UNISA university of south africa

COS2626

OCTOBER/NOVEMBER 2016

COMPUTER NETWORKS I

STUDENT NUMBER									

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Question No	Marks Examiners					
	1		2		3	
Section A						
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UNIVERSITY EXAMINATIONS

UNIVERSITEITSEKSAMENS

UNISA university of south africa

COS2626

October/November 2016

COMPUTER NETWORKS I

Duration 2 Hours

80 Marks

EXAMINERS

FIRST MS H ABDULLAH
SECOND MR MJ MABOE

Closed book examination.

This paper consists of 23 pages

Please complete the attendance register on the back page, tear off and hand to the invigilator.

INSTRUCTIONS:

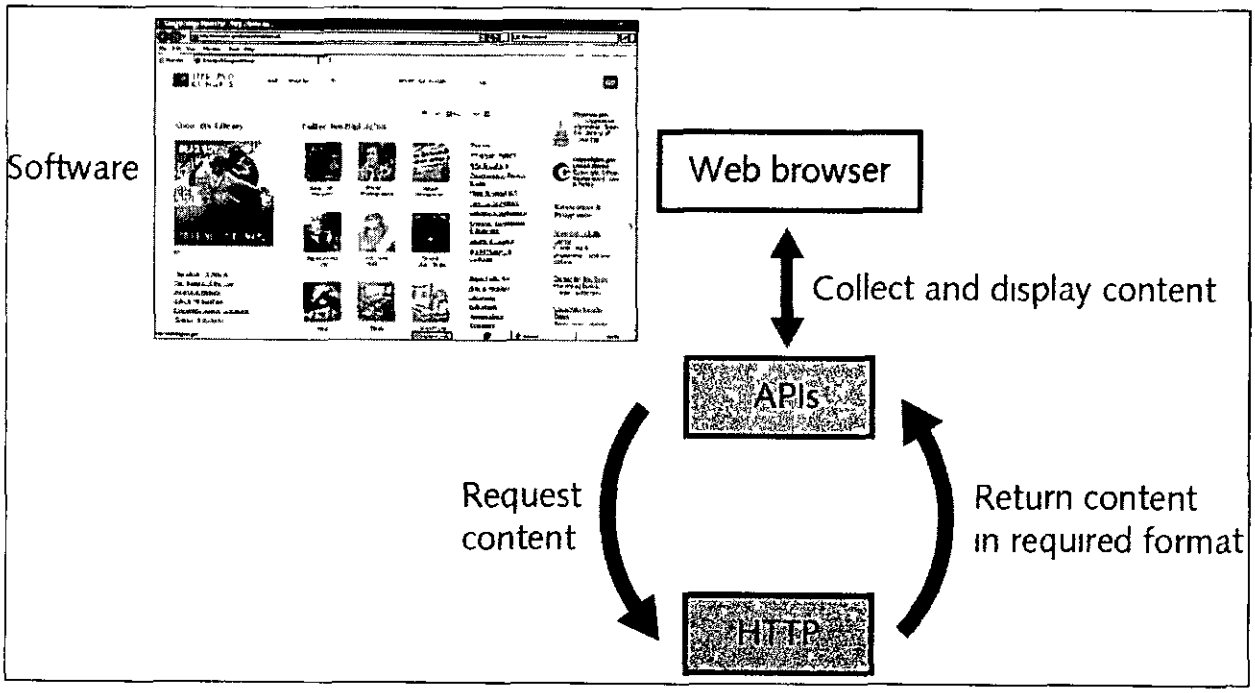
1 This paper consists of 2 sections comprising 40 marks each The final mark is converted to a total out of a 100
2 The multiple-choice section (SECTION A) must be answered on the grid provided on page 17. Each correct answer will be awarded 1 mark
3 The written section (SECTION B) must be answered in the blocks provided below the questions The marks that are awarded for each question are indicated in brackets next to the question number.

