

**SPECIFY TYPE OF
EXAMINATION**

FIRST ATTEMPT

FIRST RESIT

SECOND RESIT

RE-TAKE



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SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS
UNIVERSITY EXAMINATION FOR THE DEGREE OF COMPUTER SECURITY AND
FORENSICS
3rd YEAR 2ND SEMESTER 2021/2022 ACADEMIC YEAR
MAIN CAMPUS**

COURSE CODE: ICB 1308

COURSE TITLE: Wireless Networks and Mobile computing

DATE:

TIME:

TIME:

Instructions:

- 1. Answer ALL questions in Section A and B and ANY other TWO questions in Section C**
- 2. Tick the most correct alternative in Section A**
- 3. Answers to Questions in Section B and C must be written in the spaces provided on the question paper.**
- 4. Candidates must ensure they submit their work by clicking “finish and submit attempt” button at the end.**



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SECTION A: 30 Marks (Each question carries 1 mark)

1. Which of the following network topologies are used by wireless local area networks (WLANs)? (Choose all correct answers.)
 - A. Ad hoc
 - B. Bus
 - C. Infrastructure
 - D. Star

2. Which of the following topologies enables wireless devices to access resources on a wired network?
 - A. Ad hoc
 - B. Star
 - C. Infrastructure
 - D. Bus

3. Which of the following components are required for two computers to communicate using an IEEE 802.11 wireless LAN using an ad-hoc topology?
 - A. A router connected to the Internet
 - B. A wireless access point
 - C. An external antenna
 - D. None of the above

4. Which of the following network types are typically wireless? (Choose all correct answers.)
 - A. WAN
 - B. PAN
 - C. SAN
 - D. WLAN

5. Which of the following wireless networking technologies will never experience interference from a 2.4 GHz wireless telephone? (Choose all correct answers.)
 - A. IEEE 802.11a
 - B. IEEE 802.11b
 - C. IEEE 802.11g
 - D. IEEE 802.11n
 - E. IEEE 802.11ac

6. Which of the following wireless networking standards is capable of supporting speeds of 54 Mbps and is also backward compatible with IEEE 802.11b?
 - A. IEEE 802.11a
 - B. IEEE 802.11 g
 - C. IEEE 802.11n
 - D. Bluetooth
 - E. IEEE 802.11

7. Which of the following wireless LAN standards include the ability to use multiple input and multiple output (MIMO) antennae? (Choose all correct answers.)
 - A. IEEE 802.11a
 - B. IEEE 802.11b/g
 - C. IEEE 802.11n
 - D. IEEE 802.11ac



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8. Which of the following is a cellular communication technology that is virtually obsolete in the United States?
 - A. GSM
 - B. CDMA
 - C. CSMA/CD
 - D. TDMA
9. Which of the following IEEE wireless LAN standards uses the Direct Sequence Spread Spectrum (DSSS) signal modulation technique?
 - A. 802.11a
 - B. 802.11b
 - C. 802.11g
 - D. 802.11n
 - E. 802.11ac
10. When designing a wireless LAN installation, which of the following are valid reasons to install a unidirectional antenna in an access point, rather than an omnidirectional one? (Choose all correct answers.)
 - A. The access point will be located against an outside wall.
 - B. There are many interior walls between the access point and the most distant workstation.
 - C. A unidirectional antenna can be focused to a specific signal pattern width.
 - D. All of the above.
11. How do wireless networking devices conforming to the IEEE 802.11n and 802.11ac standards achieve transmission speeds greater than 72.2 Mbps?
 - A. By using direct sequence spread spectrum (DSSS) modulation
 - B. By using multiple antennae to transmit several data streams simultaneously
 - C. By using frequencies in the 5 GHz band
 - D. By sacrificing transmission range for speed
12. Which of the following are possible reasons why the 5 GHz frequency tends to perform better than the 2.4 GHz frequency on a wireless LAN? (Choose all correct answers.)
 - A. The 5 GHz frequency has more channels than the 2.4 GHz frequency.
 - B. The 5 GHz frequency supports longer ranges than the 2.4 GHz frequency.
 - C. The 5 GHz frequency conflicts with fewer common household devices than the 2.4 GHz frequency.
 - D. The 5 GHz frequency transmits at faster speeds than the 2.4 GHz frequency.
13. Alice is attempting to deploy an IEEE 802.11b/g wireless LAN on the fifth floor of a ten-story office building that is surrounded on all sides by other office buildings, all of which seem to be running many wireless LANs. Scanning the 2.4 GHz band, she sees literally dozens of networks, spread across all of the available channels. As a result, her wireless devices have trouble connecting to their access point, and when they do, they achieve only low speeds. Choose the two tasks from the following list that Alice should perform to enable the wireless clients to connect to the network most reliably. (Choose two correct answers.)
 - A. Upgrade all of the wireless network devices to IEEE 802.11n.
 - B. Configure the wireless devices to use the 5 GHz band.
 - C. Configure all of the network devices to use WPA2 encryption with AES.
 - D. Configure the access point to suppress SSID broadcasts.
 - E. Upgrade all of the network devices to the latest firmware.
14. Which of the following is the fastest speed achievable by a wireless LAN using the currently ratified IEEE 802.11 standards?



