



EXAMINATIONS 2013 / 2014

AHOLIADAU 2013 / 2014

Semester 1

FACULTY OF: APPLIED DESIGN AND ENGINEERING
SCHOOL OF APPLIED COMPUTING

NAME OF COURSE/PROGRAMME:	B.Sc. (Hons) / HND Computer Networks BEng (Hons) Computer Networks Technology
YEAR OR LEVEL:	5
NAME OF MODULE/UNIT/EXAM PAPER:	Wireless Networks and Protocol Design
MODULE NO:	M2X8524 M2X8633 M5X8937

DATE OF EXAMINATION:

EXAMINATION TIMES:

START TIME:

FINISH TIME:

TIME ALLOWED: 2 hours

INSTRUCTIONS TO CANDIDATES:

Section 1: This is compulsory question every one must answer. Each questions carries equal marks.

Section 2: Answer any two out of three questions. Each question carries equal marks.

Candidates are not permitted to bring calculators, dictionaries; text books/case studies or any other reference materials into the exam room.

SECTION 1

Answer all questions. Each question carry one mark.

1. The 5th layer of the OSI model is:
 - a. Transport
 - b. Presentation
 - c. Session
 - d. Data Link
2. In the TCP/IP model the Data flow layers consist of the:
 - a. Transport, application and Internet
 - b. Transport, network access and application
 - c. Transport, Internet and network access
 - d. Transport, application and Session
3. Class b addresses range from
 - a. 0 -127
 - b. 128 – 191
 - c. 192 – 223
 - d. 223 - 256
4. Most WLANs operate at:
 - a. 11Mbps to 54Mbps
 - b. 11Mbps to 128 Mbps
 - c. 11Mbps only
 - d. 11Mbps to 256Mbps
5. Mobility is a benefit of WLANs
 - a. True
 - b. False
6. Three types of radio transmission within the unlicensed 2.4 GHz frequency bands are:
 - a. ASK, PSK, FSK
 - b. FHSS, OFDM, QPSK
 - c. FHSS, QPSK, CDMA
 - d. FHSS, DSSS, OFDM
7. The electromagnetic wave equation is:
 - a. $C \times \lambda = f$
 - b. $f \times \lambda = c$
 - c. $\lambda + f = c$
 - d. $f + \lambda = c$

8. Which of the following is not a security services in IEEE 802.11 networks
 - a. Confidentiality
 - b. Accountability
 - c. Integrity
 - d. Authenticity
9. With MAC service data unit (MSDU) priority is given to
 - a. Unicast
 - b. Multicast
 - c. Broadcast
 - d. Anycast
10. The Distributed Coordination Function protocol is at the
 - a. Transport layer
 - b. Physical layer
 - c. Logical Link Control (LLC) layer
 - d. Media Access Control (MAC) layer
11. Which of the following is not a switching technology
 - a. Asynchronous Transfer Mode (ATM)
 - b. Frame Relay
 - c. Wireless Sensor Network (WSN)
 - d. Synchronous Optical Networking (SONET)
12. There is no difference between contention-less and contention-based networks
 - a. True
 - b. False
13. A high-performance, cell-oriented switching technology that utilizes fixed-length of 53 bytes packets to carry different types of traffic is
 - a. Asynchronous Transfer Mode (ATM)
 - b. Frame Relay
 - c. Wireless Sensor Network (WSN)
 - d. Synchronous Optical Networking (SONET)
14. Wireless ATM (W-ATM) has two distinct part namely:
 - a. Radio Access and Mobile ATM
 - b. Mobile ATM and ATM adaptation
 - c. Radio Access and ATM adaptation
 - d. Wireless control and ATM adaptation
15. Which of the following are multihop networks
 - a. WMN, WSN, ATM
 - b. WMN, ATM, MANet

