bit rate.

41.Which of the following standard committee specifies Bluetooth and other Personal Area Networks (PAN)?
a) IEEE 802.11b
b) IEEE 802.15
c) IEEE 802.11g
d) IEEE 802.16

Answer: b

Explanation: IEEE 802.15 standards committee is formed to provide an international forum for developing Bluetooth and other PANs. PANs are used to interconnect pocket PCs, personal digital assistants (PDAs), cell phones, light projectors and other appliances.

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Question Bank for Multiple Choice Questions

05 –Wireless Network Technology	**Marks:-12**

Content of Chapter:-

5.1 Bluetooth –features, Architecture ,frequency band ,IEEE 802.15.1 and other wireless protocols, applications, Personal area network(PAN)
5.2 RFID-Concept, frequency band, classification of RFID tags , applications.
5.3 WLAN technology-IEEE 802.11 Wireless system architecture, radio spectrum
5.4 WMAN:IEEE802.16 WMAN and IEEE802.16 a Wimax
5.5 Mobile adhoc network: MANET topologies, applications

1). An interconnected collection of piconet is called _____
a) scatternet
b) micronet
c) mininet
d) multinet

Answer: a

Explanation: Piconet is the basic unit of a bluetooth system having a master node and upto seven active slave nodes. A collection of piconets is called scatternet and a slave node of a piconet may act as a master in a piconet that is part of the scatternet.

2). In a piconet, there can be up to_____parked nodes in the network.
a) 63
b) 127
c) 255
d) 511

Answer: c

Explanation: A slave node in a piconet can be instructed by the master node to go into parked mode. Then the slave node enters the parked mode in which the node is not disconnected from the network but is inactive unless the master wakes it up.

3). Bluetooth is the wireless technology for _____
a) local area network
b) personal area network
c) metropolitan area network
d) wide area network

Answer: b

Explanation: Bluetooth is a wireless technology used to create a wireless personal area network for data transfer up to a distance of 10 meters. It operates on 2.45 GHz frequency band for transmission.
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4). Bluetooth uses _____

a) frequency hopping spread spectrum
b) orthogonal frequency division multiplexing
c) time division multiplexing
d) channel division multiplexing

Answer: a

Explanation: Frequency hopping spread spectrum is a method of transmitting radio signals by rapidly changing the carrier frequency and is controlled by the codes known to the sender and receiver only.

5). Unauthorized access of information from a wireless device through a bluetooth connection is called _____

a) Blue-making
b) Blue-snarfing
c) Blue-string
d) Blue-scoping

Answer: b

Explanation: Unauthorised access of information from a wireless device through a bluetooth connection is called Bluesnarfing. It is done through exploiting the vulnerabilities of the Bluetooth device to steal the transmitted information.

6). What is A2DP (advanced audio distribution profile)?

a) a bluetooth profile for streaming audio
b) a bluetooth profile for streaming video
c) a bluetooth profile for security
d) a bluetooth profile for file management

Answer: a

Explanation: A2DP stands for Advanced Audio Distribution Profile is a transfer standard use to transmit high definition audio through Bluetooth. It is mainly used in Bluetooth speakers and wireless headphones.

7). In a piconet, one master device _____

a) can not be slave
b) can be slave in another piconet
c) can be slave in the same piconet
d) can be master in another piconet

Answer: b

Explanation: In a scatternet, a slave node of one piconet may act as a master in a piconet that is part of the scatternet. The scatternet uses this property to connect many piconets together to create a larger network.

8). Bluetooth transceiver devices operate in _____band.
a) 2.4 GHz ISM
b) 2.5 GHz ISM
c) 2.6 GHz ISM
d) 2.7 GHz ISM

Answer: a

Explanation: Bluetooth operates on 2.45 GHz frequency ISM band for transmission. It is used to create a wireless personal area network for data transfer up to a distance of 10 meters.

9). Bluetooth supports _____
a) point-to-point connections
b) point-to-multipoint connection
c) both point-to-point connections and point-to-multipoint connection
d) multipoint to point connection

Answer: c

Explanation: In Bluetooth, each slave node communicates with the master of the piconet independently i.e. each master-slave connection is independent. The slave is not allowed to communicate with other slaves directly.

10). A scatternet can have maximum _____
a) 10 piconets
b) 20 piconets
c) 30 piconets
d) 40 piconets

Answer: a

Explanation: A scatternet can have maximum of 10 piconets and minimum of 2 piconets. To connect these piconets, a slave node of one piconet may act as a master in a piconet that is part of the scatter net. Sanfoundry Global Education & Learning Series – Computer Networks.

