

WiMAX & Wi Fi

1. In WiMAX, with outdoor CPE, what is the Maximum distance covered?
a)12km b)18km c)15km d)10km
Ans c)15 km (2012 LDCE Gen Paper Question. Answer is as per BSNL WiMAX tender requirement)
2. Specify the BSNL WiMAX projects
a)WiMAX Urban Project b)WiMAX Rural Project Phase I c)WiMAX Rural project Phase II d) All the above.
Ans. d) All the above
3. Name the Circles where WiMAX Urban project is going on.
a)Kerala b)Punjab c)Karnataka d)both a&b Ans d)both a&b
4. Which WiMAX project is aiming to cover Rural Common Service Centers (CSC), which is set up by Dept. of information Technology (DIT) for prestigious e-governance project?
a) WiMAX Urban Project b)WiMAX Rural Project Phase I c)WiMAX Rural project Phase II
d)both b &c
Ans d)both b &c
- 5) Urban project vendor
a) ICOMM b) Huawei c) Gemini d))both a& b Answer: d)both a& b
- 6) FDD Mode 2540 & 2640 MHZ with 10 MHz in each band RF spectrum is used for WiMAX services in -----circles .
a)Kerala b)Punjab c) Gujarath, Maharashtra, Andhra d) Both a&b
Ans: c) Gujarath, Maharashtra, Andhra
- 7) 20 Mhz with TDD Mode with carrier frequency of 2645 Mhz RF RF spectrum is used for WiMAX services in -----circles .
a) Gujarath b) Maharashtra c) Gujarath, Maharashtra, Andhra d) Rest of Gujarath, Maharashtra, Andhra
Ans d) Rest of Gujarath, Maharashtra, Andhra
- 8) Pilot wimax project with 16d standard was deployed in -----circle in 2004.
a)Hariyana b) Karnataka c) KRL d)AP **Ans : a)Hariyana**
- 9)**Types of WiMAX CPES**
a) USB Dongle b) Indoor c) Outdoor d) All the above Ans: d) All the above
- 10) Approximate expected cell Radius with **out door** CPE in **Urban** RF environment is
a)8 km b)15km c)2.5 km d) 1.5 km Ans a)8 km
- 11) Approximate expected cell Radius with **Indoor** CPE in **Urban** RF environment is
a)8 km b)15km c)2.5 km d) 1.5 km Ans c)2.5 km
- 12) Approximate expected cell Radius with **USB dongle WiMAX** CPE in **Urban** RF environment is
a)8 km b)15km c)2.5 km d) 1.5 km Ans d) 1.5 km
- 13) Approximate expected cell Radius with **out door** CPE in **Rural** RF environment is
a)8 km b)15km c)2.5 km d) 1.5 km Ans b)15km
- 14) MIMO uses -----Antennas for -----
a)Single , TX &RX b) Single, TX c) Multiple, TX&RX d) Multiple, RX
Ans: c) Multiple, TX&RX

15) 2X2 MIMO gives -----throughput in MIMO _____ mode

a) 4 times, Matrix A b) 2 times, Matrix B c) 2 times, Matrix A d) None

Ans: b) 2 times, Matrix B

16) Which mode transmits different data through each of the TX Antenna so that throughput can be doubled?

a) Matrix B b) Matrix A c) Spatial Multiplexing Mode d) both a & c

Ans: d) both a & c

17) Which MIMO mode improves Coverage?

a) Matrix B b) Matrix A c) Space Time Block code d) both b & c

Ans: d) both b & c

18) Which are the Modulations supported in DL in WiMAX 16e

a) QPSK, 16 QAM b) 64QAM c) both a & b d) none

Ans : c) both a & b

19) Which are the mandatory Modulations supported in UL in WiMAX 16e

a) QPSK, 16 QAM b) 64QAM c) both a & b d) none

Ans : a) QPSK, 16 QAM

20) Advantages of TDD

a) Adjustment of the downlink/uplink ratio to efficiently support asymmetric downlink/ uplink traffic

b) Channel reciprocity for better support of link adaptation

c) Requires a single channel for both downlink and uplink providing greater flexibility for adaptation to varied global spectrum allocations

d) Since there is no duplexer transceiver design is simple

e) All the above

Ans : e) All the above

21) Multiple Access method used in WiMAX 16e (Mobile WiMAX)

a) CDMA b) FDMA + TDMA c) OFDMA d) None Ans : c) OFDMA

22) NWG in WiMAX stands for -----in WiMAX Forum.

