**Mook 1**

**Week1**

**A/**

**1.**

Question 1

Which of the following networks use store-and-forward switching operation?

**2 / 2 points**



Telegraph networks

**Correct**

Correct. uses store and forward switching operation



Telephone networks



Computer networks

**Correct**

Correct. uses store and forward switching operation



Wireless Networks

**2.**

Question 2

There are similarities between message switching and packet switching. Which of following that applies to packet switching but not to message switching?

**2 / 2 points**



Variable length of information block



Supporting multiple applications



Store-and-forward



All of the above

**Correct**

Correct. only applies to packet switching as message switching can only support an application at any point in time

**3.**

Question 3

Which of the following networks can be connection-oriented?

**2 / 2 points**



Telegraph networks



Computer networks

**Correct**

Correct. requires a setup phase in each involved node before any packet is transferred to establish the parameters of communication (Computer Network Evolution Lecture)



Telephone networks

**Correct**

Correct. Requires a setup phase before calls can be place (Computer Network Evolution Lecture)



All of the above

**4.**

Question 4

A *protocol* is a set of precise and unambiguous rules that governs

**2 / 2 points**



How two or more communicating entities in a layer are to interact



*Messages* that can be sent and received



*Actions* that are to be taken when a certain event occurs



All of the above

**Correct**

Correct. Refer to "Examples of Protocol and Services" Lecture

**5.**

Question 5

DNS is a domain-name-service that responds to queries of domain name to IP address or IP address to domain name. DNS uses services provided by

**2 / 2 points**



TCP



UDP



HTTP



None of the above

**Correct**

Correct. Primarily uses UDP on port 53 to serve requests i.e a single UDP request from the client followed by a single UDP reply from the server

**6.**

Question 6

A network used to join the individual networks at different sites into one extended network is called

**1 / 1 point**



PAN



LAN



SAN



VPN

**Correct**

Virtual Private Network - refer to page 4 of computer networks (Tanenbaum and Wetherall)

**7.**

Question 7

Upon receipt of a bad segment, UDP?

**1 / 1 point**



It does not do flow and error control



Retransmission



It does error control



It does flow control

**Correct**

Correct. Not characteristics of UDP

B/

**1.**

Question 1

Which of following protocol is HTTP built upon?

**2 / 2 points**



SMTP



TCP



IP



UDP

**Correct**

Correct. In HTTP, client initiates an HTTP session by opening a TCP connection to the HTTP server with which it wishes to communicate

**2.**

Question 2

Which of following requirements are necessary for packet networks to support multiple and diverse applications?

**2 / 2 points**



Transfer arbitrary message size



Low delay for interactive applications



Packets have maximum length



All of the above

**Correct**

Correct. Refer to lecture on "Computer Network Evolution"

**3.**

Question 3

What was the concern of the telephone system that motivated the ARPANET design?

**2 / 2 points**



Scalability



Vulnerability



Efficiency



None of the above

**Correct**

Correct. Refer to lecture on "Computer Network Evolution"

**4.**

Question 4

Which of the following is an application layer protocol?

**2 / 2 points**



DNS



UDP



HTTP



TCP

**Correct**

Correct. HTTP is used to send and receive data over the network - application layer

**5.**

Question 5

Which of the following are features of ARPANET design?

**2 / 2 points**



Connectionless packet transmission



Routing tables at the packet switches



Destinations identified by unique addresses



All of the above

**Correct**

Correct. Refer to lecture on "Computer Network Evolution"

**6.**

Question 6

Bluetooth is an example of

**1 / 1 point**



Metropolitan Area Network



Personal Area Network



Wide Area Network



Local Area Network

**Correct**

Correct. Refer to page 18 of "Computer Networks by Tanenbaum and Wetherall" 5th Edition

**7.**

Question 7

In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are

**1 / 1 point**



Added



Rearranged



Modified



Removed

**Correct**

Correct. Every layer adds its own header to the packet from previous layer

**8.**

Question 8

The \_\_\_\_\_\_\_\_ is the physical path over which a message travels

**1 / 1 point**



Medium



Path



Route



Protocol

**Correct**

Correct. Message travel from sender to receiver through a medium using protocol

**9.**

Question 9

Three or more devices share a link in \_\_\_\_\_\_\_\_ connection

**1 / 1 point**



Unipoint



Multipoint



Point to Point



None of the above

**Correct**

Correct. a communication channel between two or more clients of the network

**10.**

Question 10

Which of the following is true for Transport Control Protocol

**1 / 1 point**



Connection oriented



Process to Process



Transport layer protocol



Connectionless

**Correct**

Correct. Refer to lecture slides

**Week2**

**A/**

**1.**

Question 1

Which OSI layer is responsible for providing end-to-end communication with reliable service?