SECTION A: MULTIPLE-CHOICE QUESTIONS **40 MARKS**
ANSWER THIS SECTION IN THE GRID PROVIDED ON PAGE 17

Networking Standards and the OSI Model

Question 1

The following diagram illustrates _____layer functions



a Presentation
b Application
c Transport
d Session

Question 2

The following statements describe a network address including its addressing scheme, formats and alternate names Which statement (s) regarding the network address is (are) INCORRECT?

i Network addresses follow a hierarchical addressing scheme and can be assigned through operating system software
ii Network layer address formats differ depending on which Network layer protocol the network uses
iii Network addresses are also called Network layer addresses, logical addresses, or virtual addresses

a only i and ii
b only ii and iii
c only iii
d neither i, ii nor iii

Question 3

Suppose that, at the receiving node, a frame's FCS (Frame Check Sequence) doesn't match the FCS it was issued at the transmitting node What happens as a result?
a The receiving node's Transport layer assesses the error and corrects it
b The transmitting node's Data Link layer assesses the error and corrects it
c The receiving node's Data Link layer requests a retransmission
d The transmitting node's Transport layer immediately issues a replacement frame

Question 4

Complete the following table by identifying the correct IEEE (Institute of Electrical and Electronics Engineers) 802 standard

STANDARD	NAME	TOPIC
A	Mobile broadband wireless network	Packet handling and other specifications for multivendor, mobile high-speed wireless transmission, nicknamed "mobile WiMAX"
B	Broadband wireless metropolitan area networks	The atmospheric interface and related functions associated with broadband wireless connectivity, also known as WiMAX

a. 802.20, 802 16
b 802 11, 802 22
c 802 15; 802 12
d 802 17, 802 22

Transmission Basics and Networking Media

Question 5

Given the following definitions, identify the correct property of analog signals

i Measure of strength at given point in time
ii. Number of times amplitude cycles over fixed time
iii Distance between one peak and the next
iv Progress of wave over time compared to a fixed point

a	amplitude,	frequency,	wavelength,	phase
b	frequency,	wavelength,	phase,	amplitude
c	wavelength,	phase,	amplitude,	frequency
d	phase,	amplitude,	frequency,	wavelength

Question 6

Which one of the following decimal numbers corresponds to the binary number 00001001?
a 3
b 5
c 7
d 9

Question 7

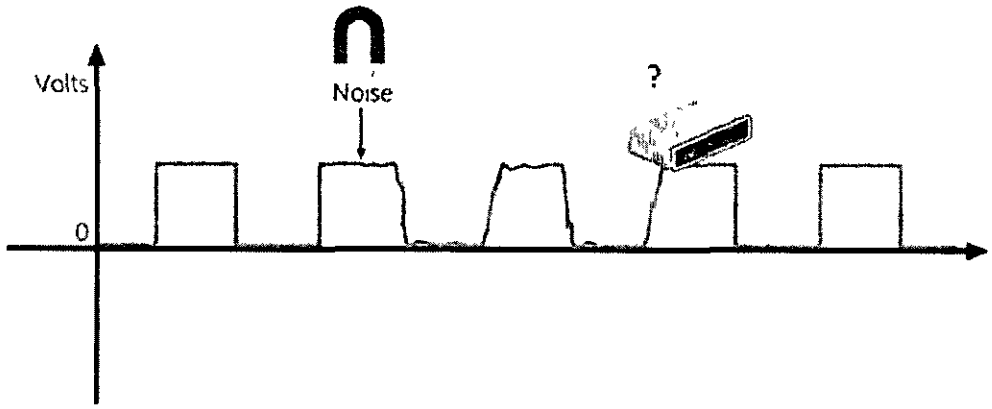
Study the following list of characteristics.

- Digital signals sent through DC (Direct Current) pulses applied to wire
- Requires exclusive use of wire's capacity
- Transmit one signal (channel) at a time
- Example Ethernet

This list depicts the characteristics of a _____system
a broadband
b baseband
c bandwidth
d throughput

Question 8

Study the following diagram



a This diagram illustrates how a digital signal is distorted by noise and then repeated
b This diagram illustrates how an analog signal is distorted by noise and then repeated
c This diagram illustrates how a digital signal is distorted by noise and then amplified
d This diagram illustrates how an analog signal is distorted by noise and then amplified