a) Network Working Group b) NetWork Group c) New Work Group d) None

Ans : a) Network Working Group

23) Which Group of WiMAX forum handles Air interface System profiles & test scripts

a) NWG b) Technical Work Group (TWG) c) SPWG Service Provider Working Group
d) GRWG (Global Roaming Work Group)

Ans : b) Technical Work Group (TWG)

24) WiMAX Forum Work Group that specifies End to End Network Specifications.

a) NWG b) Technical Work Group (TWG) c) SPWG Service Provider Working Group
d) GRWG (Global Roaming Work Group)

Ans : a) NWG

25) Air interface of WiMAX is standardized by

a) WiMAX Forum b) IEEE c) 3GPP d) None Ans : b) IEEE

26) Network side of WiMAX is standardized by

a) WiMAX Forum b) IEEE c) 3GPP d) None Ans : a) WiMAX Forum

27) WiMAX Stands for

a) Worldwide Interoperability for Microwave Access

b) Wireless Interoperability for Microwave Access

c) Wireless Interchangeability for Microwave Access

d) Wireless Interchangeability Multiple Access

Ans : a) Worldwide Interoperability for Microwave Access

28) WiMAX Forum's NRM (Normalized reference Model) consists of the following logical entities

- a) MS b) ASN c) CSN d) All Ans: d) All
- 29) The interface by which MS interacts with ASN in WiMAX forum NRM is
a) R1 b) R2 c) R3 d) R4 Ans: a) R1
- 30) The interface by which MS interacts with CSN in WiMAX forum NRM is
a) R1 b) R2 c) R3 d) R4 Ans: b) R2
- 31) The interface by which ASN interacts with CSN in WiMAX forum NRM is
a) R1 b) R2 c) R3 d) R4 Ans: c) R3
- 32) The interface by which ASN interacts with another ASN in WiMAX forum NRM is
a) R1 b) R2 c) R3 d) R4 Ans: d) R4
- 33) The interface by which CSN interacts with another CSN in WiMAX forum NRM is
a) R1 b) R5 c) R3 d) R4 Ans: b) R5
- 34) Fixed IEEE WiMAX standard
a) 802.3 b) 802.11 c) 802.16d d) 802.16e Ans: c) 802.16d
- 35) Mobile IEEE WiMAX standard
a) 802.3 b) 802.11 c) 802.16d d) 802.16e Ans: d) 802.16e
- 36) Scalable OFDMA in IEEE 802.16e Mobile WiMAX standard supports RF bandwidths from ----- MHz to ----- MHz
a) 5, 10 b) 1.25, 10 c) 1.25, 10 d) 1.25, 20 Ans: d) 1.25, 20
- 37) IEEE 802.16e Mobile WiMAX standard supports the following spectrum
a) 2.3GHz, 2.5GHz, b) 3.3GHz c) 3.5GHz d) All the above Ans: d) All the above
- 38) **WiMAX Forum** founded in-----
a) April 1985 b) March 1999 c) March 2000 d) April 2001 Ans: d) April 2001
- 39) WiMAX Peak DL & UL sector throughput with 10MHz spectrum in Mbps
a) 14, 5.84 b) 21.4, 5.87 c) 21.4, 14 d) 63, 28 Ans: d) 63, 28
- 40) IEEE 802.16e Mobile WiMAX standard supports -----based Authentication
a) EAP b) AES-CCM c) CMAC d) HMAC Ans: a) EAP
- 41) IEEE 802.16e Mobile WiMAX standard supports -----based authenticated traffic encryption
a) EAP b) AES-CCM c) CMAC d) HMAC Ans: b) AES-CCM
- 42) IEEE 802.16e Mobile WiMAX standard supports authentication based on
a) SIM/USIM b) X.509 Digital certificates c) UserID/ Password d) All the above
Ans: d) All the above
- 43) IEEE 802.16e Mobile WiMAX standard supports -----authentication
a) device b) user c) both a&b d) None Ans: c) both a&b
- 44) IEEE 802.16d-2004 profile uses OFDM with-----subcarriers
a) 512 b) 1024 c) 256 d) none Ans: c) 256
- 45) IEEE 802.16e-2005 profile uses -----with -----subcarriers
a) OFDM, 256 b) OFDMA, 256 c) Scalable OFDMA, different number of d) None
Ans: c) Scalable OFDMA, different number of
- 46) The Mobile WiMAX End-to-End Network Architecture is based on an -----
a) All-IP platform b) Legacy Circuit Switched c) both a&b d) None
Ans: a) All-IP platform
- 47) WiMAX architecture is based on -----core network.
a) packet-switched b) Legacy Circuit Switched c) both a&b d) None
Ans: a) packet-switched
- 48) WiMAX is envisaged to support interworking with NWs of
a) 3GPP b) 3GPP2 c) DSL d) All the above. Ans: d) All the above.
- 49) ----- is defined as a set of network functions that provide IP connectivity services to the WiMAX subscriber(s).
a) ASN b) CSN c) CPE d) SS Ans: CSN

