Network

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The Course Outline

Course Outline

- **Course Title:** Preparation course for FE examination
- **Intended Participants:** University Students who are going to take ITPEC examinations
- **Course Duration:** 60 hours

The Lecture Plan

Lecture Plan: Morning Exam, Sec 3-Technology Elements, Chapter 4-Network

Time	Learning Points/Keywords	Explanation Points	Method	Level	Note
10 minutes	Network architecture	Internet service provider, IDF (Intermediate Distribution Frame), Packet switched network	Verbal	Medium	
		Circuit switching network, Frame relay service	Explanation		
		ATM (Asynchronous Transfer Mode) service			
		Coaxial cable, Twisted pair cable, Optical fiber cable			
		Electromagnetic wave, Infrared ray, Wireless LAN access point			
		VoIP (Voice over Internet Protocol), Transfer rate, bps (bit per second: bit/second)			
		IPv4, IPv6, Address class			
		Global IP address, Private IP address, NAT (Network Address Translation)			
		Overlay network, DNS, Proxy server, Firewall			
20 minutes	Data communication	Point to point (Point-to-point connection), Tree topology, Bus topology, Star topology, Ring topology	Verbal	**High**	
	and control	Physical layer, Data link layer, Network layer, Transport layer, Session layer, Presentation layer, Application layer	Explanation		
		Simplex, Half duplex, Full duplex, Two-wire, Four-wire, Series, Parallel			
		WDM (Wavelength Division Multiplexing), Circuit switching, Packet switching, ATM switching			
		Frame relay, Cell relay, Public line, Leased line, Repeater, Hub, Cascade connection			
		Switching hub, Router, Digital service unit, Layer-2 (L2) switch, Layer-3 (L3) switch, Bridge			
		Gateway, Spanning tree, Data Link control, Routing control, Flow control, Basic mode data			
		transmission control procedure, Contention, Polling / Selecting, HDLC, Multilink procedure			
		Switching method, Connection method, Connection-less method, SYN synchronization, Flag synchronization			
		Frame synchronization, TDMA (Time Division Multiple Access), CSMA/CD, Token passing, Collision			

Lecture Plan: Morning Exam, Sec 3-Technology Elements, Chapter 4-Network

10 minutes	Communication protocols	Packet, Header, PPP, PPPoE (Point to Point Protocol over Ethernet)	Verbal Explanation	Medium
		IP address, Subnet address, Subnet mask, Physical address, Routing, Unicast, Broadcast, Multicast		
		ICMP (Internet Control Message Protocol), CIDR (Classless Inter Domain Routing)		
		TELNET, DHCP, IMAP, NTP, 10BASE-T, 100BASE-TX, 1000BASE-T, HDLC		
		IEEE 802.11a/b/g/n, CORBA, Distributed object technology		
10 minutes	Network management	Network configuration, Version, Information collection, Fault isolation, Fault cause identification, Recovery action	Verbal Explanation	Low
		Traffic monitoring, ping, ifconfig (ipconfig), arp, netstat, SNMP agent		
		SNMP management station, MIB (Management Information Base)		
10 minutes	Network application	SMTP, POP3, IMAP4, MIME, HTTP, CGI, cookie, URL, Upload, Download	Verbal Explanation	Medium
		Packet switching service, IP telephone, ADSL, FTTH, Mobile communication		

Objectives

4.1 Network architecture**

- Understand the definitions of LAN and WAN, their typical characteristics, and the typical services offered by telecommunications companies, and apply them to associated matters.
- Understand wired LAN and wireless LAN, mechanism of switching systems, and their typical characteristics, and apply them to associated matters.
- Understand the relation between line speed, data volume, and transfer time, and apply them to associated matters.

