1.   Data Units

    a.   At the data link layer the _____ is the unit of data.
    b.   At the network layer the _____ is the unit of data.

2.   Fiber Cable

    a.   A typical core of 1.5 to 5 micron means the fiber is _____ mode.
    b.   A typical core of 50 micron means the fiber is _____ mode.

3.   Coax Cabling

    a.   _____ coax cabling has 500 meter max length and 100 nodes per segment
    b.   _____ coax cabling has 185 meter max length and 30 nodes per segment

4.   OSI model

    a.   The layer providing the electrical and mechanical interface is the _____ layer.
    b.   The layer providing routing and sequencing of data is the _____ layer.

5.   OSI model

    a.   The layer providing the translation, formatting of information is the _____ layer.
    b.   The layer providing end to end integrity of data exchanges is the _____ layer

6.   Switching

    a.   _____ switching provides a dedicated communication path between networked nodes.
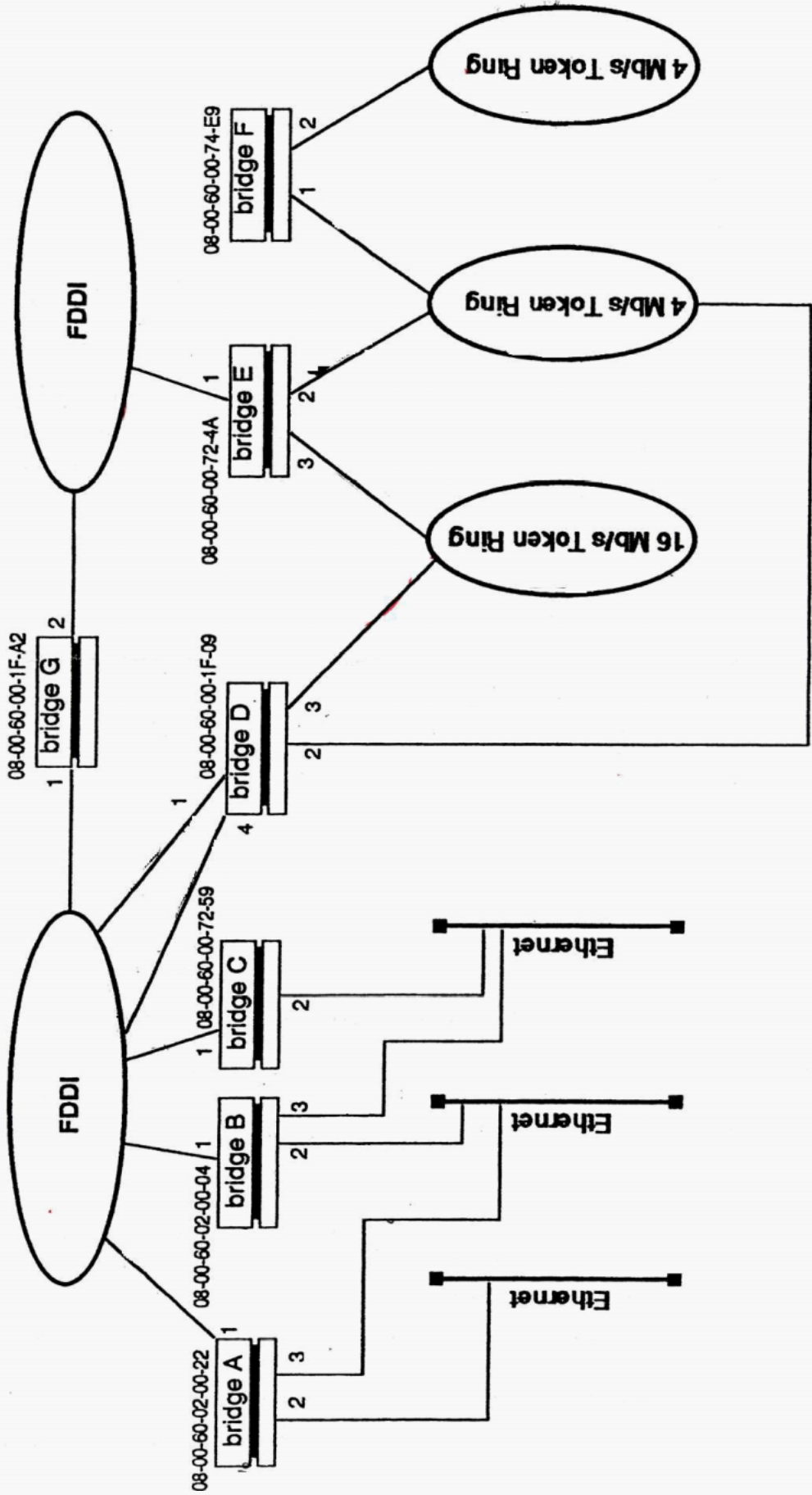   b.   _____ switching provides some path from the source to the destination.

