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AOM 6310

STUDENT OUTLINE

D.C ELECTRICAL CIRCUITS (SIMULATION TRAINING)

LESSON PURPOSE: This lesson provides an introduction to the Universal Maintenance Training System (Device 11H118). Learning objectives are not specified for this lesson; however, content is controlled to provide:

1. description, characteristics, and functions of the simulation training system and

2. use of the simulation training system with the DC Circuits - Application of Meters to Circuits panel installed.

OUTLINE

1. DESCRIPTION, CHARACTERISTICS AND FUNCTIONING OF THE SIMULATION TRAINING SYSTEM

a. The Universal Maintenance Training System is a computer controlled training simulator that has a very high degree of fidelity as it relates to systems simulated. In other words, the various panels will respond to tests and inspections just the same as an actual vehicle.

b. Student Station

(1) The student station houses a computer, two video disc players and the power supply for the station. There is a storage drawer in the kneewell of the desk which contains the test leads you will use when performing exercises.

(2) On the top of the student station you see a computer monitor, keyboard, video display monitor, typical program panel, and communication panel.

(a) The keyboard is used to input information to the computer. Don't worry, you don't have to be a typist to use the keyboard. You will use the keyboard to log on when you commence your training with the system and log off when you are finished.

(b) The computer monitor is the lower of the two monitors. It displays information about you, such as your name, and it also will give you information as what to check if you have left the simulated system in an improper condition at the end of the exercise. For example, if you did not secure your test equipment properly, the monitor will provide you a check list of things to do so you can get into your next exercise.

(c) The video display monitor, the one on top, displays visual information pertaining to the exercise you are working. You are using the DC circuits panel which will provide information that will guide you through the exercises.

(d) The panel face is where you will interact with the DC circuits panel. By simply looking at the panel face you can see that you will have to push switches, open and close toggles and connect test instrument leads to test points.

(e) This panel, entitled "DC Circuits - Application of Meters to Circuits" is unlike the other five panels. It consists of exercises that cause you to measure voltage, resistance, and current flow in representative electrical circuits. The DC circuits panel walks you through the various exercises that are in the program. You simply accomplish the steps prescribed by the monitor. But, at the end of each problem you will have to select answers from a list of four choices. The correct answer will be related to the values you received when you applied the meters to the circuits during the exercise.

c. Student Log On/Log Off Procedures

(1) You must log on at the student station each time you use the simulators. By logging on, the student station computer can maintain a record of your actions so the instructor can review your progress and provide remedial instruction if required.

(a) When the system is powered up, the student station main menu will be displayed on the computer monitor. Remember, that is the lower of the two monitors.

(b) First you must select student log on command. To do so, press function key F1. This will give you the student log on display on the computer monitor.

(c) Next, type your last name and initials using the keyboard. If two students are at a station, both must log on.

(d) Now, check the computer monitor to make sure your name is correct. If it is, press the key marked "Enter." If your name is not correct, correct it before you press "Enter." The student station main menu will again appear after you have logged on.

(2) When it is time to do so, you must log off. This is how logging off is accomplished.

(a) Select the student log off command from the student station main menu. The log off command is F2. Don't enter F2 yet.

(b) When F2 is pressed, the student log off display will appear on the computer monitor. On this display, if two students are logged on you will see a number displayed to the left on each name. Type the number of the student on the keyboard that you want logged off. Then simply punch "Enter" and the student whose number was entered is logged off. The other student simply punches F2 and he will be logged off. If only one student was logged on, simply press F2 and you will be logged off.

2. USING THE SIMULATION TRAINING SYSTEM WITH THE DC CIRCUITS - APPLICATION OF METERS TO CIRCUITS PANEL INSTALLED

a. Now, I want you to look the panel over. You will notice that there are four circuits depicted on the panel face. Each of the circuits has using units (lights) and switches to open and close circuits at various points. Above each circuit is a light. The light that is on is the circuit in use for the exercise that is being worked. The light comes on automatically; the exercise that is being worked will dictate what circuit you are to work with.

Also on the panel face you will see an ohmmeter, voltmeter, ammeter, load bank, and a variable resistor.

b. Ohmmeter. Before using the ohmmeter, it must be calibrated. To do this you must short the leads together, and turn the adjustment knob until the needle on the scale is aligned with zero.

c. All meter scales can be interpreted in basically the same manner.

(1) The first step is to determine the total value in the highest range position.