**2 / 2 points**



Session layer



Transport layer



Data link layer



Network layer

**Correct**

Correct. The transport layer is concerned with providing reliable service on an end-to-end basis across the network.

**2.**

Question 2

Which OSI layer is responsible for dividing the transmitted bit stream into frames?

**2 / 2 points**



Application layer



Transport layer



Data link layer



Network layer

**Correct**

Correct. The data link layer provides for the reliable transfer of information (frames) between adjacent nodes in a network

**3.**

Question 3

Which OSI layer is responsible for determining which route through the network to use?

**2 / 2 points**



Network layer



Data link layer



Transport layer



None of the above

**Correct**

Correct. The network layer is concerned with the selection of route across the network.

**4.**

Question 4

Which feature does the data link layer and transport layer have in common?

**2 / 2 points**



Medium access control



Congestion control



Flow control



All of the above

**Correct**

Correct. Both layers can provide flow control

**5.**

Question 5

Which protocol glues the network of networks together as the Internet?

**2 / 2 points**



TCP



UDP



IP



None of the above

**Correct**

The Internet Protocol (IP) is the glue that holds together modern computer networks. IP specifies the way that messages are sent from computer to computer; it essentially defines a common "language" that is spoken by every computer stationed on the Internet.

**B/**

**1.**

Question 1

In a LAN, which address is used to transfer frames to appropriate destination?

**2 / 2 points**



IP address



Physical address



Domain name



None of the above

**Correct**

Correct. Physical address (also known as MAC address) is expected to uniquely identify each node on a segment and allows frames to be marked for specific hosts.

**2.**

Question 2

Suppose an application layer entity wants to send an L-byte message to its peer process, using an existing TCP connection. The TCP segment consists of the message plus 20 bytes of header. The segment is encapsulated into an IP packet that has an additional 20 bytes of header. The IP packet in turn goes inside an Ethernet frame that has 18 bytes of header and trailer. What is the bandwidth utilization in terms of the percentage of the transmitted bits in the physical layer corresponds to message information if L = 500 bytes?

**2 / 2 points**



100%



70%



80%



90%

**Correct**

Correct. Since message overhead includes - TCP: 20 bytes of header, IP: 20 bytes of header, and Ethernet: total 18 bytes of header and trailer. Therefore, the total message overhead is 58 bytes. 500/(500+58) = 90% (approx.)

**3.**

Question 3

Of the following services, which service(s) does the IP layer provides?

**2 / 2 points**



Error control



Flow control



Connection-based data transfer



None of the above

**Correct**

Correct. Services provided by IP layer are addressing, fragmenting, packet timeouts

**4.**

Question 4

Which of the following is true about the ways in which the OSI reference model and TCP/IP reference model differ.

**2 / 2 points**



They differ in the number of layers



All of the above



TCP/IP model does not have presentation layer, but OSI model has



TCP/IP model does not have session layer, but OSI model has

**Correct**

Correct. All the other options are true about the ways in which the OSI model differs from TCP/IP model

**5.**

Question 5

Which of following statements is true about how the data link layer and transport layer differ?

**2 / 2 points**



Data link layer is concerned with framing and the transport layer is not



Data link layer is concerned with flow control and the transport layer is not



Data link layer is concerned with multiplexing and the transport layer is not



All of the above

**Correct**

Correct. Transport layer is not concerned with framing rather it uses segment for TCP and datagram for UDP.