Introduction to TCP/IP Protocols

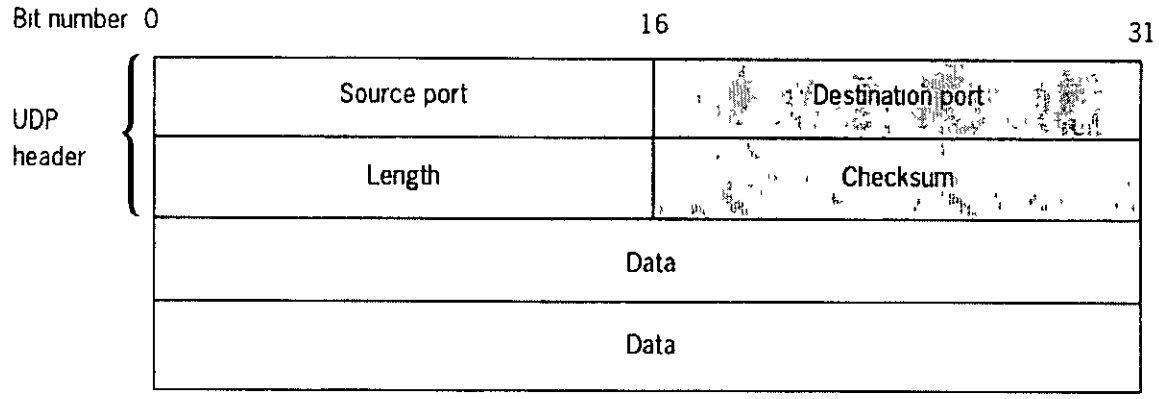
Question 9

Which one of the following statements regarding the TCP/IP (Transmission Control Protocol/Internet Protocol) as compared to the OSI (Open Systems Interconnection) model is not TRUE?

a The Application layer of the TCP/IP model is roughly equivalent to the Application, Presentation and Session layers of the OSI model.
b The Transport layer of the TCP/IP model is roughly equivalent to the Transport layer of the OSI model
c The Internet layer is equivalent to the Network layer of the OSI model
d The Data Interface layer is roughly equivalent to the Data Link and Physical layers of the OSI model

Question 10

The following diagram is a typical illustration of a (n) _____



a TCP segment
b UDP (User Datagram Protocol) segment
c IPv6 header
d IPv4 packet

Question 11

Which one of the following statements regarding multicasting is NOT TRUE?
a Multicasting is a transmission method that allows one node to send data to a defined group of nodes
b Multicasting is a point-to-point method
c Multicasting can be used for teleconferencing or videoconferencing over the Internet
d Routers use IGMP (Internet Group Management Protocol) to determine which nodes belong to a certain multicast group and to transmit data to all nodes in that group

Question 12

Which one of the following statements regarding sockets and ports is INCORRECT?
a A process's port number plus its host machine's IP address equals the process's socket
b If the standard port number for the Telnet service is 23, a host whose IPv4 address is 10 43 3 87 has a socket address for Telnet of 10 43 3 87 23
c Well known ports are in the range of 0 to 1023 and are assigned to processes that only the operating system or an administrator of the system can access
d Registered Ports are those ranging from 49152 through 65535 and are open for use without restriction

Topologies and Ethernet Standards

Question 13

Which one of the following is NOT a characteristic of a hybrid star-wired bus topology?

a Groups of workstations are star-connected to connectivity devices and then networked via a single bus
b Different network segments can easily be interconnected or isolated
c It forms the basis for modern Ethernet networks
d. It requires less cabling and less connectivity devices than a star topology alone.

Question 14

Identify the backbone type in the following table

This kind of topology allows for simple expansion and limited capital outlay for growth, because more layers of devices can be added to existing layers
Consists of two or more internetworking devices connected to each other by a single cable in a daisy-chain fashion
The most robust type of network backbone
This arrangement allows you to interconnect different types of subnetworks You can also centrally manage maintenance and troubleshooting chores

a	serial;	distributed,	collapsed;	parallel
b	distributed,	collapsed,	parallel,	serial
c	collapsed,	parallel,	distributed,	serial
d	distributed,	serial,	parallel,	collapsed

Question 15

What happens in CSMA/CD (Carrier Sense Multiple Access with Collision Detection) when a node detects that its data has suffered a collision?

