Part 1. Short answers

1. Application, Transport, Network, Link, physical
2. Non-persistent, one object sent over TCP
   Persistent, multiple objects sent ove TCP
3. UDP - unreliable, TCP - reliable
4. Disk operating system
5. 3
6. HTTP - application
   TCP - transport
   IP - network
   DNS - application
   FDMA -
   ARP -
   DHCP -
7. HTTP - 80
   SMTP - 587
8. Streaming protocol for high res vid over web.
9. 32 bits, 20 bits in netmask
10. 48 bits, yes its unique
11. IP - Routing MAC - switch
12.
13.
14.
15.

Part 2.

1) D
2) A
3) B
4) C
5) A
6) B
7) C
8) A
9) B
10) A

Part 3. Long - Answer

1. RSA $p = 3$ $q = 7$

1.1 $n = 3 \times 7 = 21$

$z = (3-1)(7-1) = 2 \cdot 6 = 12$

1.2 $e = 5$

1.3 $5 \times d = 1 \bmod 12$

$d = 5 \bmod 12$

$d = 5$

$25 \bmod 12 = 1$

1.4 $3^6 \bmod 21$ $12^5 \bmod 21$

$c = 12$ $p = 3$

2.

2.1 - Soure IP : 111.111.111.111

- Destination : 222 222 222.222

- Soure MAC : 74-29-9C-E8-FF-55

- Destination MAC : 4A-BD-D2-C7-56-2A

2.2 The header will be removed and destination IP will be searched.

2.3 - Soure IP : 222.222.222.220

- Destination IP : 222.222.222 222

- Soure MAC : 1A-23-F9-CD-06-9B

- Destination MAC : 4A-BD-D2-C7-56-2A

2.4 Packet header will be stripped, and payload is processed

3. 1) slow start: 1-4, 7-10

congestion avoidance: 4-6, 10-23,

Fast recovery: 24, 32

2) RTT = 6 timeout

3) RTT = 10 -> 5

RTT = 23 -> 13

RTT = 31 -> 13

4. 1001) 1001100 0000 (100011

1001

0000 1000

1001

1000

1001

001

10 01) 100 1100 0001 (10001001

1001

0000 1000

1001

0001 001

... 1001

0000

↓

Remainder = 0

✓

5.

5.1 DHCP server

app - DHCP

trans - UDP

Network - IP

Link - ethernet

5.2 All F Broadcast Mac address is used to initiated ARP

5.3

app - DNS

trans - UDP

Network - IP

Link - ethernet

5.4 ARP Protocol

5.5

app - HTTP

trans - TCP

Network - IP

Link - ethernet