Solutions

Each answer shows the steps, then the **result**.

2.1

- (i) **internet**
- (ii) **application**
- (iii) **transport**

2.2

- (i) **TCP**: every part must arrive
- (ii) **UDP**: speed matters more than a lost packet

2.3

- $6 \times 10^6 \times 8 = 48 \times 10^6$ bits
- $48 \times 10^6 \div 4 \times 10^6 =$ **12 s**

2.4

- its address must not change, so DNS can always point clients to it

3.1 B

- name to address

3.2 A

- 32 bits give only about 4.3 billion

3.3 C

- other traffic and errors reduce it

3.4

(a)

- the laptop asks for an address when it joins; a DHCP server replies
- it lends a free private IP address for a time

(b)

- the browser asks a DNS server for the IP address of `www.school-library.org`
- if it does not know, that DNS server asks other DNS servers
- the IP address is returned and the browser connects to it

(c)

- $24 \times 10^6 \times 8 = 192 \times 10^6$ bits
- $192 \times 10^6 \div 16 \times 10^6 =$ **12 s**

(d)

- every byte of the file must arrive, in the right order
- TCP numbers the data, checks it arrived and resends missing parts