a It immediately retransmits the data
b It signals to the other nodes that it is about to retransmit the data, and then does so
c It waits for a random period of time before checking the network for activity, and then retransmits the data
d It signals to the network that its data was damaged in a collision, waits a brief period of time before checking the network for activity, and then retransmits the data

Question 16

Identify which Ethernet Standard(s) is (are) for copper cable?

i 10Base-T
ii. 100Base-FX
iii 10GBase-LR
iv 10GBase-SR

a only i
b only ii and iii
c only iii and iv
d only i and iv

Network Hardware, Switching, and, Routing

Question 17

Which one of the following statements regarding repeaters is INCORRECT?
a. Repeaters operate in the physical layer of the OSI model
b A repeater contains one input port and one output port, so it is capable only of receiving and repeating a single data stream
c Repeaters are commonly used on modern networks
d Repeaters cannot improve or correct a bad or erroneous signal, they simply regenerate a signal over an entire network segment

Question 18

What type of addresses do bridges read, and to what layer of the OSI model do bridges belong?
a IP addresses, the Network layer
b IP addresses, the Transport layer
c MAC addresses, the Network layer
d MAC addresses, the Data Link layer

Question 19

Which one of the following DISTINGUISHES switches from repeating devices, such as hubs?
a Switches separate collision domains
b Switches separate broadcast domains
c Switches can alert the network administrator to high data collision rates
d Switches do not examine Network layer protocol information, which makes them faster than repeating devices

Question 20

Which of the following statements regarding routers and routing protocols are CORRECT?

i. Static routing is a technique in which a network administrator configures a router to use specific paths between nodes
ii RIP (Routing Information Protocol) is an IGP (Interior Gateway Protocol), which means that it can only route data within an autonomous (internal) network
iii. IS-IS (Intermediate System to Intermediate System) is a distance-vector routing protocol, designed for use on interior routers only
iv A distance-vector routing protocol suited to WANs is BGP (Border Gateway Protocol) BGP is used by interior or border routers
v Fast convergence time, low network overhead, support for multiple protocols and supported exclusively by Cisco routers are all characteristics of EIGRP (Enhanced Interior Gateway Routing Protocol)

a only ii, iv and v
b. only iii and iv
c only i, ii and v
d only i and iii

Wide Area Networks

Question 21

From the list below, HOW MANY are fundamental properties that WANs (Wide Area Networks) and LANs (Local Area Networks) have in common

- Both are designed to enable communication between clients and hosts for resource sharing
- Both use the same protocols from Layer 3 and higher of the OSI model
- Both networks typically carry digitized data via message-switched networks
- Both networks are the same with regard to the extent to which the organization that uses the network is responsible for the network

a 1
b 2
c 3
d 4

Question 22

Which of the following statements regarding ISDN (Integrated Services Digital Network) channels and connections are INCORRECT?

i The B channel is the "bearer" channel, employing packet-switching techniques to carry voice, video, audio and other types of data over the ISDN connection.
ii The D channel is the "data" channel, employing packet switching techniques to carry information about the call, such as session initiation and termination signals, caller identity, call forwarding and conference calling signals
iii BRI (Basic Rate Interface) uses one B channel and two D channels, as indicated by the following notation B+2D
iv PRI (Primary Rate Interface) uses 23 B channels and two 64-Kbps D channels, as represented by the following notation 23B+2D

a i, ii and iii
b only iii and iv
c only i and ii
d. i, iii and iv

Question 23

You're troubleshooting a problem with a T1 connection between your business and the service provider's facility The T1 connection intermittently goes down When you call the service provider for assistance, they say that they will only engage one of their service technicians after you have verified that all of your customer premises equipment is in working order Given that requirement, which of the following do you not examine for faults?

a The CSU (Channel Service Unit)/DSU (Data Service Unit) interface card where the T1 terminates.
b The router that contains the CSU/DSU interface card
c The RJ (Registered Jack)-48 connectors in your smart jack
d The cable that enters the smart jack from outside your building