- c. MANet, WSN, ATM
 - d. MANet, WSN, WMN
16. In Wireless Sensor Networks energy efficiency is an issue
- a. True
 - b. False
17. Which Standard is WiMAX
- a. IEEE 802.11
 - b. IEEE 802.15.4
 - c. IEEE 802.16
 - d. IEEE 802.3
18. WiMAX is similar to
- a. ATM networks
 - b. Frame Relay networks
 - c. Cellular networks
 - d. Optical fibre networks
19. Which of the following service WiMAX supported
- a. ATM
 - b. Frame Relay
 - c. Data Transport
 - d. All of the above
20. What type of networks are LTE and LTE-A
- a. Contention-Based
 - b. 802.11
 - c. 802.16
 - d. Cellular
21. Which of the following is a basic property of Sine Waves:
- a. Amplitude
 - b. Period
 - c. Wavelength
 - d. All of the above
22. The Technique used in WLAN is:
- a. CSMA/CA
 - b. CSMA/CD
 - c. All of the above
23. Three types of 802.11 security schemes are
- a. WEP, WPA, WPA2
 - b. TKIP, WPA, WPA2
 - c. CCMP, WPA2, WPA

- d. WEP, CCMP, WPA2

24. WEP uses:

- a. 40 bits key
- b. 32 bits Key
- c. 62 bits key
- d. 24 bits key

25. A Passive attack

- a. Listen to system passwords
- b. Attempt to log into someone else's account
- c. Wire taps
- d. All of the above

SECTION 2

Answer any **TWO** questions:

QUESTION ONE

- (a) With the aid of a diagram describe Wireless LAN.

(10 Marks)

- (b) Explain the difference between basic service set (BSS) and independent BSS (IBSS)

(6 marks)

- (c) What are the three main types of frames used at the MAC layer and their uses?

(9 marks)

QUESTION TWO

- (a) An existing medical company wants to implement a WLAN and ask you to provide information on Wireless Mesh Networks (WMN), Wireless Sensor Network (WNS) and Wireless Ad hoc Networks. Explain these wireless networks to the company. State if they have any major differences and issues.

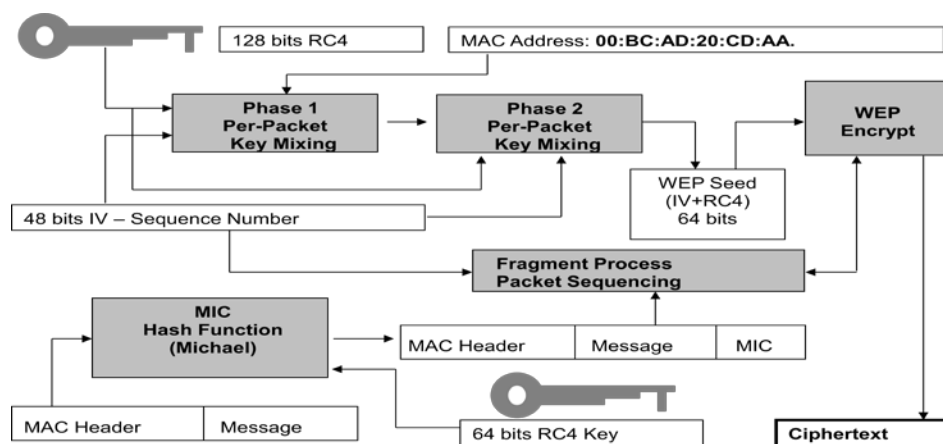
(15)

(b) Compare the differences between WiMAX and LTE technologies. Tables and or diagram may be used.

(10 marks)

QUESTION THREE

(a) Temporal Key Integrity Protocol (TKIP/WPA) is the second security scheme developed by IEEE 802.11. Explain TKIP shown in figure 2



(10 marks)

(b) Complete the IEEE 802.11 security scheme table below.

Protocol	WEP	WPA	WPA2
Feature		(TKIP)	(CCMP)
Access Control and Key Management Framework			802.1X Framework
Encryption Algorithm	RC4		
Key Size		128 or 256 bits	
Key Protection		48 bits IV	
Data Confidentiality			128 bits

Data Authenticity and Integrity			CBC-MAC 128 bits
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(12 marks)

(c) Name at least three types of attacks and detection methods

(3 marks)