Keywords

4.1 Network architecture**

- Internet service provider, Metered rate, Flat monthly fee , IDF (Intermediate Distribution Frame), Packet switched network, Circuit switching network, Frame relay service , ATM (Asynchronous Transfer Mode) service , Coaxial cable, Twisted pair cable, Optical fiber cable, Electromagnetic wave, Infrared ray, Wireless LAN access point, Packet, VoIP (Voice over Internet Protocol), Transfer rate, bps (bit per second: bit/second), Circuit capacity, Bit error rate, Traffic intensity, Erlang, IPv4, IPv6, Address class , Global IP address, Private IP address, NAT (Network Address Translation), Overlay network, DNS, Proxy server, Firewall

Objectives

4.2 Data communication and control ***

- Understand the basic concept and configuration of network architecture, and apply them to associated matters.
- Understand the types and typical characteristics of transmission methods and lines, and apply them to associated matters.
- Understand the types and typical characteristics of devices for LAN to LAN connection, and apply them to associated matters.
- Understand the basic mechanism and characteristics of typical control functions in a network, and apply them to associated matters.

4.2 Data communication and control ***

- Point to point (Point-to-point connection), Tree topology, Bus topology, Star topology, Ring topology, Physical layer, Data link layer, Network layer, Transport layer, Session layer, Presentation layer, Application layer, Simplex, Half duplex, Full duplex, Two-wire, Four-wire, Series, Parallel, WDM (Wavelength Division Multiplexing), Circuit switching, Packet switching, ATM switching, Frame relay, Cell relay, Public line, Leased line, Repeater, Hub, Cascade connection, Switching hub, Router, Digital service unit, Layer-2 (L2) switch, Layer-3 (L3) switch, Bridge, Gateway, Spanning tree, Data Link control, Routing control, Flow control, Basic mode data transmission control procedure, Contention, Polling / Selecting, HDLC, Multilink procedure, Switching method, Connection method, Connection-less method, SYN synchronization, Flag synchronization , Frame synchronization, TDMA (Time Division Multiple Access), CSMA/CD, Token passing, Collision

Objectives

4.3 Communication protocols**

- Understand which layer of the OSI model is implemented by TCP/IP, which is one of the typical protocols, and apply it to associated matters.

4.3 Communication protocols**

- Packet, Header, PPP, PPPoE (Point to Point Protocol over Ethernet), IP address, Subnet address, Subnet mask, Physical address, Routing, Unicast, Broadcast, Multicast, ICMP (Internet Control Message Protocol), CIDR (Classless Inter Domain Routing), Port number, TELNET, DHCP, IMAP, NTP, 10BASE-T, 100BASE-TX, 1000BASE-T, HDLC, IEEE 802.11a/b/g/n, CORBA, Distributed object technology

Objectives

4.4 Network management

- Understand the outline of control items in network operations management.
- Understand the outline of tools and protocols for network management.

4.4 Network management

- Network configuration, Version, Information collection, Fault isolation, Fault cause identification, Recovery action, Record, Traffic monitoring, ping, ifconfig (ipconfig), arp, netstat, SNMP agent, SNMP management station, MIB (Management Information Base)

Objectives

4.5 Network application**

- Understand the mechanisms of the Web and e-mail used on the Internet, and apply them to associated matters.
- Understand the characteristics of an intranet and an extranet, and apply them to associated matters.
- Understand the characteristics of network OS, and apply them to associated matters.
- Understand the outline of typical communication services.

4.5 Network application**

- SMTP, POP3, IMAP4, MIME , HTTP, CGI, cookie, URL, Upload, Download Search engine (Full text search, Directory type, Robot type), VPN, PVC (Permanent Virtual Connection (or Circuit)) , EC (Electronic Commerce), EDI, NetWare, Leased line service, Circuit switching service, Packet switching service, IP telephone, ADSL, FTTH, Mobile communication, Satellite communication service, International communication services, Wide-area Ethernet, IP-VPN

Analyzation

Analyzation

- Analyzed 2 questions
- Covered the most recent years
  - 2021 Q1 Exam
  - 2021 Q2 Exam