Question 24

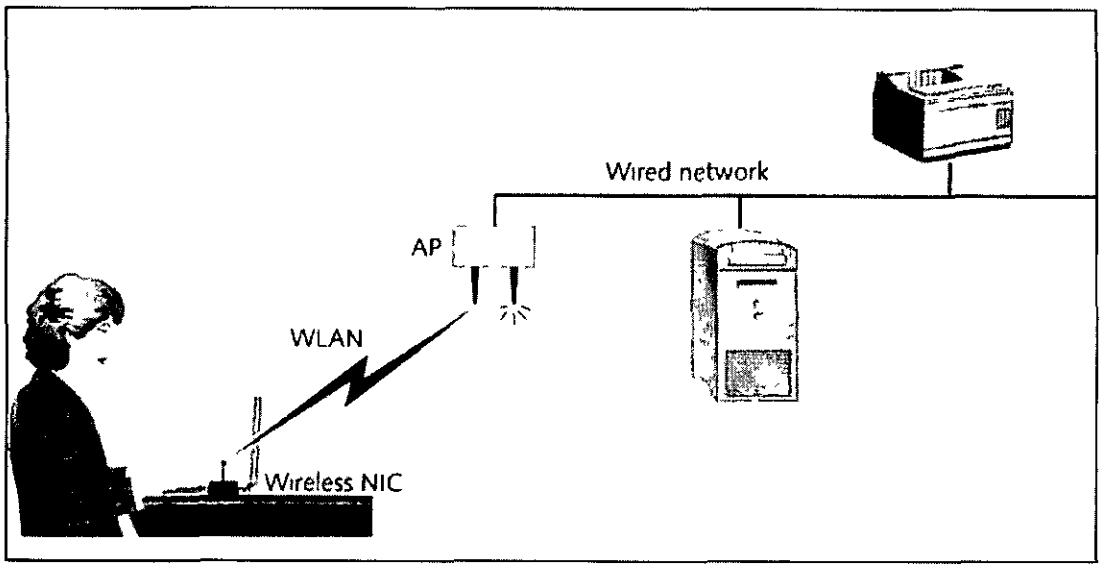
You work for an Internet service provider that wants to lease a T3 over a SONET (Synchronous Optical Network) ring What is the minimum OC (Optical Carrier) level that the SONET ring must have to support the bandwidth of a T3?

a. OC1
b OC3
c OC12
d OC24

Wireless Networking

Question 25

Which WLAN (Wireless Local Area Network) architecture is depicted in the following diagram?



a. Round robin
b. Interstitial
c Ad hoc
d Infrastructure

Question 26

When a wireless workstation is using passive scanning, how does it locate an available access point?

a It initiates a discovery process for the nearest access point
b It receives an identifying token from another workstation in range of an access point
c It receives a beacon signal from a nearby access point
d It receives a response from the nearest access point the first time it tries to transmit to the network

Question 27

Suppose your Windows workstation's wireless network adapter is configured to use the 802 11b wireless networking standard Also, suppose a café you visit has an 802 11g access point Assuming you have the correct SSID (Service Set Identifier) and logon credentials, what will happen when you attempt to associate with the café's wireless network?

a Your wireless networking client will be able to see the access point, but unable to associate with it
b Your wireless client will not be able to see the access point.
c Your wireless networking client will be able to see the access point and successfully associate with it
d Your wireless networking client will be able to see the access point and attempt to associate with it, but the incompatible frequencies will prevent successful authentication

Question 28

Your organization is expanding and you have plans to lease 3000 square feet of space in a nearby building Your supervisor asks you to conduct a site survey of the space If conducted properly, which of the following will your site survey reveal?

I The optimal quantity and locations of access points for the WLAN
II All potential sources of EMI (Electromagnetic Interference)
III The distance between each workgroup area and the telco room

a only I and II
b only III
c only II
d I, II and III

In-Depth TCP/IP Networking

Question 29

According to the classful addressing convention, the network information for the following IP address 217 89 12 4 would be _____

a 217 89 12
b 89 12 4
c 4
d 217 89

Question 30

According to the classful addressing convention, the host information for the following IP address 217 89 12.4 would be _____

a 217 89 12
b 89 12 4
c 4
d 217 89

Question 31

The following table illustrates ANDing What is the resulting bit?

