1. What is the total size of the minimum TCP MTU, including TCP and IP overhead but not including data link layer overhead?

见书本559页中倒数第二段：During connection setup, each side can announce its maximum and see its partner’s. If a host does not use this option, it defaults to a 536-byte payload. All Internet hosts are requires to accept TCP segments of 536+20= 556bytes.

再加上IP over head 556 = 20 = 576 bytes.

1. 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?

According to the slow start (Fig.6-44), after the first RTT 10-msec, the congestion window will send two packets (2×2KB = 4KB); after the 2nd RTT 10-msec (after 20 msec), the congestion window will send four packets (4×2KB = 8kB); after the 3rd RTT 10-msec (30 msec), the congestion window will send eight packets (8 × 2KB = 16KB); after the 4th RTT 10-msec (40 msec), the congestion window will send 16 packets (16 × 2KB = 32KB), but the receiver window is 24 KB, so the congestion window is min(24, 32)= 24 KB. So the answer is 40 msec.

1. 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 1KB.

我觉得这道题目有点问题，首先TCP Tahoe和TCP Reno所采取的策略是不一样的，不知是哪种情况下TCP拥塞控制？

When a timeout occurs, three things happened. First, slow start will be initiated. Second, the congestion window would start at 1. Third, the threshold will be reset to 18KB/2=9KB. If the next four transmission are all successful, then

* 1st transmission: 1 segment, 1KB
* 2nd transmission: 2 segments, 2KB
* 3rd transmission: 4 segments, 4KB
* 4th transmission: 8 segments, 8KB

After these four successful transmissions, the window size is supposed to be 16. However, since the threshold is 9KB, the window size can only be 9KB.

1. 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?

RTT = 2 × 10-msec = 20 msec.

So in 1 sec, 50 segments will be sent. 50 × 65535 = 3.3 MB/s

50 × 65535 × 8 / (1 × 109) = 2.6%

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

具有相同编号的TPDU 不应该同时在网络中传输，必须保证，当序列号循环回来重复使用的时候，具有相同序列号的TPDU 已经从网络中消失。现在存活时间是30 秒，那么在30 秒的时间内发送方发送的TPDU 的数目不能多于255 个。

255×128×8/30=8738 b/s

所以，每条连接的最大数据速率是8738b/s。

1. What is used at the transport layer to stop a receiving host’s buffer from overflowing?

Flow-control

1. Which type of service is provided by TCP?

Reliable byte stream

1. TCP uses three-way handshake scheme to establish connections.
2. Which socket primitive is used to block the caller until a connection attempt arrives?

accept

1. If the window size field of the acknowledgement TCP segment is 50 KB, and the congestion window size is 40 KB, how many bytes could the sender transmit next time?

40KB