Questions

Question 1

Q1.(q5-1) When a file of 10^6 bytes is transmitted by using a 64 kbps line, approximately how long (in seconds) does it take to transfer the file? Here, the line utilization rate is 80%.

a. 19.6
b. 100
c. 125
d. 157

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Theme: Networks, Category: FE

a. 19.6
b. 100
c. 125
d. 157

Question 2

Q2. (q5-2)Among the descriptions concerning devices that constitute a network, which of the following is an explanation concerning the CCU (Communication Control Unit)?

a. It converts the digital signals in a computer to a format that is suitable for transmission.

b. It dials the telephone number of the terminal in order to call the terminal.

c. It performs conversion from a digital signal to an analog signal, and vice versa.

d. It assembles or disassembles the data to be transmitted, or performs error control of the data.

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Question 3

Q3. (2021 A FE AM-q33) In TCP/IP, which of the following is an application layer protocol that enables a server to automatically configure its clients with network information such as IP addresses, the subnet mask, and the default gateway address?

a. ARP
b. DHCP
c. DNS
d. NSLOOKUP

Q3. (2021 A FE AM-q33) In TCP/IP, which of the following is an application layer protocol that enables a server to automatically configure its clients with network information such as IP addresses, the subnet mask, and the default gateway address?
Theme: Networks, Category: FE

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Question 4

Q4. (q3-32) In order to enable uninterrupted playback of 1.2-Mbyte audio data that is encoded at a speed of 64 Kbps while the data is downloaded through a network at a communication speed of 48 Kbps, at least how many seconds of data should be buffered before the playback is started?

a. 50
b. 150
c. 200
d. 350

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Theme: Networks, Category: FE

a. 50
b. 150
c. 200
d. 350

Question 4: Answer Explanation

As encoding speed and communication speed are represented in bits while size of audio data is represented in bytes, the conversion of everything in units of bytes gives the encoding speed of 8 KBps and a communication speed of 6 KBps. The time required for encoding 1.2 Mbytes of audio data is 1.2 Mbytes $\div$ 8 KBps $=$ 150 seconds. On the other hand, the time required for downloading is 1.2 Mbytes $\div$ 6 KBps $=$ 200 seconds. Therefore, it is clear that the downloading time is 50 seconds longer than the encoding time. For playing back uninterruptedly, it is necessary to simultaneously complete downloading and encoding. For simultaneously completing both of these, 50 seconds of data buffering is required before the playback is started. Therefore, a) is the correct answer.

Question 5

Q5. (q3-33) When data is sent at the transmission rate of 2,400 bps on a transmission line with a bit error ratio of $1/600,000$, every how many seconds on average does a single bit error occurs?

a. 250
b. 2,400
c. 20,000
d. 600,000

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a. 250
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c. 20,000
d. 600,000

Question 5: Answer Explanation

A bit error ratio of 1/600,000 means that an error of one bit occurs in 600,000 bits. A transmission speed of 2,400 bps means that 2,400 bits are transmitted in one second. Therefore, the number of seconds required for transmitting 600,000 bits should be calculated. The required time is 600,000 (bits) $\div$ 2,400 (bits/second) $=$ 250 (seconds).
Therefore, a) is the correct answer.

Question 6

Q6. (q3-34) Which of the following is the role to be played by a DNS server in a TCP/IP network?

a. Making it possible to call a program running on a server by simply specifying the program name without being aware of the physical location of the server

b. Making it possible to convert an internal private IP address into a global IP address and to access the Internet

c. Making it possible to map a domain name or a host name to an IP address

d. Making it possible to assign an IP address from a pool of registered IP addresses on server that are not currently in use, in response to a PC's request for the assignment of an IP address.

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Question 7

Q7. (q3-35) Which of the following is the appropriate explanation of the NAT function of a router that is used in an Internet connection?

a. NAT is a function that caches access to the Internet so that when a Web site with the same IP address is accessed again, the Web site can be quickly displayed.

b. NAT is a function for detecting a specific bit pattern from IP packets that are being transmitted.

c. NAT is a function that allows only IP packets addressed to a specific terminal to pass through.

d. NAT is a function that converts a private IP address to a global IP address and vice versa.

