Q1:

Answer: 540 bytes /(540+M) bytes.

Calculations and derivation: (20+20+20+100+30+20+40+60+80+150) bytes /: (20+20+20+100+30+20+40+60+80+150+M) bytes.

Explain: It is a 10-layer architecture and protocol hierarchy and header in each layer should be added. The applications generate message of length M bytes. The fraction of network bandwidth is filled with headers that is equal to the total size of 10 layers headers divided by total size of 10 layers header added message M bytes.

Q2:

Answer: 64-kbps:3121.2s ; 1-Mbps:199.8s

Explain: 1 baye = 8 bits the total size of image is equal to 4080\*2040\*3\*8 bits

64-kbps time : 4080\*2040\*3\*8 bits /64,000 bps=3121.2s

1. Mbps time: 4080\*2040\*3\*8 bits/ 1,000,000 bps =199.8s

Q3:

The total sent data is 11011011001

The generator polynomial: 10011.

The frame: 1101101.

Let r be the degree of G(x). Append r zero bits to the low-order end of the frame so it now contains m + r bits and corresponds to the polynomial x r M(x).

Frame is equals m+r = 11011010000

Divide the bit string corresponding to G(x) into the bit string corresponding to M(x), using modulo 2 division.

Subtract the remainder (which is always r or fewer bits) from the bit string corresponding to M(x) using modulo 2 subtraction. The result is the checksummed frame to be transmitted.

Q4:

TCP/IP can only represent protocol stack it suite. Like cannot describe the Bluetooth.

It does not clearly separate the concepts of services, interfaces, and protocols. So, the new technologies in new network are not suitable.

It does not distinguish between the data link and the physical layers, which has very different functionalities.

Minor protocols deeply entrenched, hard to replace.

It was originally designed and implemented for wide area networks. It is not optimized for small networks like LAN (local area network) and PAN (personal area network).