50) The ----- represents a boundary for functional interoperability with WiMAX clients, WiMAX connectivity service functions and aggregation of functions by different vendors
 a)ASN b)CSN c)CPE d)SS a)ASN

51) In an ----- system, the input data stream is divided into several parallel sub-streams of reduced data rate (thus increased symbol duration) and each sub-stream is modulated and transmitted on a separate orthogonal sub-carrier.

a)TDMA b)CDMA c)OFDMA d)none Ans: c)OFDMA

52) -----is a multiplexing technique that subdivides the bandwidth into multiple frequency sub-carriers

a)TDMA b)CDMA c)OFDMA d)none Ans: c)OFDMA

53) OFDM exploits the -----of the multipath channel by coding and interleaving the information across the sub-carriers prior to transmissions.

a) frequency diversity b)Channel reciprocity c)randomness d)none

Ans: a) frequency diversity

54)OFDM modulation can be realized with-----

a)DFT b)z-Transform c) Inverse Fast Fourier Transform (IFFT) d)None

Ans: c) Inverse Fast Fourier Transform (IFFT)

55)WiMAX 16e Supports up to -----subcarriers.

a)512 b)1024 c)256 d)2048 Ans: d)2048

56) In an OFDM system, resources are available in the time domain by means of ----- and in the frequency domain by means of -----.

a)Subcarriers, OFDM symbols b) OFDM symbols, Subcarriers c)phase, Subcarriers d)None

Ans: b) OFDM symbols, Subcarriers

57) In OFDMA, the time and frequency resources can be organized into sub-channels for allocation to individual users

a) sub-channels b)sub band c) sub spectrum d)none Ans: a) sub-channels

58) The OFDMA symbol structure consists of ----- sub-carriers

a)data b) Pilot c)Null d) All the above

59) ----- sub-carriers are used for data transmission

a)data b) Pilot c)Null d)None Ans : a)data

60)----- sub-carriers are used for estimation and synchronization purposes

a)data b) Pilot c)Null d)None Ans : b) Pilot

61))----- sub-carriers are used for guard bands and DC carriers and is not transmitted.

a)data b) Pilot c)Null d)None Ans : c)Null

62) -----sub-carriers are grouped into subsets of sub-carriers called -----

a) data and pilot, Subchannel b)data&null, Subchannel c) Null & Pilot d)none

Ans: a) data and pilot, Subchannel

63)-----Subcarriers are called Active subcarriers in OFDMA

a)data b) Pilot c)Null d)Both a&b Ans : d)Both a&b

64) The WiMAX OFDMA supports sub-channelization in -----

a)UL b)DL c)both UL & DL d) None Ans: c)both UL & DL

65) The 802.16e supports -----

a)Full Duplexed FDD b)TDD c) Half Duplexed FDD e) All the above

Ans : e) All the above

66)Initial releases of 802.16e supports

a)Full Duplexed FDD b)TDD c) Half Duplexed FDD e) All the above

Ans: b)TDD

67) 802.16e TDD frame is divided into -----separated by Transmit/Receive and Receive Transmit Transition Gaps (TTG and RTG, respectively) to prevent-----.

a) DL and UL sub-frames, DL and UL transmission collisions b) DL and UL sub-frames, time loss c) both a&b d)None

Ans: a) DL and UL sub-frames, DL and UL transmission collisions

68) -----is used for synchronization, and is the first OFDM symbol of the frame in 802.16e TDD frame.

a) DL-MAP b) UL-MAP c) Preamble d)None Ans : c) Preamble

69) The ----- follows the preamble in 802.16e TDD frame.

a) DL-MAP b) UL-MAP c) Preamble d)FCH Ans:)FCH

70)-----in 802.16e TDD frame provides the frame configuration information such as MAP message length and coding scheme and usable sub-channels.

a) DL-MAP b) UL-MAP c) Preamble d)FCH Ans: d)FCH

71))-----in 802.16e TDD frame provides the sub-channel allocation and other control information for the DL and UL sub-frames respectively.