**6.**

Question 6

This layer is an addition to OSI model

**0 / 1 point**



Application layer



Presentation layer



Session layer



Presentation layer and Session layer

**Incorrect**

Incorrect. Addition of both presentation and session layer

**7.**

Question 7

The functionalities of presentation layer includes

**1 / 1 point**



Data compression



Data encryption



Data decryption



All of the above

**Correct**

Correct. All of the mentioned are functionalities of presentation layer "page 45 of Computer Networks by Tanenbaum and Wetherall" 5th Edition

**Week3**

**A/**

**1.**

Question 1

Which of the following applications would you select TCP protocol for?

**2 / 2 points**



None of the above



Web browsing

**Correct**

Correct. Refer to the two lectures on Berkeley Socket API



File transfer

**Correct**

Correct. Refer to the two lectures on Berkeley Socket API



Domain name service

**2.**

Question 2

In BSD socket API, which *type* of socket is used to create a TCP socket?

**2 / 2 points**



SOCK\_STREAM



SOCK\_RAW



SOCK\_DGRAM



None of the above

**Correct**

Correct. reliable stream-oriented service (TCP)

**3.**

Question 3

In BSD socket API, which *type* of socket is used to create a UDP socket?

**2 / 2 points**



SOCK\_STREAM



SOCK\_DGRAM



SOCK\_RAW



None of the above

**Correct**

Correct. used for datagram service

**4.**

Question 4

In BSD socket API, which system call is used to assign a network address to the socket?

**2 / 2 points**



None of the above



listen()



connect()



bind()

**Correct**

Correct. it associates a socket with a socket address structure, i.e. a specified local port number and IP address.

**5.**

Question 5

In BSD socket API, if a client knows the server name but not server’s network address, what system call should the client use to get server’s network address?

**1 / 1 point**



None of the above



Connect()



gettimeofday()



gethostbyname()

**Correct**

Correct. Refer to Berkeley Socket API - II

**6.**

Question 6

In a transmission system, which of the following statement is true for a receiver

**1 / 1 point**



Receives energy from medium

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture



Converts information into signal suitable for transmission



Converts received signal into a form suitable for delivery to user

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture



All of the above

**7.**

Question 7

In digital transmission, long distance digital communications require the use of a generator to recover original data sequence and re-transmits on next segment

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

**8.**

Question 8

In twisted pair, a category 5 UTP cable can support a data rate of up to 16MHz

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

**9.**

Question 9

Which of the following statement is true for optical fiber

**1 / 1 point**



Plentiful bandwidth for new services



Dominates long distance transmission



Distance less of a cost factor in communications



All of the above

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

**10.**

Question 10

Which of the following are advantages of optical fiber

**1 / 1 point**



No corrosion

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture



Wavelength dependency



Noise immunity

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture



Extremely low bandwidth

**B/**

**1.**

Question 1

In BSD socket API, which call is usually used for transmitting data in the connectionless mode?

**1 / 1 point**



accept()



connect()



sendto()



None of the above

**Correct**

Correct. Refer to Berkeley Sockets API - I lecture

**2.**

Question 2

Which of following statement about TCP/UDP sockets is wrong?

**0 / 1 point**



TCP socket is stream oriented



UDP socket is block oriented



TCP is faster than UDP



All of the above

**Incorrect**

Incorrect. Refer to Berkeley Sockets API - I lecture . Correct TCP is faster than UDP

**3.**

Question 3

Which of following are commonly used as digital communication medium?

**1 / 1 point**



Optical fiber



Coaxial cable



Twisted pair



All of the above

**Correct**

Some of the commonly used physical transmission media are twisted copper cable, good quality coaxial cable and radio frequency bands.

**4.**

Question 4

Consider a network link that has distance of 100 meters, and signal traverses at the speed of light in cable 2.5 x 10^8 meters per second. The link has transmission bandwidth of 100 megabits/second (100 x 10^6 bits per second). The packet size is 400 bits. What is the signal propagation delay?

**1 / 1 point**



None of the above



4 x 10^-7 seconds



4 x 10^-6 seconds



4 x 10^-9 seconds

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

**5.**

Question 5

Consider a network link that has distance of 100 meters, and signal traverses at the speed of light in cable 2.5 x 10^8 meters per second. The link has transmission bandwidth of 100 megabits/second (100 x 10^6 bits per second). The packet size is 400 bits. What is the packet transmission delay?