(2) Then determine if that value can be reduced to the next lower scale. For example, if your voltmeter reads 8 volts in the fifty volt range, you would turn your selector knob to the 10 volt scale since 8 is less than 10.

d. At this time, I am going to tell you exactly what to do, step-by-step, to solve the first problem in the first exercise on the program.

(1) You will notice a box that is used to select instruments you will be using. When you select an instrument, a light will come on just below the instrument you select to indicate the instrument is active. If you push the wrong switch you can de-select that instrument simply by pushing the switch again.

(2) If you have already selected an instrument, de-select it now. I will cover other features on the panel as I walk you through the first problem in the first exercise.

(3) First, note that the monitor is informing you that the exercise you will be working has three problems that require you to measure battery voltage. The first problem is performed on the simple circuit. Note that the light is on above the simple circuit.

(4) Next, you will be advised to select the correct instrument. To do that press the select voltmeter switch. We're going to test for voltage so we will need the voltmeter. That switch will light and the light below the voltmeter will also light.

(5) Now that you have selected the voltmeter, you need to check your instrument selection. Simply press the check instrument selection switch to accomplish that. There are two lights below the switch, red and green. If your instrument selection was correct you will get a green light; if not, you will get a red light and you must select another test instrument. In our case the green light is on.

(6) At this time, note that the three problem lights are on. Now, you can press any one of the three lights to select the actual problem you are going to work within this exercise. You will have to work all three problems before you can move to the next exercise. We will solve problem number one.

(7) Press No. 1. At this time, the monitor is prompting you to open switch No. 1 and No. 2 and to measure the voltage of battery No. 1. Do that now. If you have not connected your test leads to the voltmeter, you'll have to do that first. Test leads are in the kneewell drawer; if not, on the desk top.

(8) After you have performed that test and noted the test results, press the switch labeled "Check Test Procedure." If you accomplished the test correctly the green light will come on. At this time, you answer switches will be on. The monitor also displays four possible voltages that you could have obtained; A, B, C, and D. In this case, "C" is the correct answer. However, I want you to press answer "A."

(9) Now, if you will notice, in the exercise feedback block, the red light is on, that means you picked the wrong answer. Since you got a twelve volt reading when you tested the battery, you should have selected answer "C." Do that now and notice the green light came on in the exercise feedback block.

(10) At this time you have completed problem No. 1 in this exercise. Now move to the next problem in the exercise that you intend to work. Since all three problems in this exercise require you to measure voltage, there was no requirement to deselect the voltmeter, in fact you cannot until all three problems are completed. Now complete problem number 2 and problem number 3. After you

have completed the problems, stop, do not go any further until told to do so.

(11) There is one more bit of knowledge that you will need to work this panel; that is about the information switch in the lower right corner of the panel. When you are using a combination of test instruments to work a problem, the information switch will be lighted. It will also light anytime you set up a circuit incorrectly, select an incorrect answer and at other times when you need additional information. Anytime that switch lights you have to press the switch to get the additional information you need. The additional information will be displayed on the video monitor.

(12) After you complete all three problems in the exercise, you will see a video display that tells you to turn off test instrument, open all switches and disconnect test leads. When this is done, a new video will appear telling you what the next exercise is and you begin again.

e. Remove DC Circuits Panels and Install Diesel Engine Charging, Cranking, and Fuel System Panels

(1) Remove the DC circuits panel from the student station. The panels are heavy; both students at the station will work together to remove the installed panel and insert the Diesel Engine Charging, Cranking, and Fuel System Panels.

(a) First, unlock the butterfly clamp on the left side of the panel.

(b) Next, pull the left side of the panel toward you. This will electrically disconnect the panel from the student station.

(c) Now, grasp the handles and slide the panel a little to the left and toward you so that it is resting on the student station, free of its mounting place. Do not slide the panel across the top of the student station.

(d) Now, put your panel into the panel storage rack provided.

(2) After removing the Diesel Engine Charging, Cranking, and Fuel System Panels from their storage racks,

each of you will place your panel on the student station relatively close to its mounting place. Do not slide the panel on the student station desk top any more than is absolutely necessary.

(a) After the panel is on the student station desk top, notice the guide pins on the right side of the panel. Move the panel back and to the right so that the pins go in their respective sockets. Don't push the left side of the panel back yet.

(b) When the panel is into its guide pins, push the left side of the panel back gently. Do not force it. The electrical connector in the back floats and it should mate up if your locating pins are properly positioned.

(c) After the panel is properly in its mounting place, secure the butterfly clamp.

REFERENCE:

Instructor Utilization Handbook (Device 11H118)