

SECTION A**A1.**

Which of the following components is necessary in order to achieve *successful* and *intelligent* network communications?

- | | |
|------------|-----------------|
| a) medium | b) protocol |
| c) message | d) transmission |

A2.

How many symbols can the *Unicode* represent?

- | | |
|--------|-----------|
| a) 128 | b) 1024 |
| c) 512 | d) 65,536 |

A3.

Which of the following topologies **does not** represent the physical design as normally drawn in actual implementation?

- | | |
|---------|---------|
| a) mesh | b) star |
| c) bus | d) ring |

A4.

What is the other term used to refer to a WAN that is wholly owned and used by a single company?

- | | |
|------------------------|----------------------------|
| a) Campus Wide network | b) Virtual Private network |
| c) Enterprise network | d) Distributed network |

A5.

Which of the following OSI standards layers **does not** append a header to the data before transmission?

- | | |
|-------------|--------------|
| a) physical | b) data link |
| c) network | d) transport |
-

A6.

Which of the following statements best describes the meaning of bandwidth for any transmission medium?

- a) The amount of signal bits that can travel along the transmission medium without any signal loss.
- b) The range of frequencies that a medium can pass without losing one-half of the power contained in that signal.
- c) The number of times the frequencies increase according to the amount of signals produced for transmission.
- d) The range of signals that can pass through without any loss of signal strength.

A7.

Pulse code modulation (PCM) consists of four separate processes. Which of the following is **not** a valid process?

- a) Line coding
- b) Binary encoding
- c) Quantization
- d) Checksum

A8.

Which of the following statements concerning quadrature amplitude modulation (QAM) is **true**?

- a) The number of phase shifts used by a QAM system is always larger than the number of amplitude shifts.
- b) This approach combines both frequency shift keying and phase shift keying to provide greater number of variations in bit rate.
- c) The number of amplitude shifts used by a QAM system is always larger than the number of phase shifts.
- d) None of the above.

A9.

Which of the following multiplexing techniques is most efficient to support data transmissions from sources with consistently small quantity of data and irregular?

- a) Frequency division
 - b) Synchronous time division
 - c) Asynchronous time division
 - d) Wave-division
-

A10.

Which of the following physical transmission media is least affected by attenuation?

- | | |
|------------------|--------------------------|
| a) Twisted-pair | b) Coaxial |
| c) Optical fiber | d) Shielded twisted-pair |

A11.

Which of the following types of wave propagation approaches is used by high frequency band signals?

- | | |
|-----------------|------------|
| a) Ionospheric | b) Space |
| c) Tropospheric | d) Surface |

A12.

For a series of bits: 1000 1000, which of the following shows a burst error affecting the given bits?

- | | |
|--------------|--------------|
| a) 1000 0000 | b) 1000 0001 |
| c) 0000 1000 | d) 0000 0000 |

A13.

Which of the following statements concerning cyclic redundancy check (CRC) technique is **true**?

- a) The CRC bits produced is appended to the front of the data bits.
- b) The data bits with the additional 0 bits is divided by a divisor using a process called denary division.
- c) The redundancy bits of the CRC must have exactly one less bit than the divisor.
- d) If the string of data bits arrive without error, the CRC checker yields a remainder greater than zero.

A14.

What is the main function for using a *repeater* in a local area network (LAN)?

- a) It is used to check the address of frames passing through it.
 - b) It regenerates any weakened signals at the original strength.
 - c) It allows the connection of two LANs of different protocols.
 - d) It amplifies any weakened signals.
-

A15.

What is the lowest data rate supported by the integrated services digital network (ISDN) *Hybrid* channel?

- | | | | |
|----|----------|----|----------|
| a) | 384 kbps | b) | 128 kbps |
| c) | 64 kbps | d) | 240 kbps |

SECTION B

B1.

Describe the **three (3)** typical types of transmission modes.

(6 marks)

B2.

Define the following characteristics of a sine wave:

- a) *Period* (2 marks)
- b) *Frequency* (2 marks)
- c) *Amplitude* (2 marks)

(6 marks)

B3.

- a) Describe **two (2)** functions of the OSI model's *physical* layer. (2 marks)
- b) What is the difference between a *physical* network address and a *logical* network address? (4 marks)

(6 marks)

B4.

- a) Define **two (2)** advantages of *shielded twisted pair* over *unshielded twisted-pair*. (2 marks)
- b) Why is *frequency* modulation better than *amplitude* modulation? (4 marks)

(6 marks)

B5.

- a) What is the difference between *encoding* and *modulation*? (3 marks)
- b) Describe the process involved for *digital* to *analog* conversion? (3 marks)

(6 marks)

SECTION C

Answer any *FOUR* questions in this section.

Each question is worth **10 marks**.

This section carries a total of **40 marks**.

C1.

Explain the *bus topology*. List **two (2)** advantages and **three (3)** disadvantages of the bus topology.

(10 marks)

C2.

a) Compare and contrast between *circuit switching* and *packet switching*.

(5 marks)

b) Compare and contrast an *analog signal* with a *digital signal*.

(5 marks)

(10 marks)

C3.

a) Describe **two (2)** responsibilities of the OSI model's *network layer*.

(5 marks)

b) Describe **two (2)** criteria necessary for an effective network.

(5 marks)

(10 marks)

C4.

a) Define **three (3)** advantages of *coaxial cable* over *twisted-pair cable*.

(3 marks)

b) Describe the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) medium access method.

(5 marks)

c) Define the **two (2)** main sub-layer(s) within the data link layer for the OSI model.

(2 marks)

(10 marks)

C5.

a) Describe **two (2)** advantages of a *fibre optic* cable. (4 marks)

b) What is meant by the notation: *10 Base 5* used for thick Ethernets and what type of signal does it carry? (4 marks)

c) Determine the *class* address for the following IP address. (2 marks)

- i) 192.168.1.1
- ii) 10.10.20.1

(10 marks)
