5B - Communications - Lesson 01

Digital Download & File Storage - **Size Prefixes.**

Name: _____

1) Draw a line from the **prefix** to its **value.**

Prefix	Value
Tetra ●	● 10^{15}
Mega ●	● 10^{3}
Peta ●	● 10^{9}
Giga ●	● 10^{6}
Kilo ●	● 10^{12}

2) One Gigabyte equals 1,000 _____bytes.

3) One Terabyte equals 1,000 _____bytes.

4) One Terabyte equals 1,000,000 _____bytes.

5) 1000 kilobytes equals one _____byte.

6) 1,000,000 bytes equals one _____byte.

7) Which is best? A 0.5 terabyte drive or 760 gigabyte drive?

5B - Communications - Lesson 02

Digital Download & File Storage

Converting Bits & Bytes.

Name: _____

1) What is a **bit**?

2) What is a **byte**?

3) In a 32-bit computer a **word** is made up of four bytes. How many **bits** in a word?

4) How many numerals are there in the decimal system? ___

5) How many numerals are there in the binary system? ___

6) In the binary system bits that are **ON** are represented by the number ___.

7) In the binary system bits that are **OFF** are represented by the number ___.

8) How many numerals are there in the hexadecimal system? ___

9) What are the **extra** numerals in the hexadecimal system?

___ ___ ___ ___ ___ ___.

10) Binary numbers are converted to decimal by adding the place values which have a value of '1'. Convert the following binary number in to a decimal number.

0011 1011

128	64	32	16	8	4	2	1

Decimal = _____ + ____ + ____ + ____ + ____ = _____

5B - Communications - Lesson 03

Digital Download & File Storage - **Download Speed.**

Name: _____

1) What is the difference between an analogue **modem** and an **ADSL router**?

2) What is the difference between **kilobit (kb)** and **kilobyte (kB)**?

3) Use the internet to find the speeds for

a. An analog to digital modem _____ b. Wireless router _____

c. ADSL router _____ d. ADSL 2+ router _____

4) You have an 8 Mb/s plan with your ISP. When you reach your limit your speed is **shaped** [slowed down] to 256kb/s. You are downloading a 500 MB file. How long will it take at:

a. Full speed [8 Mb/s]

Bytes/s = 8,000,000 b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

= _____ seconds ÷ 60 = _____ minutes.

b. Shaped speed [256 kb/s]

Bytes/s = 256,000 b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

= _____ seconds ÷ 3600 = _____ hours.

5) You have a 1500 kb/s plan with your ISP. When you reach your limit your speed is **shaped** [slowed down] to 64kb/s. You are downloading a 500 MB file. How long will it take at:

a. Full speed [1500 kb/s]

Bytes/s = 1,500,000 b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

= _____ seconds ÷ 60 = _____ minutes.

b. Shaped speed [64 kb/s]

Bytes/s = 64,000 b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

= _____ seconds ÷ 3600 = _____ hours.

6) The NBN [National Broadband Network] was planned to have a speed of 100 Mbits/s. How long will it take to download a 500 MB file?

Bytes/s = _____ b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

7) It was announced on August 10, 2010 by by NBN boss Michael Quigley that the NBN will have a speed of 1 Gbit/s. How long will it take to download a 500 MB file?

Bytes/s = _____ b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

8) The Japenese have reached speeds of 69.1 Tbit/s in the testing of their NTT. How long will it take to download a 500 MB file?
Source: broadbandguide.com.au/blogs/2010/08/1-gigabit-nbn-speed-tip-of-the-iceberg

Bytes/s = _____ b/s ÷ 8 = _____ B/s

Time = 500,000,000 bytes ÷ _____ = _____ seconds

SOLUTIONS

5B - Communications - Lesson 01

Digital Download & File Storage - **Size Prefixes.**

Name: _____

1) Draw a line from the **prefix** to its **value.**

Prefix		Value
Tera (Tera)	•	Peta • 10^{15}
Mega	•	Kilo • 10^{3}
Peta	•	Giga • 10^{9}
Giga	•	Mega • 10^{6}
Kilo	•	Tera • 10^{12}

2) One Gigabyte equals 1,000 Mega bytes.

3) One Terabyte equals 1,000 Giga bytes.

4) One Terabyte equals 1,000,000 Kilo bytes.

5) 1000 kilobytes equals one million byte.

6) 1,000,000 bytes equals one Mega byte.