IP address bit	1	1	0	0
Subnet mask bit	1	0	1	0
Resulting bit	?	?	?	?

a 0 1 0 0
b 1 0 0 0
c 0 1 0 1
d. 1 1 0 0

Question 32

SMTP (Simple Mail Transfer Protocol) is the protocol responsible for moving messages from one mail server to another over TCP/IP-based networks SMTP belongs to the _____layer of the OSI model and operates from port _____

a Network, 21
b Transport, 22
c. Data-link, 23
d Application, 25

Virtual Networks and Remote Access

Question 33

You have created a VM (Virtual Machine) on your workstation so that you can test some new applications You configured the VM's hard disk space to be dynamically allocated Which one of the following will allocate more space for the VM when it needs it?

a Virtual switch
b Virtual adapter
c. Hypervisor
d Virtual network manager

Question 34

You manage a data centre for a large ISP (Internet Service Provider) that hosts virtual Web and mail servers for many customers One of your physical servers has four NICs (Network Interface Cards) and hosts four mail servers How many vNICs (Virtual Network Interface Cards) can you assign to each of the mail servers?

a 1
b 2
c 4
d It depends on the virtualization software

Question 35

You have decided to set up a VPN (Virtual Private Network) between your home and your friend's home so that you can run a private digital telephone line over your DSL (Digital Subscriber Line) connections Each of you has purchased a small Cisco router for terminating the VPN endpoints. Which of the following protocols could you use to create a tunnel between these two routers?

a L2TP (Layer 2 Tunneling Protocol)
b PPTP (Point-to-Point Tunneling Protocol)
c PPP (Point-to-Point Protocol)
d SLIP (Serial Line Internet Protocol)

Network Security

Question 36

A security policy should

i Identify your security goals, risks, levels of authority, designated security coordinator and team members, responsibilities for each team member and responsibilities for each employee.
ii Specify how to address security breaches
iii State which hardware, software, architecture or protocols will be used to ensure security
iv Prescribe how hardware or software will be installed or configured

a only i and ii
b only ii and iii
c only i, iii and iv
d i, ii, iii and iv

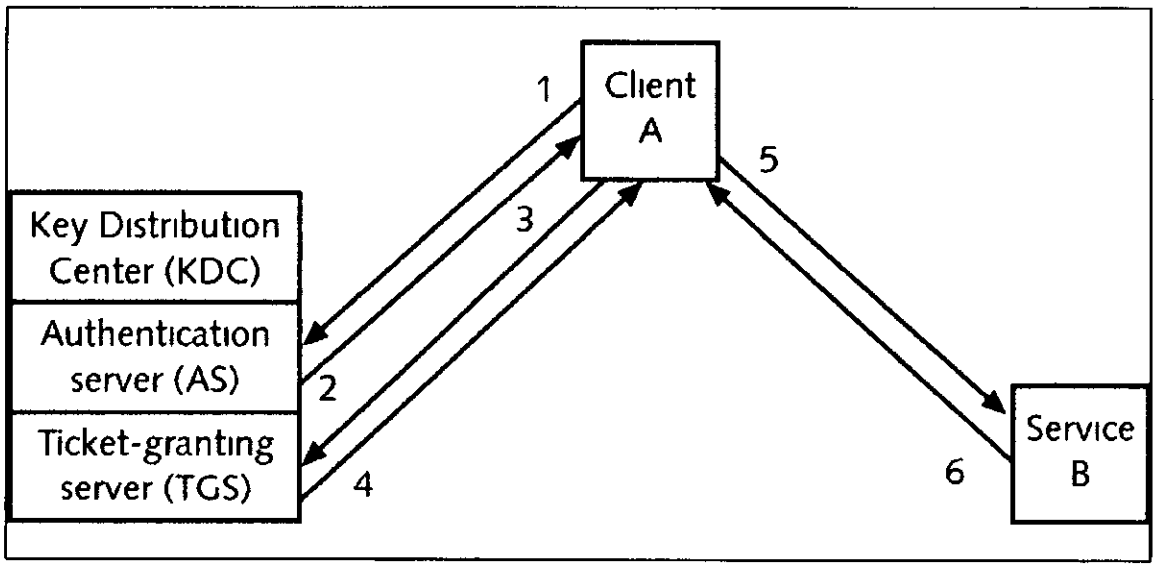
Question 37

Which one of the following is NOT an important factor when choosing a firewall?

a Does the firewall support user authentication?
b. Does the firewall detect and log suspicious activity?
c Does the firewall allow you to manage it centrally and through a standard interface?
d Does the firewall protect the identity of your internal LAN's addresses from the outside world?

