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Student Study Guide for the Tronix 2 Lab “Basic Digital Concepts” with Interactive Software

(Check the box as each step is completed.)

Student Name _____

Student ID Number _____ Period _____

Date the Lab was started _____

Date the Lab was completed _____

Average Score on Quizzes _____

Instructors Name/Signature _____

Student Study Guide Tronix Lab 2 with Software

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Start Here: Study Guide for Tronix 2 Digital Lab

LESSON 1

- Step #1-1:** Take the Pre-Quiz on the computer for Lesson #1. This is the Pre-Quiz. Unless you have had digital electronics before, you should not score well on this quiz.

To take the Quiz, open the Tronix 2 software by clicking on the [GibTechTronix] ICON on your computer desktop. Then click on [Tronix 2], then [Lesson #01], then [Pre-Quiz]. Take the quiz and print out result certificate.

- Step #1-2:** Take Inventory of all the Tronix 2 experiment parts by laying the parts on the drawings on pages 4 and 5. If there are any parts missing, notify your instructor.

- Step #1-3:** Read and study pages 8 through 15 in Tronix 2 Manual. Take notes as necessary. Then, on the computer, take the Post-Quiz for Written Lesson #1.

- Step #1-4:** Do the Interactive Lesson #1 on the computer. Here are the steps:
- a. - Open the Tronix 2 software on your computer.
 - b. - Open **Lesson #1, "Digital vs. Analog"**
 - c. - Open the Interactive Lesson.
 - d. - Click on [Digital Fundamentals]
 - e. - Click on the green arrow at the bottom of the screen to navigate from frame to frame. Read and listen to the audio narration only for frames 4 through 8 of the 32 frames available.

(When you are ready to close the Interactive Lesson, click on the 'X' in the upper right of the screen.)

f. Then take the Quiz for Interactive Lesson. Print out the certificate for your records.

LESSON 2

- Step #2-1:** On the computer, take Pre-Quiz for Written Lesson #2. Print out result certificate.
- Step #2-2:** Study the AND Logic Gate on pages 16 and 17 in your Tronix 2 manual.
- Step #2-3:** On the computer, go to [Logic Gates] on the Main Menu and click on it. Then click on [AND Gate] and use the simulation to observe and verify the Truth Table.

- Step #2-4:** Take Post-Quiz for Written Lesson. Print the certificate for your records.

- Step #2-5:** Open Interactive Lesson #2 in the Software for Tronix 2. Do the Interactive Lesson.

Here are the steps:

- a. - Open the Tronix 2 software on your computer.
- b. - Open **Lesson #2, "AND Gate"**
- c. - Open the Interactive Lesson.
- d. - Click on [Digital Fundamentals]
- e. - Click on the green arrow at the bottom of the screen to navigate from frame to frame. Read and listen to the audio narration for frames 10 and 11, and then frames 15 through 32. Take notes for to help you learn.

(When you are ready to close the Interactive Lesson, click on the 'X' in the upper right of the screen.)

f. Then take the Quiz for the Interactive Lesson #2. Print out the certificate for your records.

LESSON 3

- Step #3-1:** On the computer, take Pre-Quiz for Written Lesson #3. Print out result certificate.

- Step #3-2:** Study the **OR, YES and NOT Logic Gates** on pages 18 through 21 in your Tronix 2 manual.

- Step #3-3:** On the computer, go to [Logic Gates] on the main menu and click on it. Then click on the [OR Gate] and observe and verify the Truth Table for this gate. Now do the same thing for the [YES Gate] and then the [NOT Gate] and observe and verify the Truth Table for each gate.

- Step #3-4:** Take Post-Quiz for Written Lesson. Print the certificate for your records.

- Step #3-5:** Open Interactive Lesson #3 in the Software and study the Interactive Lesson. Click on [Digital Fundamentals] and use the green arrow to study frames 12 through 14 and frame 16. Then take the Quiz for the Interactive Lesson #3. Print out the certificate for your records.

LESSON 4

- Step #4-1:** On the computer, take Pre-Quiz for Written Lesson #4. Print out result certificate.

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Step #4-2: Study the **NOR and NAND Logic Gates** on pages 22 through 25 in your Tronix 2 manual.

Step #4-3: On the computer, go to [**Logic Gates**] on the Main Menu and click on it. Then click on the [**NOR Gate**] and the [**NAND Gate**] and use the simulation to observe and verify the Truth Table.

Step #4-4: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #4-5: Open Interactive Lesson #4 in the Software and study the Interactive Lesson. Click on [Digital Fundamentals] and use the green arrow to study frames 17 and 18. Then take the Quiz for the Interactive Lesson #4. Print out the certificate for your records.

LESSON 5

Step #5-1: On the computer, take Pre-Quiz for Written Lesson #5. Print out result certificate.

Step #5-2: Study the **NAND Logic Gate Clock, Timer and Memory** on pages 26 through 31 in your Tronix 2 manual.

