COM07026 Computer Network Quiz 1

Class 07111304 Student ID 1120131910 Name [illegible] Score ______

1. (18 points) Select the most appropriate answer

(1) A __A__ is a set of primitives (operations) that a layer provides to the layer above it.

A. service B. interface

C. protocol D. architecture

(2) __C__ layers from the ISO/OSI reference model do not have a corresponding level in Internet protocol stack.

A. Application & Transport B. Transport & Network

C. Presentation & Session D. Data Link & Transport

(3) In __A__ resources are allocated on demand.

A. packet switching B. circuit switching

C. line switching D. frequency switching

(4) ASK, PSK, FSK and QAM are examples of __B__.

A. Digital to Digital B. Digital to Analog

C. Analog to Analog D. Analog to Digital

(5) The loss in signals power as light travels down the fiber is called __A__.

A. Attenuation B. Scattering

C. Propagation D. Interruption

(6) Which of the following types of channels moves data relatively slowly? __C__

A. wide band channel B. voice band channel

C. narrow band channel D. all of above

(7) A protocol is a set of rules governing a time sequence of events __A__.

A. between peers B. between an interface

C. between modems D. across an interface

(8) The collection of communication lines and routers is called __D__.

A . LAN B . MAN

C . WAN D . Communication Subnet

(9) An inter-company network which used to distribute information, document files and database is called as __A__.

A. LAN B. MAN

C. WAN D. Extranet

(10) In Cyclic Redundancy Checking, CRC is the __B D__

A. Divisor B. Quotient

C. Dividend D. Remainder

(11) The two categories of network operating systems are __C__

A. point-to-point and round-about B. point-to-point and client-server

C. peer-to-peer and client-server D. peer-to-peer and compliant-server

(12) A __A__ is a description of the layout of the region or area covered by a network
A. network topology B. network protocol
C. network router D. network switch

(13) The Store and Forward mechanism is used in __A__
A. Packet Switching B. Message Switching
C. Circuit Switching D. Datagram Switching

(14) What are the advantages of packet switching over circuit switching? __C__
A. Less wasteful in case of bursty traffic B. Less wasteful in case of steady traffic
C. Easier to implement on network devices D. Allows for lower delays

(15) __AB__ is the protocol suite used for transferring data over the Internet.
A. ISO/OSI B. TCP/IP
C. Router D. Switch

(16) A go-back-N protocol uses 4-bit sequence number, the maximum windows size is __D__.
A. 1 B.7 C. 8 D. 15 E. 16

(17) 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 that each frame carries 1 KB of data, what is the minimum number of bits you need for the sequence number? __D__.
A. 6 B.7 C. 8 D. 9

(18) Host A is sending data to host B over a full duplex link. A and B are using the sliding window protocol for flow control. The sender and receiver window sizes are 5 packets each. Data packets (sent only from A to B) are all 1000 bytes long and the transmission time for such a packet is 50ms. Acknowledgement packets (sent only from B to A) are very small and require negligible transmission time. The propagation delay over the link is 200ms. What is the maximum achievable throughput in this communication? B

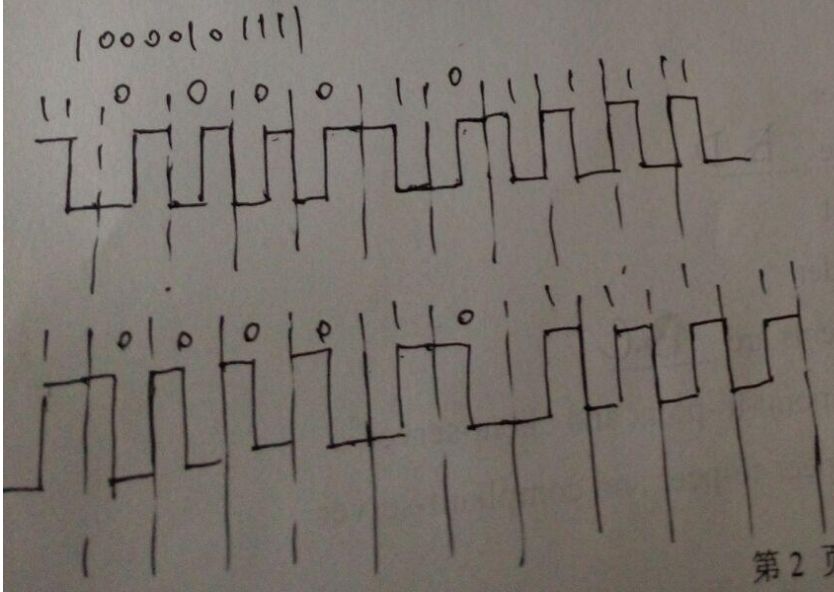
A. 7.69×10^6 bps B. 11.11×10^6 bps
C. 13.33×10^6 bps D. 15.00×10^6 bps

2. (1 point) If a binary signal is sent over a 4000Hz channel whose signal-to-noise ratio is 30 dB.