Question 38

What does the following diagram illustrate?



a EAP (Extensible Authentication Protocol)
b The 802 1x standard
c The Kerberos authentication process
d The MS-CHAP (Microsoft Challenge Authentication Protocol)

Ensuring Integrity and Availability

Question 39

Which of the following TWO statements regarding malware are NOT TRUE?

i A virus may damage files or systems or annoy users by flashing messages or pictures on the screen
ii Macro viruses were the first type of virus to infect executable files.
iii. Network viruses propagate themselves via network protocols
iv Viruses do not alter other programs in the same way that other threats do, but they may carry worms

a i and ii
b ii and iii
c ii and iv
d iii and iv

Question 40

What is the DIFFERENCE between an incremental backup and a differential backup?
a. An incremental backup saves all the files on a disk, whereas a differential backup saves only the files that have changed since the previous backup
b An incremental backup unchecks the archive bit for every file saved, whereas a differential backup does not
c An incremental backup saves all files that have not been backed up since a defined date, whereas a differential backup saves all files whose archive bit is checked
d An incremental backup requires the network administrator to choose files which should be backed up, whereas a differential backup automatically saves files that have changed since the previous backup

ANSWER SECTION A IN THE GRID PROVIDED BELOW:
Fill in the correct option in the answer column e.g.

Question 1	a

Question Number	Answer	Question Number	Answer
Question 1		Question 21.	
Question 2		Question 22	
Question 3		Question 23	
Question 4.		Question 24	
Question 5		Question 25	
Question 6		Question 26	
Question 7		Question 27	
Question 8.		Question 28	
Question 9		Question 29	
Question 10		Question 30	
Question 11		Question 31	
Question 12		Question 32	
Question 13		Question 33	
Question 14		Question 34	
Question 15		Question 35	
Question 16		Question 36	
Question 17		Question 37	
Question 18		Question 38	
Question 19		Question 39	
Question 20.		Question 40	

SECTION B: SHORT QUESTIONS 40 MARKS
ANSWER THIS SECTION IN THE BLOCKS PROVIDED ON THIS PAPER

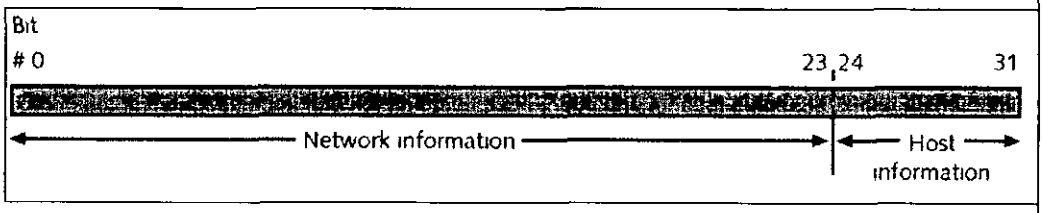
Question 1 **[3]**

Data transmission, whether analog or digital, may also be characterized by the direction in which the signals travel over the media.

1 1	In cases in which signals may travel in only one direction, the transmission is considered _____	[1]
1 2	In_____transmission, signals may travel in both directions over a medium but in only one direction at a time	[1]
1 3	When signals are free to travel in both directions over a medium simultaneously, the transmission is considered _____	[1]

Question 2 **[6]**

Complete the following questions regarding how IP Addresses are formatted and assigned

2 1	The following diagram depicts a Class _____IPv4 address 	[1]
2 2	The IP address 127 0 0 1 is called a _____	[1]

2 3	What are the default subnet masks in the following diagram?	[3]

Network class		Default subnet mask
A	1–126	A
B	128–191	B
C	192–223	C

A	
B	
C	

2 4	In IPV6, the abbreviated loopback address is _____	[1]

Question 3 **[4]**

Identify the common Ethernet standard

Standard	Maximum transmission speed (Mbps)	Maximum distance per segment	Physical media	
3 1	10	100	Cat 3 or better UTP	[1]
3 2	1000	100	Cat 5 or better UTP	[1]
3 3	1000	Up to 500, depending on modal bandwidth and fiber core diameter	MMF (multimode fiber)	[1]
3 4	10,000	40,000	SMF (single-mode fiber)	[1]