11). What is the standard form of WI-FI?
a) Wired Fidelity
b) Wired Function
c) Wireless Fidelity
d) None of the above

Answer: c

Explanation: The standard form of WI-FI is Wireless Fidelity

12). The wavelength of the low-frequency transmission type is about _
a) 33-10km
b) 10-1km
c) 1000-100m
d) 100-10m

Answer: b

Explanation: The wavelength of the low-frequency transmission type is about 10-1km

13). The throughput of the IEEE standard 802.11b is _____
a) ≤11Mbps
b) ≤64Mbps
c) ≤74Mbps
d) None of the above
Answer: a
Explanation: The throughput of the IEEE standard 802.11b is ≤11Mbps

14). The frequency range of WI-FI is around _____
a) 2.4 GHz and 5GHz
b) 2.9 GHz and 5GHz
c) 3.4 GHz and 5GHz
d) 4.4 GHz and 5GHz
Answer: a
Explanation: The frequency range of WI-FI is around 2.4 GHz and 5GHz

15). WI-FI provides support to _____
a) Limited number of users
b) Large number of users compared to Bluetooth
Answer: b
Explanation: WI-FI provides support to a large number of users compared to Bluetooth

16). The range of the WI-FI is around _____
a) 50 meters
b) 60 meters
c) 70 meters
d) 80 meters
Answer: a
Explanation: The range of the WI-FI is around 50 meters

17). The bandwidth and power consumption of WIFI is high compared to Bluetooth is it true?
a) True
b) False
Answer: a
Explanation: Yes, the bandwidth and power consumption of WIFI is high compared to Bluetooth

18). WI-FI is _____
a) More complex
b) Simple to use
c) Requires configuration of hardware and software
d) ll of the above
Answer: a

Explanation: WI-FI is more complex, simple to use, and requires configuration of hardware and software

19). The throughput of the IEEE standard 802.11a is _
a) ≤54Mbps
b) ≤64Mbps
c) ≤74Mbps
d) None of the above
Answer: a
Explanation: The throughput of the IEEE standard 802.11a is ≤54Mbps

20). In which year the standard IEEE 802.11ad (WiGig) was released?
a) 2012
b) 2014
c) 2015
d) 2016
Answer: a
Explanation: In 2012 the standard IEEE 802.11ad (WiGig) was released

21). The indoors and outdoors range of WIFI 4/IEEE 802.11n is around _____
a) 10m, 100m
b) 70m, 250m
c) 35m, 120m
d) 40m, 100m
Answer: b
Explanation: The WIFI 4/IEEE 802.11n indoors range is around 70m and the outdoors range is around 250m

22). The range of 802.16 e standard is about _
a) 5-10 Km
b) 5-20 Km
c) 5-15
d) 5-25 Km
Answer: a
Explanation: The range of 802.16 e standard is about 5-10 Km

23). The broadband wireless networks are categorized into ___
a) One
b) Two
c) Three
d) Four
Answer: b
Explanation: The broadband wireless networks are categorized into two they are fixed broadband wireless network and mobile broadband wireless network

24). The throughput of the IEEE 802.11ac wave 1 is around __
a) Up to 1.3Gbps
b) 60Mbps
c) 70Mbps

d) 72Mbps

Answer: a

Explanation: The throughput of the IEEE 802.11ac wave 1 is up to 1.3Gbps

25). WIMAX is a____broadband wireless network

a) Fixed

b) Mobile

c) Both a and b

d) None of the above

Answer: a

Explanation: WiMAX is a fixed broadband wireless network

26). The WIMAX uses_____standard specification

a) IEEE 802.16d

b) IEEE 802.16g

c) IEEE 802.11

d) Both a and b

Answer: d

Explanation: The WiMAX uses IEEE 802.16 d, and IEEE 802.16 g standard specification

27). In which year the WI-FI technology is designed?

a) 1997

b) 1998

c) 1999

d) 2000

Answer: a

Explanation: In 1997 the WI-FI technology is designed

28). In which year the WI-FI technology is implemented?

a) 1997

b) 1998

c) 1999

d) 2002

Answer: d

Explanation: In 2002 the WI-FI technology is implemented

29). The wavelength of the very high-frequency transmission type is about ____

a) 33-10km

b) 10-1km

c) 1000-100m

d) 100-10m

Answer: b

Explanation: The wavelength of the very high-frequency transmission type is about 10-1km

30). The throughput of the IEEE standard 802.11g is _

a) ≤54Mbps

b) ≤64Mbps
c) ≤74Mbps
d) None of the above

Answer: a

Explanation: The throughput of the IEEE standard 802.11g is ≤54Mbps

31). The frequency of 802.11b standard is around ___

a) 5GHz
b) 6GHz
c) 2.4GHz
d) 8GHz

Answer: C

Explanation: The frequency of 802.11b standard is around 2.4GHz

32). The range of 802.16 d standard is about _

a) 5-10 Km
b) 5-20 Km
c) 5-15 Km
d) 5-25 Km

Answer: a

Explanation: The range of 802.16 d standard is about 5-10 Km

33). WI-FI technology allows _____

a) Mobile phones
b) Laptops
c) PCs
d) All of the above

Answer: d

Explanation: WI-FI technology allows mobile phones, laptops, PCs, etc without a wired connection

