

**UEECD0042 Solve problems in ELV single path circuits**

Element/Performance criteria	MHE text	Heading reference	Test bank	Quiz	Case	Worksheets	Interactives	YouTube playlist	Prac manual
<b>1. Prepare to work on ELV single path electrical circuits</b>									
1.1 Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for the relevant work area are identified and applied	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety				6, 7		3	
1.2 Hazards are identified, risks are assessed, and control measures and workplace procedures are implemented	Pethebridge Electrical Wiring Practice 8e	2.3 Workplace hazards and risk control measures						3	
1.3 Nature of the circuit/s problem is obtained from relevant documentation or work supervisor to determine the scope of work to be undertaken	Pethebridge Electrical Wiring Practice 8e	2.3 Workplace hazards and risk control measures 6.4 Undertaking electrical work							
1.4 Advice is sought from work supervisor to ensure work is coordinated effectively with others	Pethebridge Electrical Wiring Practice 8e	2.3 Workplace hazards and risk control measures							
1.5 Materials required for the work are identified and accessed in accordance with workplace procedures	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety	1	9, 10		1, 4, 5, 7	2	4, 5, 6	
1.6 Tools, equipment and testing devices required for work are obtained and checked for correct operation and safety in accordance with workplace procedures	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety			5				
<b>2. Solve ELV single path electrical circuits problem</b>									
2.1 WHS/OHS risk control work measures and procedures are followed	Pethebridge Electrical Wiring practice 8e	2 - Work and electrical safety	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16		1, 2, 3, 4, 5,				2
2.2 Need to test or measure live electrical work is determined and conducted in accordance with WHS/OHS, workplace and regulatory requirements	Pethebridge Electrical Wiring Practice 8e	2.3.1 Lifesaving rules 9 - Testing techniques and compliance verification						3	
2.3 Circuits are confirmed as being isolated, as required, in accordance with WHS/OHS, workplace and regulatory requirements	Pethebridge Electrical Wiring Practice 8e	2.3.2 Isolating supply	5, 6						
2.4 Methodological techniques are used to solve circuit problems using measured and calculated values as they apply to single path, single source circuits in accordance with workplace procedures	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety	2, 4, 7, 8, 15, 16	11, 12, 13, 14, 15, 16	1, 2, 4	8, 9, 10, 11, 12, 13, 14, 15, 16		1, 2, 4, 5, 6	1, 2
2.5 Problems are solved without damage to apparatus, circuits, the surrounding environment or services using sustainable energy practices	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety 3.1 Sustainable work practices 3.6 Fundamental requirements (Wiring Rules Part 1)	1, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	1, 2, 3, 4, 5	1, 2, 3, 4, 5	2		1, 2
<b>3. Complete work and document problem-solving activity</b>									
3.1 WHS/OHS risk control measures for work completion are followed	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety		5, 6, 7, 8, 9, 10					
3.2 Worksite is cleaned and made safe in accordance with workplace procedures	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety							
3.3 Justification for solutions used to solve circuit problems is documented in accordance with workplace procedures	Pethebridge Electrical Wiring Practice 8e	6 - Drawings, diagrams, schedules and documents used in electrical work							
3.4 Work completion is documented and appropriate person/s notified in accordance with workplace procedures	Pethebridge Electrical Wiring Practice 8e	6 - Drawings, diagrams, schedules and documents used in electrical work							
<b>Performance Evidence</b>									
Applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including:	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety							
· checking tools, materials, equipment and testing devices for correct operation and safety	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety			5				
· ensuring circuits are isolated	Pethebridge Electrical Wiring Practice 8e	2.3.2 Isolating supply							

