BCNS/25A/FT CONTROLLED ASSIGNMENT

Duration: 24 Hours

Email your answers with attached filename *your_student_id*_ctrl_ass.pdf at bcns25aft@rishiheerasing.net

(Note: There could be more than one correct response per question)

1. StevieG needs to assign **999** IPv4 addresses in his company. Which of the networks below could he use?
   a. 198.47.32.0 and 198.47.42.0 and 198.47.52.0 and 198.47.62.0
   b. 128.47.0.0
   c. 218.47.32.0 and 218.47.42.0
   d. None of the above

2. Given network id: **77.0.0.0** and subnet mask **255.0.0.0**, which of the following could be correct?
   a. You are subnetting for a class A network
   b. You are subnetting for a class C network
   c. That is an invalid subnetting assignment
   d. None of the above

3. A wide area network (**WAN**) is defined by _____ .
   a. the geometric size of the network
   b. the maximum number of hosts in the network
   c. the maximum number of subnets in the network
   d. the topology of the network

4. A frame carries data belonging to the _____ layer and a header belonging to the _____ layer.
   a. fifth; third
   b. third; second
   c. second; third
   d. third; fourth

5. The number of links present in a full-mesh network topology of N nodes can be calculated by:
   a. $(N^2 – 1)/2$
   b. N(N-1) / 2
   c. $(N^2/2) – (N/2)$
   d. N(N-1) / 2

6. One most commonly finds data encryption for network communication at the:
   a. Application Layer
   b. Presentation Layer
   c. OSI Layer 6
   d. Encryption Layer

7. What is the theoretical maximum size of an IPv4 UDP segment payload?
   a. 65,527 bytes
   b. 65,507 bytes
   c. 20 bytes
   d. 32 bytes

8. Which best describes the structure of a Layer 4 encapsulated protocol data unit?
   a. Segment header, network header, data
   b. Segment header, presentation header, application header, data
   c. Frame header, network header, segment header, application header, data, frame trailer
   d. None of the above

9. Check all that apply to HTTP?
   a. It uses port 80
   b. It uses a “best-effort” service
   c. It is a time-sensitive protocol
   d. It is a connection-oriented protocol

10. In SMTP, _____ well-known port(s) is (are) used?
    a. one
    b. two
    c. three
    d. None of the above

11. Which are responsible for flow control and reliability of service?
    a. TCP
    b. OSI Layer 4
    c. IP
    d. Session Layer

12. In a _____ connection, one TCP connection is created for all the requests/responses
    a. persistent
    b. non-persistent
    c. both persistent and non-persistent
    d. none of the above

13. Given network 217.218.219.0 with 255.255.255.0 mask. Which of the following is(are) true?
    a. There are 254 usable hosts per subnet
    b. There is one usable network
    c. There are 254 usable subnets
    d. None of the above

14. The transport layer is to provide _____ communication.
    a. host-to-host
    b. socket-to-socket
    c. process-to-process
    d. node-to-node

15. In a Class B address where 6 bits are used for subnetting. ____ bits are left for host addresses.
    a. 18
    b. 15
    c. 10
    d. None of the above

16. The broadcast address of the **third** usable subnet in Class C network where **3 bits** are borrowed is?
    a. x.x.x.33
    b. x.x.x.127
    c. x.x.x.63
    d. None of the above

17. The Source MAC address appears in a frame _____.
    a. Footer
    b. Header
    c. Trailer
    d. Payload

18. Given a host with IP: 101.17.78.65 and /23 subnet mask, what is the host's subnet broadcast address?
    a. 101.17.78.255
    b. 101.17.79.255
    c. 101.17.78.127
    d. None of the above

19. In Cyclic Redundancy Check, what is the polynomial generator?
    a. the divisor
    b. the quotient
    c. the remainder
    d. None of the above

20. You need at least 6 usable subnets with a minimum of 17 hosts on each of those subnets. Which Class C network subnet mask could you use?
    a. 255.255.255.224
    b. 255.255.255.240
    c. 255.255.255.248
    d. 255.255.255.128

21. A 2-dimensional parity-check code can correct _____ error(s).
    a. one or more
    b. exactly one
    c. zero
    d. any number of

22. Which of the following is/are guided medium/media?
    a. STP cable
    b. USB cable
    c. Fibre Optic cable
    d. HDMI cable

23. You try to connect to https://www.google.mu but the page fails to load. This could be because of?
    a. Wrong DNS client configuration
    b. Congestion in the network
    c. Presence of malware on the client machine
    d. Web browser does not support Flash

24. Given a class A network; you want at least 7000 subnets with at least 2000 hosts per subnet?
    a. You can use subnet mask: 255.255.240.0
    b. You can use subnet mask: /21
    c. You can use subnet mask: /22
    d. Not possible

25. Which field is responsible for flow control in TCP?
    a. Sequence Number
    b. Acknowledgement Number
    c. Urgent Pointer
    d. None of the above

26. Ring topologies are used because _____.
    a. They are very cheap to implement
    b. They perform well under heavy traffic
    c. It is easy to add or remove nodes
    d. None of the above

[26 x 2 marks]

Section B

TRUE (T) or FALSE (F)

27. _____ FTP is a connection-oriented application layer protocol.
28. _____ An IP address is also referred to as a logical address.
29. _____ A Local Area Network usually span over one kilometre.
30. _____ A Cyclic Redundancy Check can correct only one bit in error.
31. _____ A switch is responsible for forwarding frames in a LAN
32. _____ A MAC address is larger than an IPv6 address.
33. _____ In a ring topology, each node is directly connected to every other in the network.
34. _____ The maximum size of an IPv4 header is 40 bytes.
35. _____ TCP Connection opening involves a 3-way handshake.
36. _____ IP fragmentation occurs whenever a datagram is smaller than the MTU size of a network.

[10x1.5 marks]

37. Suppose that the information content of a packet is the bit pattern **111100001** and an odd parity scheme is being used:
    a) What would be the checksum field in a single parity bit scheme?
    b) What would be the value of the checksum field for the case of a two-dimensional parity scheme?
    c) What would be the percentage efficiency of the latter scheme?

[2+5+2 Marks]

38. Calculate the CRC for the frame below:
    Frame data: **1101011011** Generator Polynomial: x^3+1

[7 Marks]

39. Match the terms below with the best corresponding concepts or definitions:

Datagram	a. Maps IP address onto MAC address
ARP	b. A measure of capacity on a physical transmission system
Transport	c. A OSI layer which provides host to host communication
Bandwidth	d. TCP/IP's term for an internet packet
TCP	e. A transport layer protocol
Network Layer	f. The organization which defined the OSI Reference Model
ISO	g. resolves domain name to IP address
Bps	h. The opposite of NAK
DNS	i. A measure of data throughput in a computer network
ACK	j. A OSI layer that describes how to represent data

[10 Marks]

40. Two popular Mail Access Protocols used nowadays are **POP3** and **IMAP4**.

    a. What is the main function of a Mail Access Protocol?
    b. What do the POP3 and IMAP4 acronyms stand for?
    c. Give two properties of POP3.
    d. Susan does not have her own PC. So, in order to check her email, she regularly connects to her mail server from different PCs at her workplace. Which Mail Access Protocol is she more likely to use, and why?

[1+2+2+2 marks]

Total: 100 Marks