Q7. (q3-35) Which of the following is the appropriate explanation of the NAT function of a router that is used in an Internet connection?
Theme: Networks, Category: FE, TextBook: page no. 337

a. NAT is a function that caches access to the Internet so that when a Web site with the same IP address is accessed again, the Web site can be quickly displayed.
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c. NAT is a function that allows only IP packets addressed to a specific terminal to pass through.
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Question 8

Q8. (q3-36) Which of the following is the appropriate characteristic of a 10-Mbps LAN that uses CSMA/CD?

a. When collision between transmission frames occurs, the sending terminals suspend the transmission and resend them after a random period of waiting.

b. When multiple terminals simultaneously send data, time-division multiplexing of the transmission path takes place, and therefore a transmission rate of 10 Mbps cannot be guaranteed.

c. In order for a terminal to obtain data transmission rights, it is necessary to acquire a token.

d. As a time slot is defined for each terminal, it is necessary to send data at that timing.

Q8. (q3-36) Which of the following is the appropriate characteristic of a 10-Mbps LAN that uses CSMA/CD?
Theme: Networks, Category: FE, TextBook: page no. 328

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d. As a time slot is defined for each terminal, it is necessary to send data at that timing.

Question 8: Answer Explanation

The access control method in CSMA/CD (Carrier Sense Multiple Access with Collision Detection) detects that the carrier is not passing through the transmission path, and then each node starts sending data frames. At this time, if multiple nodes simultaneously send frames, data may collide. The node that detects the occurrence of collision immediately stops sending frames and sends out a jam signal. After a random period of waiting (called back-off time), it is checked whether the carrier is passing through the transmission path, and if the carrier is not passing through, transmission of frames becomes possible.
Therefore, a) is the correct answer.

Question 9

Q9. (q3-37) Which of the following is a device that interconnects LANs at the physical layer of the OSI basic reference model?

a. Gateway
b. Bridge
c. Repeater
d. Router

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Theme: Networks, Category: FE, TextBook- page no. 330

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Question 9: Answer Explanation

When LANs are interconnected, there are predefined devices according to the connection function. For interconnecting LANs at the physical layer (Layer 1) of the OSI basic reference model, c) Repeater is used.
a) Gateway – A device that supports all protocol conversion functions from Layer 4 and above up to Layer 7.
b) Bridge – A device that establishes an interconnection at the data link layer (Layer 2).
d) Router – A device that establishes an interconnection at the network layer (Layer 3).

Question 10

Q10. (q3-38) Which of the following is an appropriate description concerning inter-LAN connection devices?

a. A gateway converts protocols in only Layers 1 to 3 of the OSI basic reference model.

b. A bridge relays frames based on an IP address.

c. A repeater extends the transmission distance by amplifying signals between the same types of segments.

d. A router relays frames based on a MAC address.

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d. A router relays frames based on a MAC address.

Question 10: Answer Explanation

By connecting two LANs, it is possible to create another LAN that has even wider coverage. In this case, the required devices differ depending on the function level of the layer of the OSI basic reference model where the connection is established. A repeater establishes a connection between segments at the physical layer. The signal is amplified at the bit level, and no specific data identification is done. It merely extends the transmission path. Therefore, c) is the appropriate answer.

a) A gateway establishes an interconnection between networks that have different protocols in Layer 4 through Layer 7.

b) A bridge uses the address (MAC number; Media Access Control number) used by the data link layer (Layer 2) to determine whether that packet should be allowed to pass or not (filtering), and enables regenerative relaying.

d) A router sets the relaying path for data (routing) in Layer 3 based on the IP address.

