

# Licensed Electrician's Practical (LEP) Assessment Sample Paper 2024

Candidate Surname	
Candidate Given Names	

**Circle the appropriate answer below.**

Is the candidate's photo ID valid?	Yes	No
Does the IR tester supplied by candidate meet calibration requirements?	Yes	No
Does the type of IR tester supplied by candidate meet the assessment requirements?	Yes	No

Candidate			
	Print name	Signature	Date
Assessor			
	Print name	Signature	Date

Marks Allocation										Possible	Actual
<b>Question 1</b>	Meter Panel and Switchboard Wiring									35	
<b>Question 2</b>	Electrical Installation Testing	<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>	<b>2.7</b>	<b>2.8</b>	32	
<b>Question 3</b>	MEN System Voltage Measurement	<b>3.1</b>				<b>3.2</b>				18	
<b>Question 4</b>	Visual Defects									15	
<b>Total:</b>										100	

Working Time: 4 hours (including reading time)

At the end of this time you will be asked to stop.

Final Percentage	Pass/Fail

I have conducted this assessment, and certify I am independent of the candidate.

Assessor			
	Print name	Signature	Date
Reviewed by (If necessary)			
	Print name	Signature	Date

## Required Reference Material

- AS/NZS 3000:2018 Wiring Rules
- AS/NZS 3008.1.1:2017 Electrical installations – Selection of cables

## Optional Reference Material:

- AS/NZS 3017:2022 Electrical installations – Verification guidelines
- The Victorian Service and Installation Rules 2014

## Instructions

- Personal notepads and paper are not permitted.
- Pens only must be used. Answers in pencil may not be marked.
- Do not remove any sheets from this assessment paper or the room.
- Papers with no name or signature will not be marked.
- A mark will be deducted per section for each missing or incorrect unit where required.
- Speak to the assessor if you require assistance or have a query.

This LEP assessment will comprise of four questions. Throughout the assessment, the LEP assessor will instruct you as to which workstation to use, and when to move to them.

**Question 1** - Meter Panel and Switchboard Wiring

**Question 2** – Electrical Installation Testing

**Question 3** – MEN System Voltage Measurements

**Question 4** – Visual Defects

**Inform your assessor if any equipment is missing or not available. DO NOT TAKE ANYTHING FROM ANOTHER WORKSTATION.**

## Results

**Candidates need to obtain 75% or more to pass this assessment. If a mark of 74% or less is achieved, a minimum of 14 days is required before you are permitted to re attempt the assessment.**

I, the above named candidate confirm:

- I understand the instructions provided to me.
- I do not have any unauthorised materials in my possession.
- I have not attempted the Licensed Electrician's Practical Assessment at any venue within the past 14 days.

Candidate	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Print name	Signature	Date

## Question 1

Wiring Bay Number	
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### Meter Panel and Switchboard Wiring

**A mark will be deducted for each missing or incorrect unit where required.**

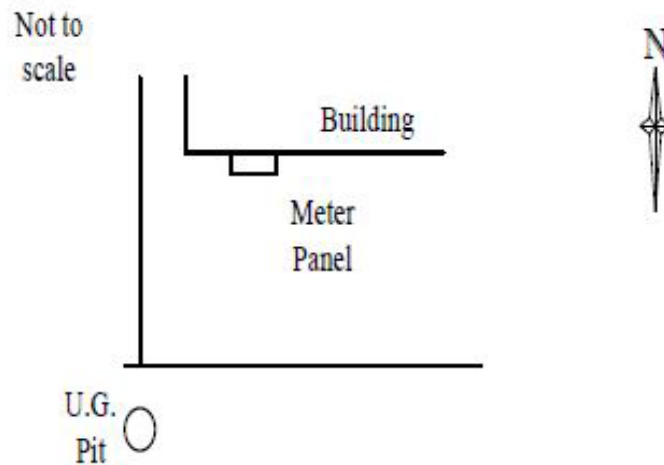
You are required to install a 3Φ 4 wire 400/230V 50Hz domestic premises. The installation comprises a 3Φ meter panel and main switchboard in a common enclosure, and a separate 1Φ distribution board. The main switchboard and the distribution board are situated in the same building.