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· symbols used to represent an electrical energy source, a load, a switch and a circuit protection device in a circuit diagram	Jenneson Electrical Principles 7e	1.8 Symbols used to represent an electrical energy source, a load, a switch and a circuit protection device in a circuit diagram	3, 4	3		1			
· purpose of each component in the circuit	Jenneson Electrical Principles 7e	1.5 Utilisation of electricity by the various loads	3						
· effects of an open circuit, a closed circuit and a short circuit	Jenneson Electrical Principles 7e	1.9 Effects of an open circuit, a closed circuit and a short circuit		4, 5, 6					
· multiple and sub-multiple units	Jenneson Electrical Principles 7e	1.10 Multiple and sub-multiple units	4			3			
Effects of electrical current, including:									
· physiological effects of current and the fundamental principles listed in AS/NZS 3000 for protection against this effect	Jenneson Electrical Principles 7e	1.18 Physiological effects of electrical current and the fundamental principles for protection	5					3	
· basic principles by which electric current can result in the production of heat, the production of magnetic fields, and a chemical reaction	Jenneson Electrical Principles 7e	1.19 Basic principles by which electric current can result in the production of heat, the production of magnetic fields or a chemical reaction		5		5			
· typical uses of the effects of current	Jenneson Electrical Principles 7e	1.20 Typical uses of the effects of current		6		4, 5			
· mechanisms by which metals corrode	Jenneson Electrical Principles 7e	1.21 Mechanisms by which metals corrode	6						
· fundamental principles listed in AS/NZS 3000 for protection against the damaging effects of current	Jenneson Electrical Principles 7e	1.22 Principles for protection against the damaging effects of current				6			
Electromotive force (EMF) sources, energy sources and conversion electrical energy, including:									
· basic principles of producing an EMF from the interaction of a moving conductor in a magnetic field	Jenneson Electrical Principles 7e	1.23 Basic principles of producing an electromotive force (EMF)							
· basic principles of producing an EMF from the heating of one junction of a thermocouple	Jenneson Electrical Principles 7e	1.23 Basic principles of producing an electromotive force (EMF)							
· basic principles of producing an EMF by the application of sun light falling on the surface of photovoltaic (PV) cells	Jenneson Electrical Principles 7e	1.23.12 Photoelectric sources		7					
· basic principles of generating an EMF when a mechanical force is applied to a crystal (piezo electric effect)	Jenneson Electrical Principles 7e	1.23.15 Piezoelectric sources							
· principles of producing an electrical current from primary, secondary and fuel cells	Jenneson Electrical Principles 7e	1.24 Principles of producing an electrical current		8					
· input, output, efficiency or losses of electrical systems and machines	Jenneson Electrical Principles 7e	1.25 Input, output, efficiency or losses of electrical systems and machines	7			8			
· effect of losses in electrical wiring and machines	Jenneson Electrical Principles 7e	1.26 Effect of losses in electrical wiring and machines							
· principle of conservation of energy	Jenneson Electrical Principles 7e	1.27 Principle of conservation of energy	8						
Resistors, including:									1, 2
· features of fixed and variable resistor types and typical applications	Jenneson Electrical Principles 7e	1.28 Resistors 1.29 Variable resistors	9	9				5	
· identification of fixed and variable resistors	Jenneson Electrical Principles 7e	1.28 Resistors 1.29 Variable resistors	9			7		5	

