

SECTION A

Answer ALL questions in this section.

This section consists of 20 questions and carries a total of 40 marks.

1. Which of the following communication techniques is traditionally used for voice communication?
 - a) Circuit switching
 - b) Packet switching
 - c) ATM
 - d) Frame Relay
2. Which of the following items is not included in the header of the transport layer for use data communication?
 - a) Sequence number
 - b) Error detection code
 - c) Data encoding format
 - d) Destination Service Access Point
3. Which of the following options best describes the *Primary Rate Interface (PRI)* of ISDN services?
 - a) Twenty three 32-kbps B channels and two 64-kbps D channel
 - b) Twenty two 64-kbps B channels and two 64-kbps D channels
 - c) Twenty three 32-kbps B channels and two 16-kbps D channel
 - d) Twenty three 64-kbps B channels and two 64-kbps D channels
4. Which of the following statements is not a disadvantage of Asynchronous transfer Mode?
 - a) Complexity of the basic mechanisms to implement such technology
 - b) Can calculate the exact cell-by-cell timing
 - c) The need for a new system that can interface with existing network systems
 - d) Complexity owing to the quality of service mechanisms
5. Which of the following types of antennas is commonly used in corner-excited cellules networks?
 - a) Bi-directional
 - b) Omni-directional
 - c) Sectorized directional
 - d) Parabolic
6. Which of the following terms is used to refer to the force that allows the geosynchronous satellites remain stationary in orbit?
 - a) Centrifugal
 - b) Applied
 - c) Gravity
 - d) Magnetic

7. Which of the following terms is used to refer to establishing a wireless network without an infrastructure?

- a) Removable
- b) Planned
- c) Portable
- d) Ad-hoc

8. Which of the following statements concerning the Star topology is **true**?

- a) The computers are connected together using T-connectors and barrel connectors.
- b) The network requires dedicated cables to connect each computer to the hub.
- c) Each computer require termination of the network cable connected to it.
- d) Such topology is also referred to as an active topology.

9. Which of the following statements concerning the Mesh topology is **false**?

- a) Such network supports dedicated links between each nodes.
- b) To determine the number of links necessary for connecting all nodes the formulae; $n(n-2)/2$ can be applied.
- c) The mesh network physically prevents any intrusion on the information sent.
- d) The fully-meshed network provides atleast one alternate link between a group of nodes.

10. Which of the following characteristics for local area network implementation is covered by the IEEE 802. standards?

- a) Signal encoding techniques
- b) Wiring configuration
- c) Type of medium
- d) Configuration of connectors

11. Which of the following statements concerning the OSI application layer is **false**?

- a) Performs conversion of data contents so it is suitable for the users.
- b) Allow users to access the content of Web pages.
- c) Allow users to control the operation of remote terminals.
- d) Provides the user interface between users and resources found in computer systems.

12. Which of the following values correctly define the port number used by the Simple Mail Transfer Protocol?

- a) 23
- b) 25
- c) 22
- d) 21

13. Which of the following items is used as the *check digits* in cyclic redundancy checking (CRC)?

- a) The divisor
- b) The dividend
- c) The quotient
- d) The remainder

14. Which of the following processes is used for retransmission of damaged or lost frames in the data link layer?

- a) Flow control
- b) Error conditioning
- c) Error control
- d) Line discipline

15. Which of the following frame numbers will the receiver of go-back-n ARQ send to the sender if frames 4, 5 and 6 are received successfully?

- a) 5
- b) 6
- c) 7
- d) 4

16. Which of the following characteristics is **not** a requirement for routers?

- a) Complexity
- b) Stability
- c) Fairness
- d) Simplicity

17. Which of the following routing strategies gathers extensive information concerning the network to determine the best possible route?

- a) Random
- b) Adaptive
- c) Flooding
- d) Fixed

18. Which of the following statements concerning the Distance vector routing algorithm is **true**?

- a) Before sending an update, each router adds its own distance value to the route's metric.
- b) It performs routing decision based on the information by all routers in the wide area network.
- c) Routers send only the latest information in its routing table to adjacent neighbors.
- d) Updates include details of subnet addresses and masking information.

19. Which of the following internetworking devices is most appropriate to connect two LANs that are 30 miles (80 kilometers) apart?

- | | |
|-------------|------------------|
| a) Switches | c) Access Points |
| b) Routers | d) Bridges |

20. Which of the following Open Systems Interconnection (OSI) layers can a Gateway device operate on?

- | | |
|------------|----------------|
| a) Network | c) Application |
| b) Session | d) Transport |

SECTION B

Answer any FOUR questions in this section.

This section consists of 5 questions and each carries 15 marks.

This section carries a total of 60 marks.

1. a) State and describe the purpose of each of the 5 layers found in the TCP/IP architecture.
(10 marks)
- b) Describe **two (2)** reasons when personal area networks is most suitable to be implemented. Suggest which communication technology is commonly used to implement the personal area network.
(5 marks)
(Total: 15 marks)
2. a) Describe where frame relay technology is commonly adopted and what speeds it is capable of. State any **two (2)** features frame relay offers.
(5 marks)
- b) Describe the importance of frequency reuse concept in cellular networks. Include in your answer how the frequency reuse concept works.
(8 marks)
- c) Briefly describe **one (1)** advantage and **one (1)** disadvantage of geosynchronous orbit satellites.
(2 marks)
(Total: 15 marks)
3. a) State and describe any **two (2)** design goals that must be taken into account for wireless local area networks to be commercially successful.
(6 marks)
- b) Describe the characteristics of Fiber Distributed Data Interface (FDDI) ring emphasizing on its standard, protocol, operation, and advantages.
(6 marks)
- c) Describe the meaning of 'logical topology'. Give **one (1)** example of such implementation.
(3 marks)
(Total: 15 marks)

4. a) Produce a suitable diagram with proper labeling to compare the layers of the Open Systems Interconnection (OSI) model with the layers of the Transmission Control Protocol/Internet Protocol (TCP/IP) architecture showing the similarities and differences. In addition, state one (1) example of protocol for each layer of the TCP/IP architecture.

(Total: 15 marks)

5. a) By using decimal 13 as the divisor, determine the check digits or frame check sequence for binary data "10101101" when Cyclic Redundancy Check algorithm is used. Show the exact working in producing the required result.

(7 marks)

- b) Describe the purpose of two (2) different types of link-state advertisements (LSAs) sent by routers in order to share information.

(4 marks)

- c) Describe why it is that a bridge is said to handle data packets in a more intelligent manner compared to a repeater.

(4 marks)

(Total: 15 marks)