Topic Skills Practice Cover Sheet

Unit Name:	NAT10809006 – Verify compliance, functionality and aspects critical to the safety of electrical installations.
Topic Title:	Electrical Circuit Principles

Skill Practice Number:	2.2
Skill Practice Name:	Circuit Connection and Measurement

Student Name:	
Student ID:	
College/Campus:	
Group:	

Results	
Planning:	
Carryout:	
Completion:	
Overall Results:	
Comments:	

Topic Skills Practice 2.2

NAT10809006 – Verify compliance, functionality and aspects critical to the safety of electrical installations.

KE- NAT10809006 Verification of Australian electrical installations principles

Topic 2. Electrical circuit principles and diagrams

Skills Practice 2.2: Circuit Connection and Measurement

Task:

To connect a series/parallel circuit, and determine the circuit parameters by calculation and measurement.

Objectives:

At the completion of this skills practice, you should be able to:

- Connect resistors in series/parallel
- Calculate the circuit equivalent resistance
- Calculate the current through each component
- Calculate the voltage drop across each component
- Measure the circuit current
- Measure the voltage across each component

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1. Planning the Skills Practice

1.1 Equipment

- d.c. power supply
- Multimeter
- Analog voltmeter
- Analog ammeter
- Control switch
- Fuse

1.2 Suggested Materials

- Resistors:
- R_1 = _____ Ω
- R_2 = _____ Ω
- R_3 = _____ Ω
- R_4 = _____ Ω

1.3 Miscellaneous Items

- Connection leads
- PPE
- Pens/pencils

1.4 Risk Assessment

Risk assessment procedure:

- Identify any hazards that may exist with this skills practice below
- List the supervision level you will be working under - Direct (D), General (G) or Broad (B)
- List the risk classification – High Risk (H), Medium Risk (M) or Low Risk (L)
- List the control measures required for each identified hazard that you need to implement.

Hazard/s Identified	Supervision Level (D, G or B)	Risk Classification (H, M or L)	Control Measure/s

Feedback

Have your teacher/trainer check your risk assessment

Teacher/Trainer Initials and Date

✓

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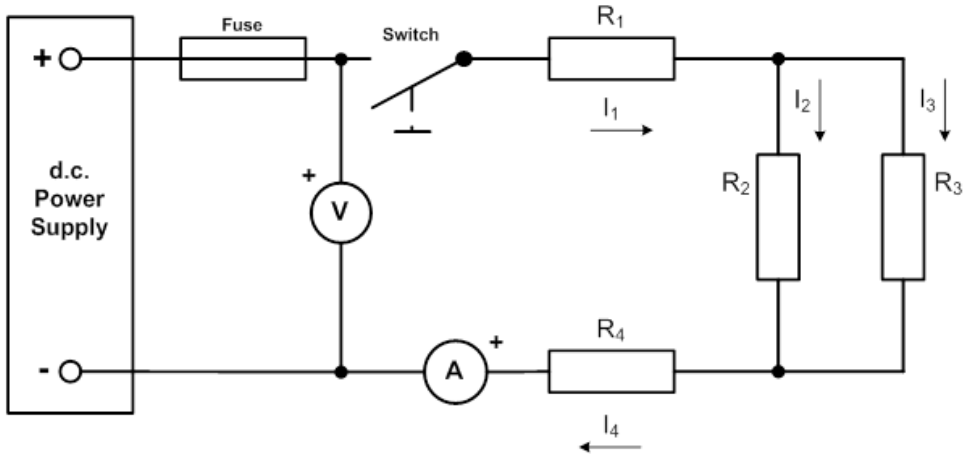
2. Carrying Out the Skills Practice

2.1 Series/Parallel Circuit Connection

2.1.1 Ensuring that the supply is de-energised, connect the circuit components to the d.c. energy source as shown in the following diagram:



2.1.2 Neatly write the value of supply voltage and the value of each resistor on the circuit diagram above.

	Feedback Have your teacher/trainer check your circuit layout and connections are correct	Teacher/Trainer Initials and Date	✓

2.1.3 Calculate the circuit parameters from the resistance and supply voltage values. Record all calculated values in the following table:

Calculated Circuit Values										
Total Values			Branch Currents (mA)				Voltage Drops (V)			
V_T	R_T	I_T	I_1	I_2	I_3	I_4	V_{R1}	V_{R2}	V_{R3}	V_{R4}

	Feedback Have your teacher/trainer check your answers	Teacher/Trainer Initials and Date	✓

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2.2 Series/Parallel Circuit Measurements

2.2.1 When you have gained permission from your teacher/trainer, turn on the power supply, close the circuit switch, and adjust the supply voltage to the correct value.

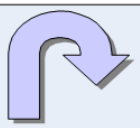
2.2.2 Measure and record VT and total circuit current IT in the table provided below.

2.2.3 Measure the voltage drop across each resistor in the circuit making sure you isolate the circuit each time you reposition the voltmeter. Record your readings in the table provided below.

2.2.4 Measure the current through each resistor in the circuit making sure you isolate the circuit before connecting the ammeter. Record your readings in the table provided below.

Measured Circuit Values										
Total Values			Total Values				Total Values			
V_T	R_T	I_T	I_1	I_2	I_3	I_4	V_{R1}	V_{R2}	V_{R3}	V_{R4}

2.2.5 When you have taken all the required measurements, turn off the power supply, disconnect the circuit.



Feedback

Have your teacher/trainer check your electrical measurements

Teacher/Trainer Initials and Date	✓

3. Completing the Skills Practice

3.1 Skills Practice Review Questions

3.1.1 Clean your work area and return all equipment to the correct storage areas as instructed by your teacher/trainer, and then complete the following review questions.

1. Briefly explain the differences between calculated and measured values of circuit current?

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2. Briefly explain the differences between calculated and measured values of circuit voltage?

3. What would be the effect on circuit current if a short-circuit developed across R_4?

4. What would be the effect on circuit current if an open-circuit developed in R_3?

5. What would be the effect on circuit current if an open-circuit developed in R_4?

6. Explain the purpose of the fuse, functional switch, and resistors in the circuit.

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7. List three practical applications of a series/parallel circuit.

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8. According to AS/NZS 3000:2018, what are the fundamental risks associated with current flow in an electrical installation?

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	 *Feedback* Have your teacher/trainer check your answers	Teacher/Trainer Initials and Date	✓