a) DL-MAP b) UL-MAP c) DL-MAP & UL-MAP d)FCH Ans: c) DL-MAP & UL-MAP

72)MS perform closed-loop time, frequency, and power adjustment as well as bandwidth requests using -----in 802.16e

a) DL-MAP b) UL-MAP c) Preamble d) UL ranging sub-channel

Ans: d) UL ranging sub-channel

73)----- channel is allocated for the MS to feedback channel state information

a) DL-MAP b) UL-MAP c) Preamble d) UL CQICH Ans: d) UL CQICH

74) ----- channel is allocated for the MS to feedback DL HARQ acknowledge.

a) **UL ACK** b) UL-MAP c) Preamble d) UL CQICH Ans : a) UL ACK

75) In Mobile WiMAX to enhance coverage and capacity for WiMAX which of the following features are introduced.

a) Adaptive modulation and coding (AMC) b) Hybrid Automatic Repeat Request (HARQ) c) Fast Channel Feedback (CQICH) d) All the above

Ans: d) All the above

76)Which ARQ protocol is used in WiMAX

a) selective repeat b) maximum-ratio combining c) *N* channel “Stop and Wait” d)None

Ans: c) *N* channel “Stop and Wait”

77)Which type of combining is used in WiMAX when a packet received with error

a)Chase/Soft b)MRC c)selection d)none

Ans: a)Chase/Soft

78) The MAC layer can simultaneously support -----

a) bursty data traffic with high peak rate demand b) streaming video and latency-sensitive voice traffic over c)both a& b d)None

Ans: c)both a& b

79) The resource allocated to one terminal by the MAC scheduler can vary from ----- to -----

a) One frame to 5 frame b) Single time slot to an Entire frame c) None d) One slot to 5 slot

Ans: b) Single time slot to an Entire frame

80) In WiMAX scheduler can effectively change the resource allocation on a ----- to adapt to the bursty nature of the traffic.

a)slot basis b) frame basis c) two consecutive frame basis d) None.

Ans: b) frame basis.

81) In the Mobile WiMAX MAC layer, QoS is provided via -----

- a) service flows b) connection c) bearer d)none

Ans : a) service flows

82)----- is a unidirectional flow of packets that is provided with a particular set of QoS parameters in WiMAX

- a) service flow b) connection c) bearer d)none

Ans : a) service flow

83) Before providing a certain type of data service, the base station and user-terminal first establish a unidirectional logical link between the peer MACs called -----.

- a) Service flows b) connection c) bearer d) none
b) Connection

84)QoS Categories of WiMAX 16e

- a) (UGS) Unsolicited Grant Services & (rtPS) Real-Time Polling Services
b) (nrtPS) Non-Real-Time Polling Services
c) (BE) Best Effort
d)All the above

Ans: d)All the above

85)Match the following

A	(UGS) Unsolicited Grant Services	1	File Transfer Protocol	nrtPS is designed to support non-real-time SF that require variable size data grant burst type on a regular basis, such as FTP.
B	(rtPS) Real-Time Polling Services	2	VoIP	UGS is designed to support constant bit rate (CBR) such as T1/E1 emulation, VoIP without silence suppression.
C	(nrtPS) Non-Real-Time Polling Services	3	Streaming Audio or Video	rtPS is designed to support real time data that generate variable size data packets on a periodic basis, such as MPEG video
D	(BE) Best Effort	4	Data Transfer, Web browsing etc.	Best effort services are typically provided by

Ans:

A	2
B	3
C	1
D	4

86)WiMAX MAC scheduling services supports

- a) **Fast Data Scheduler**
b) **Scheduling for both DL and UL**
c) **Dynamic Resource Allocation & QoS Oriented**
d) **All the above**

Ans : d) All the above

87) In 16e WiMAX the scheduler is located at -----to enable rapid response to traffic requirements and channel conditions.

- a) each base station b)ASN c) CSN d)None

Ans: a) each base station

88) In WiMAX to preserve battery which mode is used

- a) Sleep b) Idle c) both a & b d) none

Ans : c) both a & b

89) In which mode of WiMAX paging is used.

- a) Sleep b) Idle c) both a & b d) none

Ans : b) Idle

90) In which mode SS is latched to one BS, but SS conducts pre-negotiated periods of absence from the Serving Base Station air interface and these periods are characterized by the unavailability of the SS to DL or UL traffic.

