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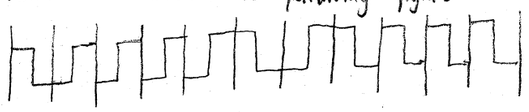
1. (1) According to ISO/OSI, ___ layer is responsible for end to end communication.
(2) Consider building a CSMA/CD network running at 10Mbps over a 1-km cable with no repeaters. The signal speed in the cable is 200000 km/sec. The minimum frame size is ___.
(3) Suppose that x bits of user data are to be transmitted over a k-hop path in packet-switched network as a series of packets, each containing p data bits and h header bits, with $x \gg p+h$. The bit rate of the lines is b bps and the propagation delay is negligible. The total delay is ___.
(4) An example of digital modulation is shown as following figure:

Manchester encoding 

These signals represent bit stream _____
(5) There are three major classes of routing algorithms, they are ___, ___ and ___.
(6) A router has just received the following new IP address: 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, they can be aggregated into ___.
(7) RIP use ___ algorithm to compute the "best" route.
(8) In TCP, the size of the send window is the ___ of receive and congestion windows.
(9) ___ is primarily used for mapping host names and e-mail destinations to IP address.

2. (1) The ___ is a set of primitives (operations) that a layer provides to the layer above it
A. service B. interface C. protocol D. architecture
(2) In ___, resources are allocated on demand.
A. packet switching B. circuit switching C. line switching D. frame switching
(3) A network uses a signaling speed of 25 MHz and requires three twisted pairs. On each twisted pairs it sends ternary digits with three different voltage levels. The bit rate of this network is ___.
A. 25Mbps B. 50mbps C. 75Mbps D. 100Mbps.
(4) The MAC protocol for Ethernet is ___
A. Ethernet B. CSMA C. CSMA/CD D. CSMA/CA
(5) Suppose you are designing a sliding window protocol for a 1-mbps point-to-point link to the moon, which has a one-way latency of 1.25 seconds. Assuming the each frame carries 1 KB of data, what is the minimum number of bits you need for the sequence number?
A. 6 B. 7 C. 8 D. 9
(6) You want to improve network performance by increasing the bandwidth available to hosts and limit the size of the broadcast domains. ___ will achieve this goal
A. Manage hubs B. Bridge C. Switches D. switches configure with VLANs.
(7) A router has two processes inside it. One of them is responsible for filling in and updating the routing tables. This process is ___.
A. routing B. forwarding C. processing D. queuing
(8) BGP messages are exchanged using ___ protocol.
A. ICMP B. TCP C. UDP D. IP
(9) If you want to find the number of routers between a source and destination on Windows, an utility to be used is ___
A. route B. ipconfig C. ifconfig D. tracert
(10) For the network in Figure 1, the constraint ___ on x and y guarantees traffic from B to C will always flow through node A).
A. $x>4$
B. $y+x<6$
C. $y+x<4$
D. $x<4$

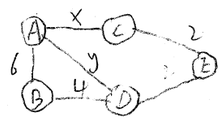


Figure 1.

3. (1) Network layer protocols must be defined in every router
(2) Given the CRC coding bits 10111001 and generator 1001, no error is detected
(3) Internet transport-layer protocols provide delay and bandwidth guarantees
(4) In cut-through switching, frame are forwarded from input to output ports before they are received in their entirety

4. For the network in Figure 2, give the contents of the forwarding table of these Ethernet switches (assume that these are ZZZZ 802.1 transparent bridges). Assume that all