3.1	
3 2	
3 3	
3 4	

Question 4 **[4]**

Identify the CORRECT WAN topology in the table below

WAN TOPOLOGY	DESCRIPTION	
4 1	_____ WANs are the most fault-tolerant type of WAN because they provide multiple routes for data to follow between any two points	[1]
4 2	In a _____ topology WAN, each site depends on every other site in the network to transmit and receive its traffic	[1]
4 3	A _____ topology WAN cannot be taken down by the loss of one site, instead, if one site fails, data can be rerouted around the WAN in a different direction	[1]
4 4	An advantage of a _____ WAN is that when all of its dedicated circuits are functioning, it provides shorter data paths between any two sites	[1]

4 1	
4 2	
4 3	
4 4	

Question 5 **[10]**

The following questions pertain to wireless networking Match Column A with the correct term (Column B) Provide your answer by supplying only the option in the grid provided

5 1	Uses the 2 4–2 4835-GHz frequency range	a	mobile wireless	[1]
5 2	The locations of the transmitter and receiver do not move	b	fixed wireless	[1]
5 3	Uses channels in the 5-GHz band and provides a maximum theoretical throughput of 54 Mbps	c	access point	[1]
5 4	Accepts wireless signals from multiple nodes and retransmits them to the rest of the network	d	uplink	[1]
5 5	Represents the connection between a carrier's antenna and a client's transceiver	e	downlink	[1]
5 6	Uses the 2 4-GHz frequency band and provides a maximum theoretical throughput of 54 Mbps	f	802 11b	[1]
5 7	The receiver can be located anywhere within the transmitter's range	g	802 11a	[1]
5 8	Refers to the connection between a client's transceiver and the carrier's antenna	h	802 11g	[1]
5 9	Boasts a maximum throughput of 600 Mbps	i	802 11n	[1]
5 10	Maximum downlink throughput is 120 Mbps and the maximum uplink throughput is 60 Mbps	j	802 16m	[1]

5.1	
5 2	
5 3	
5.4	
5 5	
5 6	
5 7	
5 8	
5 9	
5 10	

Question 6 **[10]**

State whether the following statements regarding designing TCP/IP (Transmission Control Protocol/Internet Protocol) based networks are true or false If FALSE, correct the statement

6 1	The formula for determining how to modify a default subnet mask is $2^n - 2 = Y$ where n equals the number of bits in the subnet mask that must be switched from 0 to 1, and Y equals the number of subnets that result.	[1]
6 2	If you use subnetting on your LAN (Local Area Network), only your LAN's devices need to interpret your devices' subnetting information Routers external to your LAN, such as those on the Internet, pay attention to only the network portion of your devices' IP addresses when transmitting data to them	[1]
6 3	On private networks, hiding IP addresses allows network managers more flexibility in assigning addresses Clients behind a gateway may use any IP addressing scheme, regardless of whether it is recognized as legitimate by the Internet authorities	[1]
6 4	The route utility allows you to view a host's routing table On a UNIX or Linux system, type route print and then press Enter at the command prompt to view the routing table On a Windows-based system, type route and then press Enter. On a Cisco-brand router or another brand that uses Cisco command conventions type show ip route and press Enter	[3]
6 5	POP3's (Post Office Protocol, version 3) design makes it best suited to users who retrieve their mail from the same workstation all the time	[1]
6 6	IMAP4 (Internet Message Access Protocol) servers require less storage space and usually more processing resources than POP servers do	[2]

6 7	CIDR (Classless Interdomain Routing) notation takes the form of the network ID followed by a forward slash (/), followed by the number of bits that are used for the extended network prefix	[1]

Question 7 **[3]**

Identify the backup media from the definitions below

7 1	A type of media capable of storing digitized data and that uses a laser to write data to it and read data from it	[1]
7 2	A storage device that can be attached temporarily to a computer via its USB, PCMCIA, FireWire or CompactFlash port	[1]
7 3	This type of backup saves data across the Internet to another company's storage array	[1]