The following is a list of possible questions for our Quiz #3. Some of the questions will not be asked in the quiz. All the questions that will appear in the quiz will appear exactly as shown below (however, parameters may be changed). The quiz is closed textbook, closed notes and closed neighbors. Note that the questions, which did not appear in this quiz, still may appear in the exams.

#1: How large are typical LANs (Local Area Network)?

#2: How large are typical WANs (Wide Area Network)?

#3: What is the primary purpose of LANs?

#4: What is the primary purpose of WANs?

#5: What is an internet?

#6: What is an intranet?

#7: Who owns LAN, WAN, intranet and internet?

#8: What is a protocol (define "network protocol" by providing the three keywords)?
   
   A protocol is (1) ________________, (2) ________________ and (3) ____________.

   Give two examples of the existing network protocols.

#9: What is an interface (define "network protocol" by providing the three keywords)?
   
   An interface is (1) ________________, (2) ________________ and (3) ____________.

#10: What is “layered structure” for a protocol?

#11: Why do some computer networks use packets to transmit data? Provide one primary advantage and disadvantage in using packets for data transmission.

#12: What is the primary tradeoff in using “layered architecture”?
#14: Answer the following questions to describe what packet header: is:

1. What do packets consist of?
2. Where is the packet header?
3. What kind of information is in the packet header (you need to name at least two different types of information)?

#15: What is “packet encapsulation”? What is it for (i.e., what is the purpose of “packet encapsulation”)?

#16: If network protocols are implemented without “packet encapsulation”, what problems would we have?

#17: Name each layer of the OSI seven-layer model (from low level (= layer 1) to high level).

#18: Why don’t network applications perform actual network data transmissions (instead, “protocol stack” does the work)?

#19: What are the major advantages in using “network protocols”? What are the major disadvantages in using “network protocols”?

#20: Show the TCP/IP protocol suite on top of the OSI 7-layer reference model.

#21: What are the two internal components in packets (packets for network data transmissions)?

#22: Complete the following table by providing an example to each category. If there is no existing network system applicable to a category, clearly mention so.

<table>
<thead>
<tr>
<th>Internal Operation</th>
<th>External Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Circuit</td>
<td>Virtual Circuit</td>
</tr>
<tr>
<td>Datagram</td>
<td>Datagram</td>
</tr>
</tbody>
</table>

#23: Do the two terms, “peer-to-peer” and “point-to-point” mean the same concept?

#24: What is the counter concept of “peer-to-peer”?

#25: What is the counter concept of “point-to-point”?

#26: What is “flow control” for packet-switching networks?
#27: What is “error control” for packet-switching networks?

#28: Describe how “stop-and-wait flow control” work.

#29: Stop-and-wait flow control is not popularly used today. Why?

#30: What is “(link bandwidth) utilization”?

#31: Show the formula for calculating the (link bandwidth) utilization of stop-and-wait flow control.

#32: For each of the following factors, what should we (i.e., computer scientists) do to increase the expected link bandwidth utilization?

(a) Transmission rate (in bps):

(b) Packet size (in bytes per packet):

(c) End-to-end logical link distance (in miles):

(d) Signal propagation speed (in miles per second):

#33: Describe how “sliding window flow control” works (especially from a view point of how it fixes the problem of stop-and-wait flow control).