The installation is located at 23 Road Street, Norwood.

The installation will be supplied from:

- Overhead supply** – from the fused overhead line connector box to the main switchboard. The consumer's mains are V90 SDI stranded copper cables. The cables are run enclosed in air.
- Underground supply** – from the service pit, the cables run underground in PVC conduit at a depth of 500mm. The consumer's mains are V90 SDI stranded copper cables.

The meter panel enclosure is located on the front of the building, 18 meters from the southern property boundary, and 6 metres from the western property boundary. The underground pit is located at the south west corner of the property.



All wiring and identification is to be carried and completed to the requirements of AS/NZS3000:2018 Wiring Rules. You may ignore voltage drop requirements. Assume unity power factor on all loads. Assume short circuit protection is provided on the supply side of the consumer's mains. All cables installed are solid/stranded and will operate at normal operating temperatures.

You must select and arrange main switches, circuit breakers, RCDs and cables from the equipment provided. Divide the equipment in the installation into final sub-circuits, as per AS/NZS3000:2018 requirements. Select the **minimum** permissible cable size (cables available for final sub-circuits are 1.5mm<sup>2</sup>, 2.5mm<sup>2</sup>, 4mm<sup>2</sup> and 6mm<sup>2</sup>) and correct circuit protective device rating for each circuit.

Do not cut any cables or bus-bar, or take any equipment from another workstation, unless directed by your assessor. Inform your assessor if there is any equipment missing or not provided.

**Note:** Although Appendix C of AS/NZS3000:2018 Wiring Rules is classed as informative (i.e. for guidance only), Appendix C Tables C1, C2, C5 and C9 may be used in this assessment where appropriate.

**Note:** AS/NZS3008.1.1 shall be used for all cable selection and cable current ratings.

**The installation will comprise of the following:**

Equipment installed from the main switchboard:

- 1 - 3Φ 20A Reverse Cycle Air Conditioning unit
- 1 - 1Φ 9kW Range
- 14 - 200W Outdoor tennis court lights
- 22 - 230V 15W LED downlights installed on one circuit
- 20 - 230V 10A Double socket outlets. All circuits are to be installed on the same phase, across 2 circuits.

The following equipment is to be installed from the **distribution board** and controlled by an isolator:

- 2 - 230V 15A Socket outlets installed on the same circuit
- 8 - 230V 10W LED downlights
- 1 – 230V 3kW Electric vehicle charger

**Note:** Use of RCDs and/or RCBOs are permitted.

The 3Φ final sub-circuit wiring is V90 single insulated cable, installed enclosed in the cable duct/conduit provided.

The 1Φ sub-main is V90 single insulated cable, installed enclosed in the cable duct/conduit provided.

All 1Φ final sub-circuit wiring in the installation is two core and earth V90 flat copper TPS, installed partially surrounded in thermal insulation.

**Note:** This installation will never be connected to the electrical supply. Some parts and equipment may not satisfy the requirements of AS/NZS3000:2018 and other associated standards, they are only used in the assessment environment to keep assessment costs to a minimum. Please ask your assessor if you have any questions in relation to this.

Calculate the maximum demand of the installation. Use the maximum demand table below for your working.

**Maximum Demand Table Used:**

Circuits	Load Group	Calculations	MD		
			Red	White	Blue
1 - 3Φ 20 Air Conditioner					
1 - 1Φ 9kW Range					
14 – 200W Outdoor tennis court lights					
22 - 230V 15W LED downlights					
20 - 230V 10A Double socket outlets					

Equipment 1Φ Distribution Board					
2 - 230V 15A Socket outlets					
8 - 230V 10W LED downlights					
1 – 3kW 230V Electric vehicle charger					
<b>Distribution Board MD</b>					
<b>Total Installation MD</b>					

Based on the maximum demand calculation, select the current rating of the main switch, the **minimum** size of the consumer’s mains cable, and the **minimum** size of the main earth conductor.

