Please DO NOT upload questions and answers onto the Internet.

| 1.1 | D | 1.2 | C | 1.3 | D | 1.4 | C | 1.5 | C |

| 1.6 | E | 1.7 | E | 1.8 | B | 1.9 | C | | |

2.

(a)

400 Mbps

(b)

120 Mbps

(c)

81 μs

3.

(a)

16 ms

(b)

3

4.

Encrypted hash of the message: digital signature of Alice used to prove her identity to Bob. Alice's private key is used.
Encrypted message: message encrypted with the session key to ensure confidentiality of the message. Session key is a symmetric key.
Encrypted session key: session key encrypted with Bob's public key. The purpose is to share the session key with Bob.

5.

(a)

Yes. Premature timeout and retransmitted packet delivered to application.

(b)

Yes. Premature timeout and retransmission. The next new packet is lost but undetected because the sender treats the duplicate ACK as the acknowledgement for the next packet.

(c)

P_3

6.

(a)

3

(b)

2

(c)

1

(d)

5

7.

(a)

$\alpha \geq 11$, since $d_z(y) \geq 1$, $c(x,y) = 10$, and $\alpha = d_x(y) = c(x,z) + d_z(y)$.

(b)

$d_w(z) = 6$, otherwise we will go through w to reach y.