**1 / 1 point**



None of the above



4 x 10^-6 seconds



4 x 10^-9 seconds



4 x 10^-7 seconds

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

**6.**

Question 6

An API allows application programs to access certain resources through a predefined interface?

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Berkeley Sockets API - I lecture

**7.**

Question 7

In transport protocol, which of the following statements is true for User Datagram Protocol

**1 / 1 point**



It enables best-effort connectionless transfer of individual block of information



It enables connection-oriented reliable transfer of individual block of information



It enables best-effort connectionless reliable transfer of a stream of bytes



None of the above

**Correct**

Correct. Refer to Berkeley Sockets API - I lecture

**8.**

Question 8

Which of the following sentences are true for connectionless stream mode of service

**1 / 1 point**



Multiple write/read between peer processes



Destination address with each block

**Correct**

Correct. Refer to Berkeley Sockets API - I lecture



No setup overhead and delay

**Correct**

Correct. Refer to Berkeley Sockets API - I lecture



Send/receive to/from multiple peer processes

**Correct**

Correct. Refer to Berkeley Sockets API - I lecture

**9.**

Question 9

In transmission delay, in order to reduce the number of bits in a message we use data compression

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

**10.**

Question 10

Which of the following is true of data compression algorithms

**1 / 1 point**



Modify data headers



Recover information approximately

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture



Recover original information exactly

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture



Represent the information using fewer bits

**Correct**

Correct. Refer to Digital Transmission Fundamentals lecture

### Week4

### A/

### 1.

Question 1

Given a 7-bit information frame (0, 1, 0, 1, 1, 0, 1), what is the even parity bit?

**2 / 2 points**



1



0



None of the above

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### 2.

Question 2

Which of following statements are true for single-bit parity error detection?

**2 / 2 points**



It can detect all single bit errors in an information frame

**Correct**

Correct. Refer to Error Control - Parity Checks lecture



It can detect all double bit errors in an information frame



It can detect all tripe bit errors in an information frame

**Correct**

Correct. Refer to Error Control - Parity Checks lecture



None of the above

### 3.

Question 3

Which of following statements are true for two-dimensional parity error detection?

**2 / 2 points**



It can detect all single bit errors in an information frame



It can correct all single bit errors in an information frame



It can detect all double bit errors in an information frame



All of the above

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### 4.

Question 4

Assume bit errors occur at random. If each bit has 50% probability to be in error by transmission. What is the probability of a four-bit frame to be in error by transmission?

**2 / 2 points**



1/4



1/8



1/16



None of the above

**Correct**

Correct. (1/2)^4

### 5.

Question 5

What is the binary sequence that corresponds to polynomial code X^3 + x^2 + 1?

**2 / 2 points**



0111



1110



1101



111

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### 6.

Question 6

A cyclic code can be generated using \_\_\_\_\_\_\_\_\_\_.

**0 / 1 point**



Generator matrix



Generator polynomial



Both of the mentioned



None of the mentioned

**Incorrect**

Incorrect. Block codes can be generated using generator matrix. Choose generator polynomial

### 7.

Question 7

Which of the following is true for two-dimensional parity check

**1 / 1 point**



More parity bit to improve coverage

**Correct**

Correct. Refer to Error Control - Parity Checks lecture



Arrange information in rows



Add multiple parity bits to each column



Arrange information in columns

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### 8.

Question 8

Polynomial codes are implemented using shift register circuits

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### 9.

Question 9

What is the binary equivalent of the following polynomial arithmetic

x7 + x6 + x5 + x2 + 1

**1 / 1 point**



11011101



11101101



11100111



11100101

**Correct**

Correct. Refer to Error Control - Polynomial Codes (CRC)

### 10.

Question 10

Using Euclidean Division, what will be the remainder of 70 by 999 where 70 is the divisor and 999 is the dividend

**1 / 1 point**



19



21



14



17

**Correct**

Correct. Refer to Error Control - Polynomial Codes (CRC) lecture

B/

### 1.

Question 1

Given an information polynomial code I(x) = X^7 + x^6 + x^1 + 1, which is its corresponding per-bit information frame?