Step #5-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #5-4: Open Interactive Lesson #5 in the Software and study the Interactive Lesson. Click on [Sequential Logic] and use the green arrow to study only frame 4. Then take the Quiz for the Interactive Lesson #5. Print out the certificate for your records.

LESSON 6

Step #6-1: On the computer, take Pre-Quiz for Written Lesson #6. Print out result certificate.

Step #6-2: Study the **555 Timer** pages 32 through 33 in your Tronix 2 manual.

Step #6-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #6-4: Open Interactive Lesson #6 in the Software and study the Interactive Lesson. Click on [Digital Fundamentals] and use the green arrow to study only frames 22 and 23. Then take the Quiz for the Interactive Lesson #6. Print out the certificate for your records.

LESSON 7

Step #7-1: On the computer, take Pre-Quiz for Written Lesson #7. Print out result certificate.

Step #7-2: Study the **Binary and Decade Counters** on pages 34 through 37 in your Tronix 2 manual.

Step #7-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

LESSON 8

Step #8-1: On the computer, take Pre-Quiz for Written Lesson #8. Print out result certificate.

Step #8-2: Study the **Divider Circuit** on pages 38 through 39 in your Tronix 2 manual.

Step #8-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

LESSON 9

Step #9-1: On the computer, take Pre-Quiz for Written Lesson #9. Print out result certificate.

Step #9-2: Study **LED Readouts, 7-Segment Decoders, Digital Counter with display, and Digital Up-Down Counters** on pages 40 through 47 in your Tronix 2 manual.

Step #9-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

LESSON 10

Step #10-1: On the computer, take Pre-Quiz for Written Lesson #10. Print out result certificate.

Step #10-2: Study **Multiplexer and Demultiplexer circuits** on pages 48 through 49 in your Tronix 2 manual.

Step #10-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

LESSON 11

Step #11-1: On the computer, take Pre-Quiz for Written Lesson #11. Print out result certificate.

Step #11-2: Study **Introduction to Flip-Flops and D-Flip Flops** pages 74 through 77 in your Tronix 2 manual.

Student Study Guide

Tronix Lab 2 with Software



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Step #11-3: On the computer, go to [**Logic Gates**] on the Main Menu and click on it. Then click on [**D Flip-Flop**] and use the simulation to observe and verify the Truth Table.

Step #11-5: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #11-6: Open Interactive Lesson #11 in the Software and study the Interactive Lesson. Click on [Digital Fundamentals] and use the green arrow to study only frame 32. Then take the Quiz for the Interactive Lesson #11. Print out the certificate for your records.

LESSON 12

Step #12-1: On the computer, take Pre-Quiz for Written Lesson #12. Print out result certificate.

Step #12-2: Study **J-K Flip-Flops** pages 78 through 79 in your Tronix 2 manual.

Step #12-3: On the computer, go to [**Logic Gates**] on the Main Menu and click on it. Then click on [**Clocked R-S Flip-Flop**] and use the simulation to observe and verify the Truth Table.

Step #12-4: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #12-5: Open Interactive Lesson #12 in the Software and study the Interactive Lesson. Click on [Digital Fundamentals] and use the green arrow to study only frame 31. Then take the Quiz for the Interactive Lesson #12. Print out the certificate for your records.

LESSON 13

Step #13-1: On the computer, take Pre-Quiz for Written Lesson #7. Print out result certificate.

Step #13-2: Study the **Schmitt Trigger** on pages 80 through 81 in your Tronix 2 manual.

Step #13-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

LESSON 14

Step #14-1: On the computer, take Pre-Quiz for Written Lesson #14. Print out result certificate.

Step #14-2: Study **Shift Registers** on pages 82 through 83 in your Tronix 2 manual.

Step #14-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #14-4: Open Interactive Lesson #14 in the Software and study the Interactive Lesson. Click on [Sequential Logic] and use the green arrow to study only frames 9 through 10. Then take the Quiz for the Interactive Lesson #14. Print out the certificate for your records.

LESSON 15

Step #15-1: On the computer, take Pre-Quiz for Written Lesson #15. Print out result certificate.

Step #15-2: Study **Operational Amplifiers** on pages 84 through 85 in your Tronix 2 manual.

Step #15-3: Take Post-Quiz for Written Lesson. Print the certificate for your records.

Step #15-4: Open Interactive Lesson #15 in the Software and study the Interactive Lesson. Click on [Operational Amplifiers] and use the green arrow to study frames 1 through 18. Then take the Quiz for the Interactive Lesson #15. Print out the certificate for your records.

Congratulations! You have completed the Tronix 2 Digital Lab. This is a major step in your technology education. Keep up the good work! We need people like yourself to continue on in the engineering, medicine and science fields.

When you have completed these assignments, continue through Projects PR19 - PR30 in the Tronix 2 Lab manual, as you may want or as requested by your instructor. You can also use the student workbook #TL2-WB to further enhance your knowledge of electronics. You can go to www.GSSTechEd.com for more ideas.