34). What are the disadvantages of WI-FI?

a) It has limited range
b) If range increases the performance decreases exponentially
c) Less reliable
d) All of the above

Answer: b

Explanation: The main disadvantages of using WI-FI are it has limited range and if the range increases the performance decreases exponentially, and the WI-FI is less reliable compared to other networks

35). In how many ways does WI-FI could cause harm?

a) One
b) Seven
c) Three
d) Four

Answer: b

Explanation: In seven ways the WI-FI could cause harm they are insomnia, neutralizes sperm, affects cell growth, damage to child development, reduces brain activity in females, effects on fertility, and cardiac stress

36). In how many ways does a wireless LAN can be configured?
a) One
b) Two
c) Three
d) Four

Answer: a

Explanation: In two ways wireless LAN can be configured they are peer to peer and client/server

37). _____ are the examples of the standard WI-FI devices
a) Wireless routers
b) Wireless ethernet bridge
c) Wireless access point
d) All of the above

Answer: d

Explanation: The wireless routers, Ethernet bridge, and access point are examples of the standard WI-FI devices

38). What is the standard form of WPA?
a) Wireless Protocol Access
b) Wired Protocol Access
c) WI-FI Protected Access
d) None of the above

Answer: c

Explanation: The standard form of WPA is WI-FI Protected Access

39). What is the standard form of the U-NII band?
a) Unlicensed National Infrastructure Information Band
b) Unlicensed Network Infrastructure Information Band
c) Unlicensed National Information Infrastructure Band
d) None of the above

Answer: c

Explanation: The standard form of U-NII band is Unlicensed National Information Infrastructure Band

40). The throughput of the IEEE standard 802.16 d is _
a) ≤54Mbps
b) ≤64Mbps
c) ≤75Mbps
d) None of the above

Answer: c

Explanation: The throughput of the IEEE standard 802.16 d is ≤75Mbps (20 MHz bandwidth)

41). The frequency of 802.11g standard is around ___
a) 5GHz
b) 6GHz
c) 2.4GHz
d) 8GHz
Answer: c
Explanation: The frequency of 802.11g standard is around 2.4GHz

42). The range of 802.11 g standard is about _
a) 5-10 Km
b) 5-20 Km
c) ≤100 Km
d) 5-25 Km
Answer: c
Explanation: The range of 802.11 g standard is ≤100 Km

43). In which year the standard WIFI 6/IEEE 802.11ax was released?
a) 2013
b) 2014
c) 2015
d) 2019
Answer: d
Explanation: In 2019 the standard WIFI 6/IEEE 802.11ax was released

44). How many ranges does the ISM band have?
a) One
b) Two
c) Three
d) Four
Answer: c
Explanation: The ISM band has three ranges they are 902-928MHz, 2400-2483MHz, and 5725-

45). Which one is the EAP-TLS security claim?
a) Mutual authentication with public-key cryptography
b) Protected cipher suite negotiation
c) Key management capabilities
d) All of the above
Answer: d
Explanation: The mutual authentication with public-key cryptography, protected cipher suite negotiation, key management capabilities are the EAP-TLS security claims

46). In which year the standard IEEE 802.11ah (HaLow) was released?
a) 2013
b) 2014
c) 2015
d) 2016
Answer: d
Explanation: In 2016 the standard IEEE 802.11ah (HaLow) was released

47). What is the type of authentication used in WPA personal mode?
a) FSK
b) PSK
c) IEEE 802.1X/EAP
d) None of the above
Answer: d
Explanation: The type of authentication used in WPA personal mode is phase shift keying

48). Which modulation scheme does IEEE 802.11g standard use?
a) OFDM
b) DSSS/CCK
c) Both a and b
d) None of the above
Answer: b
Explanation: The IEEE 802.11 g standard uses both orthogonal frequency division multiplexing and DSSS/CCK modulation scheme

49). What is the type of encryption used in WPA personal mode?
a) FSK
b) PSK
c) AES-CCMP
d) TKIP/MIC
Answer: d
Explanation: The type of encryption used in WPA personal mode is TKIP/MIC

50). The wavelength of the high-frequency transmission type is about _
a) 33-10km
b) 10-1km
c) 1000-100m
d) 100-10m
Answer: d
Explanation: The wavelength of the high-frequency transmission type is about 100-10m

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