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- A. 54 Mbps
 - B. 600 Mbps
 - C. 1.3 Gbps
 - D. 2.6 Gbps
15. What is the term for the technology implemented in the IEEE 802.11ac standard that enables a wireless device to transmit multiple frames to multiple clients simultaneously?
- A. MIMO
 - B. Channel bonding
 - C. CSMA/CA
 - D. MU-MIMO
16. On an IEEE 802.11b/g/n wireless network running at 2.4 GHz with multiple access points, the traditional best practice is to use channels 1, 6, and 11, with no two adjacent access points configured to use the same channel. Which of the following is the real reason why this is a good plan?
- A. Channels 1, 6, and 11 are the only three channels with frequencies that do not overlap.
 - B. Channels 1, 6, and 11 have more bandwidth than the other channels.
 - C. Channels 1, 6, and 11 have greater ranges than the other channels.
 - D. Channels 1, 6, and 11 are the default settings on most wireless devices.
17. Ralph is performing a site survey for a wireless LAN installation in a warehouse with two offices at either end of the building, approximately 300 feet apart. If he installs a single access point in the center of the warehouse, equidistant from the two offices, which of the following standards should he look for when purchasing hardware so that workstations in both offices will be able to connect to the network at the best possible speed?
- A. IEEE 802.11a
 - B. IEEE 802.11g
 - C. IEEE 802.11n
 - D. IEEE 802.11ac
18. Which of the following terms defines a wireless LAN transmission technique in which devices use multiple antennae to increase transmission speeds?
- A. MIMO
 - B. TDMA
 - C. PAN
 - D. Ant+
19. What is the maximum channel width possible using wireless networking equipment based on the ratified IEEE 802.11 standards?
- A. 20 MHz
 - B. 40 MHz
 - C. 80 MHz
 - D. 160 MHz
20. Which of the following wireless networking standards are capable of using only the 5 GHz frequency? (Choose all correct answers.)
- A. IEEE 802.11a
 - B. IEEE 802.11b
 - C. IEEE 802.11g
 - D. IEEE 802.11n
 - E. IEEE 802.11ac
21. Which of the following IEEE wireless LAN standards provides the greatest possible throughput?



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- A. 802.11a
 - B. 802.11ac
 - C. 802.11b
 - D. 802.11g
 - E. 802.11n
22. Which of the following IEEE 802.11 wireless LAN standards are capable of supporting both the 2.4 GHz and 5 GHz frequencies?
- A. 802.11a
 - B. 802.11b
 - C. 802.11g
 - D. 802.11n
 - E. 802.11ac
23. What is the maximum number of transmit and receive antennae supported by the currently ratified IEEE 802.11 wireless LAN standards?
- A. 2
 - B. 4
 - C. 8
 - D. 16
24. Which of the following is the term for the network name that you use to connect a client device to an access point on a wireless LAN?
- A. BSS
 - B. ESS
 - C. SSID
 - D. BSSID
25. Which of the following IEEE wireless LAN standards define devices with a maximum aggregate channel width of 20 MHz? (Choose all correct answers.)
- A. 802.11a
 - B. 802.11g
 - C. 802.11n
 - D. 802.11ac
26. You are installing a wireless network solution that uses a feature known as MIMO. Which wireless networking standard are you using?
- A. 802.11a**
 - B. 802.11b**
 - C. 802.11g
 - D. 802.11n**
27. Which of the following wireless protocols operate at 2.4GHz? (Select two.)
- A. 802.11a**
 - B. 802.11b**
 - C. 802.11g
 - D. 802.11n**
28. Under what circumstance would you change the default channel on an access point?
- A. When channel overlap occurs between access points**
 - B. To release and renew the SSID**



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- C. To increase WEP security settings
 - D. To decrease WEP security settings
29. A client on your network has had no problems accessing the wireless network in the past, but recently she moved to a new office. Since the move she cannot access the network. Which of the following is most likely the cause of the problem?
- A. The SSIDs on the client and the AP are different.
 - B. The SSID has been erased.
 - C. The client has incorrect WEP settings.
 - D. The client system has moved too far from the access point
30. You are asked to configure the security settings for a new wireless network. You want the setting that offers the greatest level of security. Which of the following would you choose?
- A. WEP-Open
 - B. WEP-Closed
 - C. WEP-Shared
 - D. WEP-Unshared

SECTION B: 20 Marks

1. In a home network scenario why constant beacon information is unnecessary. How would you deal with it? **(2marks)**
2. Access Point is limited by a transmission range support your answer with at least two factors **(2marks)**
3. Distinguish between data rate and throughput **(4marks)**
4. Before a client system can attempt to connect to an access point, it must locate it. State and explain the two methods of Access Point discovery **(4marks)**
5. Wireless interference though inevitable is an important consideration when you plan a wireless Network. State and explain at least four factors that cause interference **(8marks)**



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SECTION C: 20 Marks (Choose any two)

QUESTION 1

1. A GSM network consists of several functional entities, whose functions and interfaces are defined. State the four broad parts the form the GSM (4marks)
2. When designing wireless LAN how would you ensure that a mobile wireless client will not lose connectivity when moving from one access point to another? (2marks)
3. Distinguish between spread spectrum and narrow band technology (2marks)
4. Access Point is limited by a transmission range support your answer with at least two factors (2marks)

QUESTION 2

1. A GSM network consists of several functional entities, whose functions and interfaces are defined. State the four broad parts the form the GSM (4marks)
2. Describe what you understand by the following GSM network areas: (4 marks)
 - i. Cell:
 - ii. Location Area:
3. State at least two function of the Operation Support Subsystem(OSS) in GSM networks (2marks)

QUESTION 3

1. Distinguish between Basic Service Set (BSS) and Extended Service Set (ESS) (2marks)
2. Distinguish between omnidirectional and Yagi antennas (4 marks)
3. You are faced with a problem in which client systems cannot consistently access the AP, you could try moving the access point to better cover the area, but then you may disrupt access for users in other areas. Briefly explain at least four things that you can do to troubleshoot AP coverage? (4 marks)