(1) The maximum baud rate is __8000__.

(2) The maximum data rate is about __39.87__ bps.

3. (1 point) Show the Manchester encoded signal for the bit stream: 10000101111.



2. A noiseless 4-kHz channel is sampled every 1 msec. What is the maximum data rate?

3. If a binary signal is sent over a 3-kHz channel whose signal-to-noise ratio is 20 dB, what is the maximum achievable data rate?

36. Compare the delay in sending an x-bit message over a k-hop path in a circuit-switched network and in a (lightly loaded) packet-switched network. The circuit setup time is s sec, the propagation delay is d sec per hop, the packet size is p bits, and the data rate is b bps. Under what conditions does the packet network have a lower delay?

37. Suppose that x bits of user data are to be transmitted over a k-hop path in a packet-switched network as a series of packets, each containing p data bits and h header bits, with $x >> p + h$. The bit rate of the lines is b bps and the propagation delay is negligible. What value of p minimizes the total delay?

18. A channel has a bit rate of 4 kbps and a propagation delay of 20 msec. For what range of frame sizes does stop-and-wait give an efficiency of at least 50 percent?

30. Consider an error-free 64-kbps satellite channel used to send 512-byte data frames in one direction, with very short acknowledgements coming back the other way. What is the maximum throughput for window sizes of 1, 7, 15, and 127? The earth-satellite propagation time is 270 msec.

15. A 1-km-long, 10-Mbps CSMA/CD LAN (not 802.3) has a propagation speed of 200 m/μsec. Repeaters are not allowed in this system. Data frames are 256 bits long, including 32 bits of header, checksum, and other overhead. The first bit slot after a successful transmission is reserved for the receiver to capture the channel in order to send a 32-bit acknowledgement frame. What is the effective data rate, excluding overhead, assuming that there are no collisions?

16. Consider building a CSMA/CD network running at 1 Gbps over a 1-km cable with no repeaters. The signal speed in the cable is 200,000 km/sec. What is the minimum frame size?

5. Consider the subnet of Fig. 5-12(a). Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E: (7, 6, 3, 9, 0, 4). The measured delays to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.

20. Suppose that host A is connected to a router R 1, R 1 is connected to another router, R 2, and R 2 is connected to host B. Suppose that a TCP message that contains 900 bytes of data and 20 bytes of TCP header is passed to the IP code at host A for delivery to B. Show the Total length, Identification, DF, MF, and Fragment offset fields of the IP header in each packet transmitted over the three links. Assume that link A-R1 can support a maximum frame size of 1024 bytes including a 14-byte frame header, link R1-R2 can support a maximum frame size of 512 bytes, including an 8-byte frame header, and link R2-B can support a maximum frame size of 512 bytes including a 12-byte frame header.

27. A large number of consecutive IP address are available starting at 198.16.0.0. Suppose that four organizations, A, B, C, and D, request 4000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation.

28. A router has just received the following new IP addresses: 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, can they be aggregated? If so, to what? If not, why not?

29.* The set of IP addresses from 29.18.0.0 to 19.18.127.255 has been aggregated to 29.18.0.0/17. However, there is a gap of 1024 unassigned addresses from 29.18.60.0 to 29.18.63.255 that are now suddenly assigned to a host using a different outgoing line. Is it now necessary to split up the aggregate address into its constituent blocks, add the new block to the table, and then see if any reaggregation is possible? If not, what can be done instead?

30. A router has the following (CIDR) entries in its routing table:

Address/mask	Next hop
135.46.56.0/22	Interface 0
135.46.60.0/22	Interface 1
192.53.40.0/23	Router 1
default	Router 2

For each of the following IP addresses, what does the router do if a packet with that address arrives?

(a) 135.46.63.10
(b) 135.46.57.14
(c) 135.46.52.2
(d) 192.53.40.7
(e) 192.53.56.7

25. Consider the effect of using slow start on a line with a 10-msec round-trip time and no congestion. The receive window is 24 KB and the maximum segment size is 2 KB. How long does it take before the first full window can be sent?

26. Suppose that the TCP congestion window is set to 18 KB and a timeout occurs. How big will the window be if the next four transmission bursts are all successful? Assume that the maximum segment size is 1 KB.

28. A TCP machine is sending full windows of 65,535 bytes over a 1-Gbps channel that has a 10-msec one-way delay. What is the maximum throughput achievable? What is the line efficiency?

30. In a network that has a maximum TPDU size of 128 bytes, a maximum TPDU lifetime of 30 sec, and an 8-bit sequence number, what is the maximum data rate per connection?