**2 / 2 points**



10100010



11000011



None of the above



01100011

**Correct**

Correct. Refer to Error Control - Polynomial Codes (CRC) lecture

### 2.

Question 2

What is the remainder obtained by dividing x^7 + x^5 + 1 by the generator polynomial x^3 + 1?

**2 / 2 points**



x^2 + x + 1



x^2 + x



x^2 + 1



None of the above

**Correct**

Correct. Refer to Error Control - Polynomial Codes (CRC) lecture

### 3.

Question 3

Given a generator polynomial g(x) = x^3 + x + 1. Consider the information sequence 1001. By CRC method, what is the resulted codeword for transmission?

**2 / 2 points**



1001110



1001000



1010110



1001111

**Correct**

As the degree of generator function is 3, the information sequence is appended three bits of 0s. The resulting bit frame 1001000 is divided by 1011 in binary arithmetic, and the remainder is 110 (check bits). Codeword is 10001 appended by the check bits, which is 1001110.

### 4.

Question 4

Which of following generator polynomial can detect all single bit errors in an information frame?

**2 / 2 points**



g(x) = x



g(x) = x^2



g(x) = x + 1



All of the above

**Correct**

Correct. G(x) has more than one term that can detect all single bit errors.

### 5.

Question 5

Internet protocols use check bits to detect errors, instead of using CRC polynomial. The primary rationale is

**2 / 2 points**



Strength of error detection capability



Simplicity of implementation



CRC polynomial cannot work for Internet protocols



None of the above

**Correct**

Correct. Refer to CRC Capability, Internet Checksum lecture

### 6.

Question 6

The two basic approaches in error control are error prevention and detection, and error correction and re-transmission

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### 7.

Question 7

Find parity bit for 1001011

**1 / 1 point**



0



1



2



None of the above

**Correct**

Correct. Refer to required reading

### 8.

Question 8

The divisor in a cyclic code is normally called the \_\_\_\_\_\_\_\_\_.

**1 / 1 point**



Degree



Redundancy



Generator



None of the above

**Correct**

Correct. Refer to Error Control - Polynomial Codes (CRC) lecture

### 9.

Question 9

The checksum of 0000 and 0000 is

**1 / 1 point**



0101



1010



1111



0000

**Correct**

Correct. Refer to required reading on Parity, Checksums, Cyclic Redundancy Checks

### 10.

Question 10

In ASCII, a single parity bit code can detect \_\_\_\_\_\_\_\_ errors.

**1 / 1 point**



An even number of



Two



An odd number of



No errors

**Correct**

Correct. Refer to Error Control - Parity Checks lecture

### Mook2

### Week1

### A/

### 1.

Question 1

In networks where errors are infrequent, which approach is favored for efficiency?

**2 / 2 points**



Hop-by-hop approach



End-to-end approach



Either one of the above



Neither one of the above

**Correct**

Correct. Refer to Peer-to-Peer Protocols and Services lecture

### 2.

Question 2

Which of the following statements is true about the stop-and-wait ARQ protocol?

**2 / 2 points**



Stop-and-wait is only efficient if the link delay-bandwidth product is small



Stop-and-wait is only efficient if the link bandwidth is low



Stop-and-wait is only efficient if the link bandwidth is high



Stop-and-wait is only efficient if the link delay-bandwidth product is large

**Correct**

Correct. Refer to Stop-and-Wait ARQ lecture

### 3.

Question 3

Consider a situation where an interactive application produces a packet to send each keystroke from the client and the server echoes each keystroke that it receives from the client. Which of following strategies for sending ACK frames in a Go-Back-N is appropriate for the situation?

**2 / 2 points**



send an ACK frame immediately after each frame is received



send an ACK frame after every other frame is received



send an ACK frame when the next piggyback opportunity arises



Any one of the above

**Correct**

Correct. Since each keystroke is echoed, there will always be a piggyback opportunity. Thus, the piggyback method should be used. Indeed, the echo packet constitutes an acknowledgment.