7) Which is best? A 0.5 terabyte drive or 760 gigabyte drive?
5×10^{11} bytes or 7.6×10^{11} bytes.

5B - Communications - Lesson 02

Digital Download & File Storage

Converting Bits & Bytes.

Name: _____

1) What is a **bit**?
is a basic unit of information in computing with a value of 0 or 1.

2) What is a **byte**? 8 bits

3) In a 32-bit computer a **word** is made up of four bytes. How many **bits** in a word?
32 bits.

4) How many numerals are there in the decimal system? 10

5) How many numerals are there in the binary system? 2

6) In the binary system bits that are **ON** are represented by the number 1.

7) In the binary system bits that are **OFF** are represented by the number Ø.

8) How many numerals are there in the hexadecimal system? 16

9) What are the **extra** numerals in the hexadecimal system?

A B C D E F.

10) Binary numbers are converted to decimal by adding the place values which have a value of '1'. Convert the following binary number in to a decimal number.

0011 1011

128	64	32	16	8	4	2	1
0	0	1	1	1	0	1	1

Decimal = 32 + 16 + 8 + 2 + 1 = 59

5B - Communications - Lesson 03

Digital Download & File Storage - **Download Speed.**

Name: _____

1) What is the difference between an analogue **modem** and an **ADSL router**?
A modem is a device that provides access to the internet. In order for devices on a network to connect to the internet, the router must be connected to a modem.

2) What is the difference between **kilobit (kb)** and **kilobyte (kB)**?
1 kilobit is roughly 1000 bits (to be exact 1024 bits) = 125 bytes. 1 byte is equal to 8 bits, therefore 1 kilobyte is 1024 bytes

3) Use the internet to find the speeds for (changes according to time)

a. An analog to digital modem ____ b. Wireless router ____

c. ADSL router ____ d. ADSL 2+ router ____

4) You have an 8 Mb/s plan with your ISP. When you reach your limit your speed is **shaped** [slowed down] to 256kb/s. You are downloading a 500 MB file. How long will it take at:

a. Full speed [8 Mb/s]

Bytes/s = 8,000,000 b/s ÷ 8 = 10^6 B/s

Time = 500,000,000 bytes ÷ 10^6 = 500 seconds

= 500 seconds ÷ 60 = 8.33 minutes.

b. Shaped speed [256 kb/s]

Bytes/s = 256,000 b/s ÷ 8 = 32000 B/s

Time = 500,000,000 bytes ÷ 32000 = 15625 seconds

= 15625 seconds ÷ 3600 = 4.34 hours.

5) You have a 1500 kb/s plan with your ISP. When you reach your limit your speed is **shaped** [slowed down] to 64kb/s. You are downloading a 500 MB file. How long will it take at:

a. Full speed [1500 kb/s]

Bytes/s = 1,500,000 b/s ÷ 8 = 187500 B/s

Time = 500,000,000 bytes ÷ 187500 = 2666.7 seconds

= 26667 seconds ÷ 60 = 44.44 minutes.

b. Shaped speed [64 kb/s]

Bytes/s = 64,000 b/s ÷ 8 = 8000 B/s

Time = 500,000,000 bytes ÷ 8000 = 62500 seconds

= 62500 seconds ÷ 3600 = 17.36 hours.

6) The NBN [National Broadband Network] was planned to have a speed of 100 Mbits/s. How long will it take to download a 500 MB file?

Bytes/s = 100,000,000 b/s ÷ 8 = 12500000 B/s

Time = 500,000,000 bytes ÷ 12500000 = 40 seconds

7) It was announced on August 10, 2010 by by NBN boss Michael Quigley that the NBN will have a speed of 1 Gbit/s. How long will it take to download a 500 MB file?

Bytes/s = 10^9 b/s ÷ 8 = 1.25×10^8 B/s

Time = 500,000,000 bytes ÷ 1.25×10^8 = 4 seconds

8) The Japanese have reached speeds of 69.1 Tbit/s in the testing of their NTT. How long will it take to download a 500 MB file?

Source: broadbandguide.com.au/blogs/2010/08/1-gigabit-nbn-speed-tip-of-the-iceberg

Bytes/s = 69.1×10^{12} b/s ÷ 8 = 8.64×10^{12} B/s

Time = 500,000,000 bytes ÷ 8.64×10^{12} = 5.79×10^{-5} seconds