Question 11

Q11. (q3-39) Which of the following is the specification that is not present in IPv4, but is added or changed in IPv6?

a. 128 bits are allocated as address space.

b. A subnet mask is implemented for the effective use of address space.

c. An IP address is represented with the pair of network address and subnet mask.

d. A private address is implemented for the effective use of limited IP addressed.

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Question 12

Q12. (q3-40) When the IP address of a communicating party is known but the MAC address is not known, which of the following is a method that is used for obtaining the MAC address?

a. ARP
b. DHCP
c. ICMP
d. NAT

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Theme: Networks, Category: FE

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c. ICMP
d. NAT

Question 12: Answer Explanation

A protocol for obtaining MAC addresses from IP addresses is the ARP (Address Resolution Protocol) stated in a). In ARP, the host that wants to get a MAC address sends an ARP request packets containing its known IP address to be inquired to the entire LAN. Every host that receives this ARP request determines whether it is meant for its own IP address, and the host where the APR request matches with the host's IP address returns the ARP response packet containing the MAC address. The MAC address obtained by APR is cached for some time; however, old information is automatically deleted. In addition, the protocol used for obtaining an IP address from its known MAC address is RARP (Reverse ARP).

b) DHCP (Dynamic Host Configuration Protocol) is a protocol for automatically allocating an IP address when the client is started.

c) ICMP (Internet Control Message Protocol) is a protocol for determining and providing notification of failures such as an IP packet not reaching its destination.

d) NAT (Network Address Translation) is a technique for one-to-one inter-conversion of private IP addresses and global IP addresses.

Question 13

Q13. (q3-41) When the IP address and subnet mask of a PC are as shown below, which of the following is the appropriate network address of this PC?

IP address: 200.170.70.19
Subnet mask: 255.255.255.240

a. 200.170.70.0
b. 200.170.70.16
c. 200.170.70.31
d. 200.170.70.255

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Subnet mask: 255.255.255.240
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a. 200.170.70.0
b. 200.170.70.16
c. 200.170.70.31
d. 200.170.70.255

Question 13: Answer Explanation

In an IP address, the section of digit 1 in the subnet mask is the network part, and the section of digit 0 is the host part. Writing the subnet mask of "255.255.255.240" in binary number gives the following:
IP address———–11001000 10101010 01000110 00010011
Subnet mask——–11111111 11111111 11111111 11110000
Network address–11001000 10101010 01000110 00010000
An AND operation on an IP address and a subnet mask gives a network address, which in this case is 200.170.70.16. Therefore b) is the correct answer. In addition, in the case of this subnet mask, only the last eight bits are required to be calculated.

Question 14

Q14. (q3-42) Which of the following is the address class of the IP address 192.168.10.10?

a. Class A
b. Class B
c. Class C
d. Class D

Q14. (q3-42) Which of the following is the address class of the IP address 192.168.10.10?

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a. Class A
b. Class B
c. Class C
d. Class D

Question 14: Answer Explanation

- By looking at the bit pattern of the first three bits in an IP address, it is possible to identify the class.
- An IP address where the first three bits are 000 is Class A, 100 is Class B, 110 is Class C, and 111 is Class D.
- Class D IP addresses are also called multicast addresses, and they are specially used for simultaneous communication between specific participants only.
- Based on the aforementioned bit patterns, the first three bits of the IP address starting with 192 are 110, which is Class C. Therefore, c) is the correct answer.

Question 15

Q15. (q3-43) When a network is constructed in a TCP/IP environment, an increase in the number of clients makes the management of IP addresses cumbersome. Which of the following is a protocol that dynamically assigns IP addresses in response to requests from clients in order to efficiently manage the IP addresses?

a. DHCP
b. HTTP
c. LDAP
d. SNMP

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b. HTTP
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Question 16

Q16. (q3-44) Which of the following is the upper-layer protocol of IP that achieves connectionless datagram communication without having the functions of acknowledgment and sequence control for reliability?