### 4.

Question 4

Consider a bulk data transfer application where a server sends a large file that is segmented in a number of full-size packets that are to be transferred to the client. Assume the channel has a low probability of error. Which of following strategies for sending ACK frames in a Go-Back-N is appropriate for the situation?

**2 / 2 points**



Any one of the above



send an ACK frame immediately after each frame is received



send an ACK frame after every other frame is received



send an ACK frame when the next piggyback opportunity arises

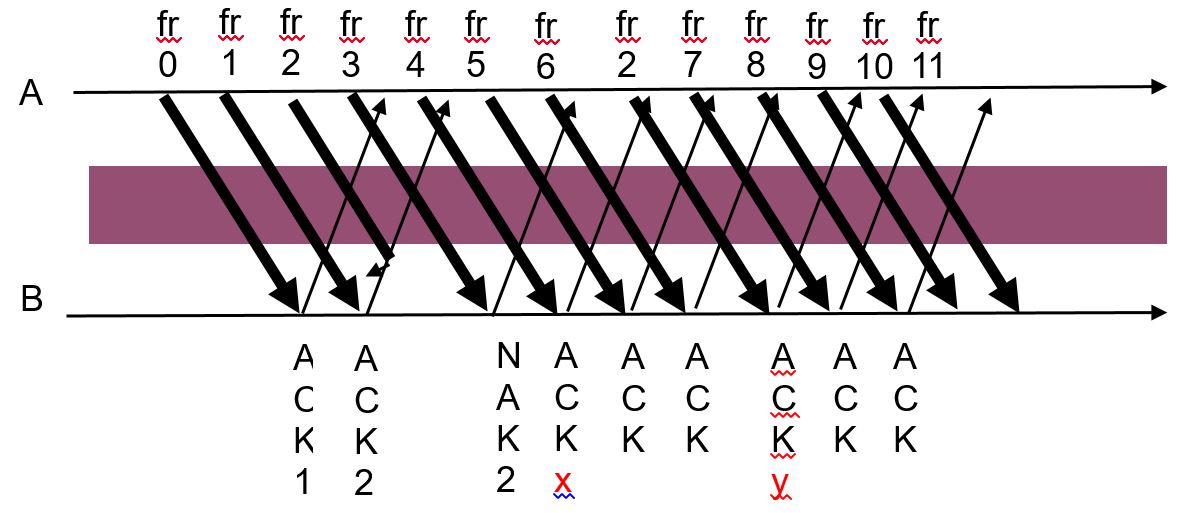
**Correct**

The upstream traffic to a server is generally much less than the downstream traffic. Thus, the piggybacking method is non-ideal in this case. If the channel has a low probability of error, the alternating ACK method is better, as it saves bandwidth.

### 5.

Question 5

Consider Selective Repeat ARQ flow control protocol. In the following scenario, what should be the value of frame number x at receiver B?



**0 / 2 points**



3



2



4



None of the above

**Incorrect**

Incorrect. Refer to Stop-and-Wait ARQ lecture

### 6.

Question 6

ARQ protocols combine error detection, retransmission and sequence numbering to provide reliability

**1 / 1 point**



True



False

**Correct**

Correct. Refer to Peer-to-Peer Protocol and Services lecture

### 7.

Question 7

A service model specifies a level of performance that can be expected in the transfer of information.

**1 / 1 point**



True



False

**Correct**

Incorrect. Refer to Peer-to-Peer Protocols and Services lecture

### 8.

Question 8

A service offered at a given layer can include which of the following feature(s)

**1 / 1 point**



Sequencing



Reliability



Timing



All of the above

**Correct**

Correct. Refer to Peer-to-Peer Protocols and Services lecture

### 9.

Question 9

Digital communication technologies may introduce errors in communication, which of the following can be used to provide reliable communication

**1 / 1 point**



UDP



HDLC

**Correct**

Correct. Refer to Peer-to-Peer Protocols and Services lecture



DNS



TCP

**Correct**

Correct. Refer to Peer-to-Peer Protocols and Services lecture

### 10.

Question 10

Ensuring that information is not altered during transfer is associated with

**1 / 1 point**



Confidentiality



Authentication



Integrity



Availability

**Correct**

Correct. Refer to Peer-to-Peer Protocols and Services