CS470 Fall 2007 Midterm Exam 2 NAME _____

For multiple-choice questions, circle the letter of the single answer that best answers the question.

1. In a router, the switch fabric is:
    a. The electronics that connect the router input ports to the output ports
    b. Often called the "backplane"
    c. Neither (a) nor (b) is correct
    d. Both (a) and (b) are correct
2. Two common performance measures for a router are bits per second and packets per second.
3. When a switch is said to be "non-blocking", it means that:
    a. Packets can be simultaneously transferred from multiple input ports to a single output port.
    b. A packet can be transferred from any input port to any output port.
    c. Packets can be simultaneously transferred from any combination of input ports to any combination of output ports.
    d. None of the above
4. A crossbar switch has the advantage that it is non-blocking, but the disadvantage that it is not scalable .
5. A network uses Distance Vector routing. A particular router R has a current cost of 5 for destination D. R receives a Distance Vector from its neighbor router N. N's cost for destination D is 3. What is R's new cost for D?
    a. 3
    b. 5
    c. 8
    d. Not enough information is given
6. One of the two primary classes of routing algorithms is Distance Vector. The other is Link State Vector.
7. The IPv4 packet header without options is 20 bytes in length.
8. A basic IPv4 packet can contain up to 64K-20 bytes of data.
9. The IPv4 Time-To-Live (TTL) field was originally intended to specify the remaining time before the packet dies, but instead, it is typically used to specify hop count.
10. A particular computer is on an Ethernet LAN and runs TCP/IP. An application on the computer sends some data across the LAN. The first byte in the Ethernet payload field will be:
    a. The first byte of the TCP header
    b. The first byte of the IP header
    c. The first byte of the data
    d. None of these
11. The classfull IP address 192.36.7.7:
    a. is a Class C address
    b. includes a 16-bit host number

c. both (a) and (b) are true
d. neither (a) nor (b) is true

12. When we wish to indicate all IP addresses that start with "128" (this would include for example, the addresses 128.76.3.44 and 128.0.12.1), we write 128.*.
13. We discussed the Address Resolution Protocol as a way to automatically identify the MAC address that a particular IP address corresponds to.
14. We discussed the idea of performing fragmentation at L2, but rejected it. One of the reasons we rejected the idea was:
    a. Fragmentation is an L4 function.
    b. A packet might be fragmented and reassembled several times in transit.
    c. Frame payloads are larger than IP payloads.
    d. None of these.
15. A 1000-byte packet is fragmented when it is transmitted over a link having an MTU of 600. The resulting fragments are then transmitted over a link having an MTU of 500. How many fragments will be received at the destination? 3
16. IP tunneling is most related to the concept of:
    a. Encapsulation
    b. Fragmentation
    c. Security
    d. Circuits
17. The boundaries of AS's in the Internet are usually defined by:
    a. Sets of common router types
    b. Administrative boundaries
    c. BGP
    d. ICANN
18. A Boundary Router in an AS communicates with:
    a. Boundary routers in other AS's
    b. Other boundary routers in this AS
    c. Other non-boundary routers in this AS
    d. Any of these can occur
19. We call the inter-AS network a "virtual network". This means that:
    a. The network does not exist, and so, cannot run it own routing algorithm.
    b. There are no direct or indirect links between the routers in the inter-AS network.
    c. Two routers that are neighbors in the inter-AS network may or may not have a hardware link directly between them.
    d. The routers in the inter-AS network do not actually exist.
20. An IETF RFC is:
    a. A proposal or standard for an Internet protocol or other feature.
    b. A number assigned by ICANN.
    c. A failure report.
    d. None of these.
21. In subnetting, we:
    a. Divide a Class-C network into smaller subnetworks.
    b. Divide a Class-B network into multiple smaller networks.
    c. Combine Class C networks to form a larger network

d. None of these.