· various types of fixed resistors used in the electrotechnology industry e.g. wire-wound, carbon film and tapped resistors	Jenneson Electrical Principles 7e	1.28.2 Resistor types				7		5	
· various types of variable resistors used in the electrotechnology industry e.g. adjustable resistors: potentiometer and rheostat, light dependent resistor (LDR), voltage dependent resistor (VDR), negative temperature dependent resistor (NTC) positive temperature dependent resistor (PTC)	Jenneson Electrical Principles 7e	1.29 Variable resistors	9	10				5	
· characteristics of temperature, voltage and light dependent resistors and typical applications of each	Jenneson Electrical Principles 7e	1.29 Variable resistors	9					5	
· power ratings of a resistor	Jenneson Electrical Principles 7e	1.30 Power ratings of a resistor				15		5	
· power loss (heat) occurring in a conductor	Jenneson Electrical Principles 7e	1.31 Power loss (heat) occurring in a conductor				9			
· resistance of a colour-coded resistor from colour-code tables and confirm the value by measurement	Jenneson Electrical Principles 7e	1.32 Reading resistors	10					6	
· measurement of resistance of a range of variable resistors under varying conditions of light, voltage and temperature conditions	Jenneson Electrical Principles 7e	1.29 Variable resistors	9		5				
Ohm's Law, including:									1, 2
· basic direct current (d.c.) single path circuit	Jenneson Electrical Principles 7e	1.11 Basic d.c. single-path circuit		11	2, 3				
· voltage and current levels in a basic d.c. single path circuit	Jenneson Electrical Principles 7e	1.13 Voltage, current and resistance in a circuit			2, 3			1	
· effects of an open circuit, a closed circuit and a short circuit on a basic d.c. single path	Jenneson Electrical Principles 7e	1.9 Effects of an open circuit, a closed circuit and a short circuit	12		3			1	
· relationship between voltage and current from measured values in a simple circuit	Jenneson Electrical Principles 7e	1.13 Voltage, current and resistance in a circuit			2, 3			1	
· determining voltage, current and resistance in a circuit given any two of these quantities	Jenneson Electrical Principles 7e	1.13.1 Determining voltage, current and resistance in a circuit	11	11	2, 3	10		1	
· graphical relationships of voltage, current and resistance	Jenneson Electrical Principles 7e	1.13.1 Determining voltage, current and resistance in a circuit	11					1	
· relationship between voltage, current and resistance	Jenneson Electrical Principles 7e	1.13 Voltage, current and resistance in a circuit	11	12	2, 3			1	
Electrical power, including:									1, 2
· relationship between force, power, work and energy	Jenneson Electrical Principles 7e	1.14 Relationship between force, power, energy and work		13	4			4	
· power dissipated in circuit from voltage, current and resistance values	Jenneson Electrical Principles 7e	1.15 Power dissipated in a circuit from voltage, current and resistance values		14	1, 4			4	
· power ratings of devices	Jenneson Electrical Principles 7e	1.16 Power ratings of devices	14		1, 4			4	
· measurement of electrical power in a d.c. circuit	Jenneson Electrical Principles 7e	1.17 Measure of electrical power in a d.c. circuit			4	11			
· effects of power rating of various resistors	Jenneson Electrical Principles 7e	1.30 Power ratings of a resistor	13		4	15		4	
Relevant electrical regulations and legislations	Pethebridge Electrical Wiring Practice 8e	3 - Regulations and standards							
Relevant manufacturer specifications	Pethebridge Electrical Wiring Practice 8e	6.4.1 Specifications for electrical work							
Relevant safe work method statements (SWMS)/job safety assessments or risk mitigation processes	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16						
Relevant WHS/OHS legislated requirements	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16						

Relevant workplace documentation	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety 6 - Drawings, diagrams, schedules and documents used in electrical work							
Relevant workplace policies and procedures	Pethebridge Electrical Wiring Practice 8e	2 - Work and electrical safety	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16						
Series circuits, including:									2
· circuit diagram of a single source d.c. series circuit	Jenneson Electrical Principles 7e	1.34 Series (connected) circuits		15, 16	4		2	2	
· identification of the major components of a series circuit: power supply, loads, connecting leads and switch	Jenneson Electrical Principles 7e	1.34 Series (connected) circuits			4		2		
· applications where series circuits are used in the electrotechnology industry	Jenneson Electrical Principles 7e	1.34.2 Where are series circuits used?			4				
· characteristics of a series circuit - connection of loads, current path, voltage drops, power dissipation and effects of an open circuit in a series circuit	Jenneson Electrical Principles 7e	1.35 Characteristics of a series circuit		15, 16	4			2	
· the voltage, current and resistances or power dissipated from measured or given values of any two of these quantities	Jenneson Electrical Principles 7e	1.35 Characteristics of a series circuit	16		4	12, 14		2	
· relationship between voltage drops and resistance in a simple voltage divider network	Jenneson Electrical Principles 7e	1.35 Characteristics of a series circuit	15			13		2	
· setting up and connecting a single-source series d.c. circuit	Jenneson Electrical Principles 7e	1.35 Characteristics of a series circuit			4	16		2	
· measurement of resistance, voltage and current values in a single source series circuit	Jenneson Electrical Principles 7e	1.35 Characteristics of a series circuit			4			2	
· effect of an open circuit on a series connected circuit	Jenneson Electrical Principles 7e	1.35 Characteristics of a series circuit			4			2	
Sustainable energy principles and practices	Jenneson Electrical Principles 7e	3.1 Sustainable work practices	1						
Techniques to confirm that a circuit is isolated	Pethebridge Electrical Wiring Practice 8e	2.3.2 Isolating supply	5, 6						
Techniques to check if tools, equipment and testing devices are operating correctly and safely	Jenneson Electrical Principles 7e	1.12 Measuring electricity-devices and units 1.45 Hazards involved in using electrical instruments							