7.   DOD model

    a.   Application Layer   _____ Communication between proceses
    b.   Internet Layer   _____ Signal rate, tranmission media
    c.   Network Layer   _____ Hop by hop
    d.   Transport Layer   _____ Routing of data, hides toplogy
    e.   Physical Layer   _____ End to end data services

8.   Briefly explain why the OSI and DOD models both use layering?

Nyquist formula $C = 2B\log_2 M$

Shannon Hartley Law $C = B \log_2 (1 + S/N)\text{bps}$

$SNRdb = 10\log_{10}(S/N)db$

Deduce the maximum theoretical information rates associated with the following transmission channels:

9.   Telex (international message switching) network with a bandwidth of 500 Hz and a signal-to-noise ratio of 5 db.?

10.   What is the frequency of a switched telephone network with a signal-to-noise ratio of 24db and a data transfer rate of 16Mbps.

Which protocol gets a hardware address from a known IP address?
a. RARP
b. ARP
c. TCP
d. UDP

2. Which protocol is used to get an IP address from a known MAC address?
a. ARP
b. RARP
c. TCP
d. UDP

3. What does the Spanning Tree Algorithm do?
a. Restores lost frames
b. Forwards packets through a switch
c. Prevent loops
d. Prevents duplication in bridged networks

4. Which of the following is a characteristic of a bridge but not a repeater
a. Bridges forward packets based on IP addresses in the frame
b. Bridges forward packets based on IP addresses in the packet
c. Bridges forward packets based on MAC address in the frame.
d. Bridges forward packets based on the MAC address in the packet.

5. True or False
a. _____   Layer 2 defines IP addresses.
b. _____   MAC Address are defined by layer 3.
c. _____   Routers are layer 3 devices.
d. _____   Repeaters are layer 2 devices.
e. _____   Bridges are layer 1 devices.

6. Define the term broadcast domain

7. Outline the steps (describe) of CSMA/CD Operation

A Spanning Tree Problem

1.   What is the routing algorithm used by RIP?
      a. Routed information
      b. Link together
      c. Link-state
      d. Distance-vector

2.   When should you use static routing instead of dynamic routing?
      a. Whenever you can
      b. When you have very few routes and want to save bandwidth
      c. When you need the routing tables to be automatically updated
      d. When you want to use a default route

3.   Name and describe the three components of the Domain Name System?

4.   UDP and TCP represent mechanisms used by which layer of TCP/IP?
      a. Data Link Layer
      b. Physical Layer
      c. Presentation Layer
      d. Transport Layer

5.   What is the sequence number in a TCP header used for?
      a. Acknowledgements
      b. Reordering of the octets received
      c. Rejecting duplicate octets
      d. All of the above

6. True or False
   a. Variable sliding windows provide an explicit mechanism for notifying TCP if an intermediate node becomes congested. True or False
   b. IP is described as an unreliable mechanism because it does not guarantee delivery? True or False

7. What are three objectives for a routing protocol?
   a. Accuracy
   b. Quick holddowns
   c. Rapid convergence
   d. Low overhead

8. Which of the following does TCP provide?
   a. Unreliable data stream
   b. Connectionless virtual circuit
   c. Flow Control
   d. Structured byte stream movement.

9. What is a socket in the transport layer?
   a. An IP address plus a port.
   b. An IP address
   c. A port
   d. A Mac address plus a port.

10. Describe the initial TCP Connection establishment. Which end normally does a passive open? Which end normally does an active open?