22. A Subnetted network has an IP address of 128.96.40.21 and a subnet mask of 255.255.255.0. Ignoring reserved addresses and including 128.96.40.21, what is the maximum number of hosts that can be in the same subnetwork as 128.96.40.21? 256
23. In CIDR, we:
    a. Divide a Class-C network into smaller subnetworks.
    b. Divide a Class-B network into multiple smaller networks.
    c. Combine Class C networks to form a larger network
    d. None of these.
24. NAT:
    a. Allows an organization to use IP addresses that are not globally unique.
    b. "Lends" IP addresses that are not globally unique to users within an organization.
    c. Is useful, but is an "ugly hack" that is responsible for much of the inefficient use of the IP address space.
    d. All of these are true.
25. IPv6 addresses are 16 bytes long.
26. In IPv6, fragmentation:
    a. Is expected to be a major problem
    b. Is performed at L4
    c. Is not done -- there are no limits on packet size..
    d. None of these.
27. UDP is sometimes called "IP with ports"
28. UDP is a:
    a. Best-effort protocol
    b. Reliable protocol
    c. Redundant protocol
    d. None of these
29. TCP and UDP port numbers are 16 bits in length.
30. A TCP header without options is 20 bytes in length.
31. TCP includes a feature that violates the normal rule that network protocol layers should operate completely independently of each other's internal variables. This feature is related to:
    a. Advertised Window Size
    b. Specification of the maximum acceptable segment size during negotiation
    c. The pseudo-header
    d. The Urgent Pointer.
32. The designers of TCP made several changes to the basic Sliding Window Algorithm. Which of the following is NOT one of the changes that they made?
    a. Implicit ACK
    b. Advertised Window Size
    c. Larger sequence numbers
    d. Adaptive timeouts
33. Other than over-provisioning, the two classes of congestion control methods we discussed were open-loop and closed-loop.

34. (Insert “long” or “short” in the blank.) If you make the TCP timeout value too short, you may re-transmit a segment that has not actually been lost.
35. A Weighted Fair Queue is used to control data flow over link with a bandwidth of 100Mbps. The queue has two channels, A and B. The weight for channel A is 4. The weight for channel B is 1. Channel A is effectively allocated:
    a. 100Mbps
    b. 80Mbps
    c. 40Mbps
    d. 50Mbps
36. The “DEC bit” that we discussed:
    a. Is set by a router and returned directly to the sender in an error segment.
    b. Is set by a router and forwarded with the segment to the receiver.
    c. Is used by the receiver to adjust it’s receive window size.
    d. Is used to control random deletion of packets when a router is overloaded.
37. The Congestion Window:
    a. Is a new send window added in TCP, in addition to the original sliding send window
    b. Is a new receive window added in TCP, in addition to the original sliding receive window
    c. Has a size that is statically set during the TCP negotiation phase.
    d. None of these.
38. One major difference between the Leaky Bucket algorithm and the Token Bucket algorithm is that the Leaky Bucket algorithm does not allow bursts, while the Token Bucket algorithm does allow them within the famework of regulated long-term behavior.
39. In a network that implements QoS using Resource Reservation, the sender must specify a Service Spec that specifies the type of QoS support desired and a Traffic Spec that characterizes the data that the sender plans to send.
40. In Resource-Reservation QoS, “Packet Scheduling” refers to:
    a. Planning the times at which flows will be handled.
    b. Reviewing, accepting, or rejecting requests for QoS support
    c. Ensuring that senders obey the agreement made during negotiation.
    d. Ensuring that the network obeys the agreement made during negotiation.
41. In a particular approach to QoS, packets contain a field that specifies a priority for the packet. Network routers check this field and forward high-priority packets before lower-priority ones. This scheme would be an example of:
    a. Resource Reservation-type QoS
    b. Differentiated Services-type QoS
    c. Admission Control and (possibly) Policing
    d. None of these
42. DNS Resource Records contain a “Time to Live” field. This is so that:
    a. If a Record is lost during transmission, it will not circulate endlessly
    b. Cached copies of the record will expire eventually
    c. Redundant servers can trace the record back to its creation time so that it can be validated.
    d. None of these.

43. We discussed two “mailbox managers” in class. These were:
    a. IMAP and POP3
    b. SMTP and POP3
    c. IMAP and SMTP
    d. None of these.
44. We discussed two versions of HTTP. Version 1.0 closes the connection after each response. Version 1.1 leaves the connection open until it is explicitly closed. Version 1.0 would be a better choice for applications in which:
    a. The HTML pages you are accessing have many embedded graphics
    b. The HTML pages you are accessing have few embedded graphics
    c. You want a higher-reliability connection
    d. You want a higher-speed connection
45. When a router receives a packet with an IP address that is not in the router’s routing table, it forwards the packet through its default port.