a. ICMP
b. PPP
c. TCP
d. UDP

Q16. (q3-44) Which of the following is the upper-layer protocol of IP that achieves connectionless datagram communication without having the functions of acknowledgment and sequence control for reliability?
Theme: Networks, Category: FE

a. ICMP
b. PPP
c. TCP
d. UDP

Question 17

Q17. (q3-45) Among the protocols used in a TCP/IP environment, which of the following is a network management protocol that is used for collecting information about constituent devices and for obtaining information at the time of a failure?

a. NNTP
b. NTP
c. SMTP
d. SNMP

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a. NNTP
b. NTP
c. SMTP
d. SNMP

Question 17: Answer Explanation

The network management protocol used in the TCP/IP environment is d) SNMP (Simple Network Management Protocol).
Information about the failure of devices connected to the network and about the connection can be tracked, and the load on each device can be monitored based on the amount of data sent and received.
a) NNTP (Network News Transfer Protocol)
b) NTP (Network Time Protocol)
c) SMTP (Simple Mail Transfer Protocol)

Question 18

Q18. (q3-46) Which of the following is the technology that is used for establishing a network connection between remote communication sites through a public network (e.g. the Internet) as if a leased line were virtually used?

a. IP-VPN
b. IPv6
c. PBX
d. VoIP

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Theme: Networks, Category: FE

a. IP-VPN
b. IPv6
c. PBX
d. VoIP

Question 18: Answer Explanation

VPN (Virtual Private Network) is a technology that uses authentication technology and encryption technology so that a public line can be used like a virtual dedicated line. Originally, it was technology for using telephone lines, but as Internet connections became commonly available IP-VPN was designed for usage on the Internet, which is a public network. Its advantage is the cost reduction compared to actually building a dedicated line. Therefore, a) is the correct answer.

Question 19

Q19. (q3-47) Which of the following is a mechanism that stores user information and other data in a browser according to instructions from a Web server so that the Web server can identify the PC from which the server is accessed?

a. CGI
b. Cookie
c. SSL
d. URL

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Theme: Networks, Category: FE

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Question 19: Answer Explanation

The HTTP protocol basically releases a session in a one-time data transaction. Therefore, with the information specified, it is difficult to quickly change the contents of the next webpage. In order to solve this, the Web server transfers the data for user identification to the browser, and by presenting this data to the Web server when the browser accesses the Web server again, the Web server identifies that access is from the same user and can provide a series of services. The mechanism that enables this process is b) Cookie.

Question 19: Answer Explanation

a) CGI (Common Gateway Interface) is an interface that runs a program (CGI program) prepared on the Web server based on the browser's request, and transfers the results to the browser. While a normal webpage is a static file, dynamically created webpages can be delivered with CGI.
c) SSL (Secure Sockets Layer) provides safe communication that is encrypted. It allows the exchange of private or money-related information on the Internet without allowing another person to access this information.
d) URL (Uniform Resource Locator) is a description method for indicating the location of information resources on the Internet, and it consists of protocol name, domain name, and file path.

Question 20

Q20. (q3-48) Which of the following is an appropriate description of SMTP?

a. SMTP is a protocol for accessing information stored on a Web server.
b. SMTP is a system for creating and editing electronic documents that contain a combination of characters, diagrams, and images.
c. SMTP is a protocol for forwarding e-mails.
d. SMTP is one of the document description languages for structural representation of documents.

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Question 21

Q21. (q3-49) Which of the following is the appropriate explanation of a splitter in ADSL?

a. It refers to the interface between the premises wiring and the router.
b. It is a device that separates and combines high-frequency data signals and low-frequency audio signals.
c. It is ADSL transmission equipment installed in a telephone exchange.
d. It is a function that corrects errors produced by noise.

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d. It is a function that corrects errors produced by noise.