- a) Sleep b) Idle c) both a & b d) none

Ans : a) Sleep

91) Which mode provides a mechanism for the MS to become periodically available for DL broadcast traffic messaging without registration at a specific base station

- a) Sleep b) Idle c) both a & b d) none

Ans : b) Idle

92) Hand offs supported in WiMAX

- a) Hard Handoff b) Fast Base Station Switching (FBSS) c) Macro Diversity Handover (MDHO)
d) All the above

93) When Fast Base Station Switching (FBSS) is supported, the MS and BS maintain a list of BSs that are involved in FBSS with the MS called

- a) Passive set b) Neighbors c) Active set d) None

Ans : c) Active set

94) In FBSS MS communicates with-----

- a) only with Anchor BS b) All BS in Active set c) All Neighbors d) No BS

Ans : a) only with Anchor BS

95) In WiMAX FBSS Transition from one Anchor BS to another (i.e. BS switching) is performed

- a) with HO messages b) without invocation of explicit HO signaling messages c) both a & b d) None

Ans : b) without invocation of explicit HO signaling messages

96) When operating in ----- the MS communicates with all BSs in the active set of uplink and downlink uni-cast messages and traffic

- a) FBSS b) HHO c) MDHO d) none

Ans: c) MDHO

97) In WiMAX FFR users close to the base station operate on the zone with -----available, while for the edge users, each cell or sector operates on the zone with -----

- a) all sub-channels, a fraction of all sub-channels available
b) a fraction of all sub-channels available, all sub-channels,
c) all sub-channels, all sub-channels,
d) a fraction of all sub-channels available, a fraction of all sub-channels available,

Ans: a) all sub-channels, a fraction of all sub-channels available

98) Which of the following authentication methods used in WiMAX

- a) EAP-SIM b) EAP-AKA c) EAP-TLS or EAP-MSCHAPv2 d) All the above

Ans : d) All the above

99) In 2004 itself BSNL deployed -----standard based WiMAX system at 10 locations- 6 being in urban metros and 4 locations being in rural areas of Haryana on pilot basis

- a) 802.16d-2004 b) 802.16e-2005 c) 802.11 d) 802.3

Ans : b) 802.16e-2005

100) Which is the advanced and true 4G WiMAX standard

- a) 802.16d b) 802.16e c) 802.16m d) 802.16h

Ans : c) 802.16m

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Sample self study objective type questions

1. Wi-MAX stands for_____

- a) Worldwide Interchangeability for Microwave Access.
- b) Worldwide Interoperability for Microwave Access.**
- c) Work Information Microwave Access Technology.
- d) None of the above.

2. Mobile Wi-MAX air interface adopts_____

- a) Quadrature Phase shift keying (QPSK) technique.
- b) Binary Phase Shift keying (BPSK) technique.
- c) Orthogonal Frequency Division Multiple Access (OFDMA)**
- d) None of the above.

3. IEEE 802.16 standard simply addresses_____

- a) The MAC interface specifications.
- b) Air interface specifications.**
- c) Router standard specifications.
- d) Switch standard specifications.

4. Peak DL(Down Link) data rates upto 63Mbps per. sector can be achieved in Wi-MAX because_____

- a) MIMO Antenna technique use.
- b) Flexible Sub channelization
- c) Advanced Coding and Modulation
- d) All of the above are correct.**

5. ASN stands for_____

- a) Access Service Network.**
- b) Account Service Network.
- c) Accessibility Service Network.
- d) Advanced Service Network.

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6. Preamble is used for synchronization which is also the _____
- a) Last symbol of the frame.
 - b) First OFDM symbol of the frame.**
 - c) Both at first & last symbols of the frame.
 - d) Not used as first symbol of the frame.
7. Ranging is used only in the _____
- a) Uplink sub frame**
 - b) Downlink sub frame
 - c) Both (a) & (b)
 - d) None of the above
8. Out of three Handoff methods used i.e. Hard Handoff (HHO), Fast Base Station Switching (FBSS) and Macro Diversity Handoff (MDHO), the mandatory is _____
- a) Fast Base Station Switching
 - b) Macro Diversity Handoff
 - c) Hard Handoff
 - d) All of the above**
9. Mobile Wi-MAX supports _____
- a) Fractional Frequency Reuse.
 - b) Flexible sub-channel reuse.
 - c) Fractional frequency reuse for edge users to assure edge-user connection quality and throughput
 - d) All of the above are correct.**
10. Spectrum for BSNL for using Wi-MAX is _____
- a) 20 MHz**
 - b) 25 MHz
 - c) 30 MHz
 - d) 10 MHz