

Name \_\_\_\_\_ Date \_\_\_\_\_

# **Module 5 - Number Systems**

## **Introduction to Networks – Semester 1**

### **Student Version**

#### **Module 5 Sections:**

- 5.0 Introduction
- 5.1 Binary Number System
- 5.2 Hexadecimal Number System
- 5.3 Module Practice and Quiz

#### **Required Materials:**

Reading Organizer

Packet Tracer Activities:     None

Labs:   None

Module's 4 – 7 Exam

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Name \_\_\_\_\_ Date \_\_\_\_\_

## Module 5 - Number Systems

### Reading Organizer

#### Student Version

**Note:** The Reading Organizer has weighted scoring. Any question with the word **explain, define, or describe** in it is expected to have a longer answer and is worth two points each.

**After completion of this chapter, you should be able to:**

- Calculate numbers between decimal and binary systems.
- Calculate numbers between decimal and hexadecimal systems.

### 5.1 Binary Number System

1. Binary is a numbering system that consists of the digits 0 and 1 called \_\_\_\_\_.
2. Each address consists of a string of \_\_\_\_\_, divided into four sections called \_\_\_\_\_.
3. For ease of use by people, IPv4 addresses are commonly expressed in \_\_\_\_\_.
4. Convert the following binary numbers to decimal.

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

Answer: \_\_\_\_\_

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

Answer: \_\_\_\_\_

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

Answer: \_\_\_\_\_

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

Answer: \_\_\_\_\_

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

Answer: \_\_\_\_\_

5. Convert the following binary numbers to decimal.

0000011     Answer: \_\_\_\_\_

00001111     Answer: \_\_\_\_\_

0110100     Answer: \_\_\_\_\_

01111100     Answer: \_\_\_\_\_

01111111     Answer: \_\_\_\_\_

6. Convert the following decimal numbers to binary.

Number: 14

128	64	32	16	8	4	2	1

Number: 28

128	64	32	16	8	4	2	1

Number: 75

128	64	32	16	8	4	2	1

Number: 200

128	64	32	16	8	4	2	1

Number: 254

128	64	32	16	8	4	2	1

7. Convert the following decimal numbers to binary. (Show all eight binary digits)

Number: 12    Answer: \_\_\_\_\_

Number: 56    Answer: \_\_\_\_\_

Number: 224    Answer: \_\_\_\_\_

## 5.2 Hexadecimal Number System

8. Just as decimal is a base \_\_\_\_\_ number system, hexadecimal is a base \_\_\_\_\_ system.

9. The hexadecimal numbering system is used in networking to represent \_\_\_\_\_ and \_\_\_\_\_.

10. IPv6 addresses are \_\_\_\_\_ in length and every \_\_\_\_\_ is represented by a \_\_\_\_\_ hexadecimal digit; for a total of \_\_\_\_\_ hexadecimal values.

11. Are IPv6 addresses case sensitive?

12. When referring to 8 bits of an IPv4 address we use the term \_\_\_\_\_.

13. In IPv6, a \_\_\_\_\_ is the unofficial term used to refer to a segment of 16 bits or four hexadecimal values.

14. Describe the steps to convert decimal numbers to hexadecimal values.

a.

b.

c.

15. Based on the sample convert the following decimal numbers to binary and then hexadecimal. (Hint: Use the comparison charts earlier in the chapter.)

Decimal: 168

Binary: 1010 1000

Hexadecimal: A8

a. Decimal: 100

Binary: \_\_\_\_\_

Hexadecimal: \_\_\_\_\_

b. Decimal: 235

Binary: \_\_\_\_\_

Hexadecimal: \_\_\_\_\_

c. Decimal: 15

Binary: \_\_\_\_\_

Hexadecimal: \_\_\_\_\_

d. Decimal: 255

Binary: \_\_\_\_\_

Hexadecimal: \_\_\_\_\_

e. Decimal: 61

Binary: \_\_\_\_\_

Hexadecimal: \_\_\_\_\_

16. Describe the steps to convert hexadecimal values to decimal numbers.

a.

b.

c.

17. Based on the sample convert the following hexadecimal numbers to binary and then decimal.

Hexadecimal: A8	Binary: <u>1010 1000</u>	Decimal: <u>168</u>
a. Hexadecimal: 32	Binary: _____	Decimal: _____
b. Hexadecimal: CB	Binary: _____	Decimal: _____
c. Hexadecimal: 43	Binary: _____	Decimal: _____
d. Hexadecimal: F8	Binary: _____	Decimal: _____
e. Hexadecimal: 80	Binary: _____	Decimal: _____