1. Does FTP or TFTP perform error recovery? If so, describe the basics of how error recovery is performed?

2. TFTP or FTP

    a. _____ Uses TCP
    b. _____ Sends data over a separate connection from control commands
    c. _____ Requires less memory
    d. _____ Uses simple control commands
    e. _____ Typically used by routers

3. TRUE or FALSE
    a. _____ ICMP echo and Echo replies are send and received by the ping command.
    b. _____ ICMP network unreachable is used when the packet can be routed to the router connected to the destination subnet but the end node is not responding.
    c. _____ ICMP Source Quench means the source is sending data faster than it can be forwarded.
    d. _____ The "trace" or "traceroute" command uses the TTL exceeded message.

4. BootP stands for Bootstrap Protocol. It is typically used by diskless workstations to learn or obtain what information(s):

5. This protocol was designed to transfer e-mail messages between two remote computers.

    a. SNMP
    b. SMTP
    c. TELNET
    d. FTP
    e. TFTP

6. UDP OR TCP
   a. _____   FTP
   b. _____   TELNET
   c. _____   TFTP
   d. _____   SMTP
   e. _____   BOOTP

7 Explain how DHCP works? How does DHCP differ from BOOTP?

8. Which Protocol?
   a. _____   Retransmission is symmetric
   b. _____   Alternative to RARP
   c. _____   Report error messages
   d. _____   Transfer files from systems
   e. _____   Emulates NVT

9. Describe the purpose and functionality of the TELNET protocol.

10. What protocol(s) uses two ports during a connection? What is the purpose of the two
    ports? What transmission parameters would be set for the two ports?

1.   True or False

       _____ RIP1 Routing protocols must carry extended-network-prefix information with each route advertisement.

    _____ All routers must implement a consistent forwarding algorithm based on the "longest match"

     ____ For route aggregation to occur, addresses must be assigned so that they have no topological significance

    ____ Routes with longer extended-network-prefixed are "more specific".

     _____ CIDR eliminates traditional concept of Class A, Class B, Class C address spaces.

2.   Describe

    a. Encapsulation

    b. Demultiplexing.

3.   True or False?

    a. _____   IP is a reliable service

    b. ____   IP is a connection datagram delivery service

    c. _____   Datagram delivery can be out of order

    d. _____   **IP does not address the end-to-end reliable delivery of data or the sequential delivery of data**

    e. ____   IP does not maintain any state information about successive datagrams

4.   What is the class of for each network?

   a. Class _____   8 bits netid, 24 bits hosted

    b. Class _____   Reserved

    c. Class _____   16 bits netid, 26 bits hosted

    d. Class _____   24 bits netid, 8 bits hosted

    e. Class _____   28 bits groupid

5.   How is an undeliverable IP datagram removed from the network?

6.   How large can a datagram be?

7.   Router two can summarize (aggregate) the 192.1/1.0/24, 192.1/2.0/24, and 192.1/3.0/24 routes into?????

one   10.1.50.0/24   two   192.1.1.0/24   three

Serial0

10.1.10.0/24   192.1.3.0/24   192.1.2.0/24

four
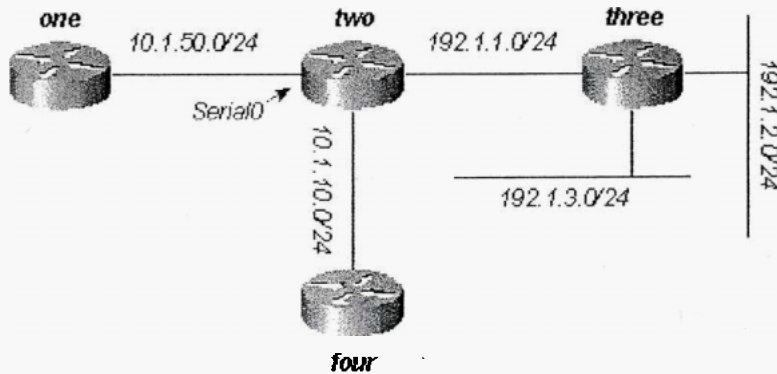
8.   What is the subnet mask of a class C network that effectively gives 30 networks and 6 hosts per network?

9.   A subnet mask of 255.255.255.240 for a class B network effectively gives _____ subnets and _

10.   Let's say you were assigned the class B address 172.16 from the NIC. A typical (and easy to use) subnetting scheme for a class B network would be to use an 8-bit subnet mask. So, an 8-bit subnet mask would be 255.255.255.0. This means you have 254* subnets available and 254 addresses for nodes per subnet. *Why are there only 254 subnets available instead of 256 (0-255)?*