Question 21: Answer Explanation

A splitter is a device that separates and combines an audio signal and data signal in a high speed digital communication service such as ADSL that uses subscriber phone lines (copper lines). It is installed at the both ends of a telephone line (switching center and telephone subscriber). In ADSL, as audio signals and data signals pass through the same line, noise is mixed and this slows down the transfer rate. Therefore, by using a splitter, incoming signals are separated into signals for telephone equipment and signals for an ADSL modem. On the other hand, a splitter combines outgoing signals and passes them through the telephone lines. Therefore, the answer is b).

a) A splitter is connected to a telephone line.

c), d) As described earlier, the only function of splitter is the separation and combination of signals. It is not the ADSL transmission device, and it does not have any error correction functions.

Question 22

Q22. (2021 S FE AM-q30) Which of the following is the response time when a client and server at different locations communicate under the conditions below? Here, the response time is in seconds and starts from the moment the client sends a message until a response is received from the server. 1 MB is 10^6 bytes. The propagation delay between the client and server can be ignored.

Line speed between client and server	8 Mbit/s
Transmission efficiency	60%
Message size	1 MB for upstreaming and 2 MB for downstreaming
Processing time at client side	Total of 0.4 s for sending and receiving
Processing time at server side	Total of 0.4 s for sending and receiving

a. 1.4

b. 3.8

c. 5.0

d. 5.8

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Theme: Networks, Category: FE

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b. 3.8

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d. 5.8

Question 23

Q23. (2021 S FE AM-q31) Which of the following is an appropriate transmission operation of a node connected to a CSMA/CD LAN?

a. All nodes are connected in a ring topology, where a special frame is circulated around to control transmission rights. Only the node that has the special frame can transmit data.

b. Each node is logically ordered, a transmission right is passed along in order, and only the node that has received the right can transmit data.

c. Each node waits for the medium to be idle before transmitting data. When collision occurs, it waits for a random backoff time before retransmission.

d. Only the node that has a time slot assigned can transmit data.

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Question 24

Q24. (2021 S FE AM-q32) In a TCP/IP environment, which of the following is a protocol for synchronizing the clocks of multiple computers with that of a time server?

a. FTP
b. NNTP
c. NTP
d. RTP

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b. NNTP
c. NTP (Network Time Protocol)
d. RTP

Question 25

Q25. (2021 S FE AM-q33) Which of the following is an appropriate explanation of DHCP?

a. It is a protocol for accessing a directory service.
b. It is a protocol for automatically assigning an IP address.
c. It is a protocol for converting a private IP address to a global IP address.
d. It is a protocol for forwarding an e-mail.

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Question 26

Q26. (2021 A FE AM-q30) In the OSI basic reference model, which of the following is a network device that operates at the network layer?

a. Access point
b. Bridge
c. Repeater
d. Router

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Question 27

Q27. (2021 A FE AM-q31) Which of the following is a mechanism that enables multiple terminals to have private addresses different from each other to connect to the Internet by sharing a single global IP address?

a. DHCP
b. DNS
c. NAPT
d. RADIUS

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b. DNS
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d. RADIUS

Question 27: Answer Explanation

Network address port translation (NAPT) is a technique in which port numbers and private Internet Protocol (IP) addresses are mapped from multiple internal hosts to one public IP address.
It is a type of network address translation (NAT) technology that extends capabilities by translating and mapping port numbers, in addition to the IP address, when communicating with an external network.

RADIUS is a protocol for carrying authentication, authorization, and configuration information between a Network Access Server which desires to authenticate its links and a shared Authentication Server. RADIUS stands for Remote Authentication Dial In User Service.

Question 28

Q28. (2021 A FE AM-q32) Which of the following is a data link layer function that enables a receiver to control the amount of data a sender transmits?

a. Congestion control
b. Error control
c. Flow control
d. Media access control

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a. Congestion control
b. Error control
c. Flow control
d. Media access control

Question 28: Answer Explanation

Data Link Layer functions:

- Line Discipline: Who should send now?
- Flow Control: How much data may be sent?
- Error Control: How can errors be detected and corrected?

Any Questions?

References

 IT Fundamentals (New FE Textbook Vol. 1)