Based on the maximum demand calculation, select the current rating of the distribution board isolator and the **minimum** size of the sub-mains cable.

Enter these details into the table below, and state the AS/NZS 3008.1.1 Table number and column number used for your cable selection:

<b>Consumer’s Mains</b>	Table	Column
<b>Sub-mains</b>	Table	Column
<b>Three phase load</b>	Table	Column
<b>Single phase loads</b>	Table	Column

Maximum Demand of the Installation	Current Rating of the Main Switch	Size of the Consumer’s Mains Cable		Size of the Main Earth Conductor	
		O/head	U/G	O/head	U/G

Maximum Demand of the Distribution Board	Current Rating of the Distribution Board Sub-main Circuit Protection	Size of the Sub-main Cable

Question 1 = 35 marks

## Question 2

### Electrical Installation Testing

Bay Number	
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A mark will be deducted for each missing or incorrect unit where required.

Using your insulation resistance and continuity tester, carry out the following tests, as required under AS/NZS3000:2018, on the electrical installation indicated by the assessor.

#### NEUTRAL CONDUCTORS MUST NOT BE DISCONNECTED.

Insert the meter readings with the correct units, and other information as required, in the appropriate places throughout question 2.

### 2.1 Resistance of Main Earth and Bonding Conductors

Test	Record Instrument Reading and Units	Indicate if Test is Pass or Fail
Main Earthing Conductor		
Bonding conductor to water pipe		

(1 + 1 = 2 marks)

### 2.2 Insulation Resistance of Wiring

Circuit Test	Record Instrument Reading and Units	Indicate if Test is Pass or Fail
Whole Installation (wiring only)		
Final sub-circuit 1		
Final sub-circuit 2		
Final sub-circuit 3		
Final sub-circuit 4		

(5 x 2 = 10 marks)

### 2.3 Earthing and Insulation Resistance of Appliance

Test	Record Instrument Reading and Units	Indicate if Test is Pass or Fail
Earthing of Exposed Metal		
Insulation Resistance		

(1 + 2 = 3 marks)

## 2.4 Resistance of Protective Earthing Conductors

Determine Pass or Fail using Table 8.2 of AS/NZS3000:2018 Wiring Rules

Test	Active Cond. Size mm <sup>2</sup>	Earth Cond. Size mm <sup>2</sup>	Protective Device Rating Type C	Active Cond. Resistance (R <sub>ph</sub> ) (Given)	R <sub>e</sub> Value and Units (Measured)	R <sub>phe</sub> Value and Unit (Calculated)	Indicate if Test is Pass or Fail
Ceiling Rose	1.5mm <sup>2</sup>	1.5mm <sup>2</sup>	10A	0.70Ω			
Fluorescent Light	1.5mm <sup>2</sup>	1.5mm <sup>2</sup>	10A	0.60 Ω			
Socket Outlet 1	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	16A	0.25 Ω			
Socket Outlet 2	2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	20A	0.40 Ω			

(4 x 1 = 4 marks)

## 2.5 Polarity Test of Consumer's Mains

Test	Record Instrument Reading and Units	Indicate if Test is Pass or Fail
Consumer's Mains Active		
Consumer's Mains Neutral		

(1 +1 = 2 marks)

## 2.6 Operation of Switches

Switch Under Test	Indicate which conductor is being switched ACTIVE / NEUTRAL / NEITHER	Indicate if Test is a Pass or Fail
Ceiling Rose		
Fluorescent Light		
Socket Outlet 1		
Socket Outlet 2		
Fan Socket Outlet		

(5 x 1 = 5 marks)

## 2.7 Testing of Circuit for Automatic Disconnection of Supply

Measure the fault loop impedance of the final sub-circuit supplying the socket outlet listed in the table below.

The final sub-circuits are protected by Type C miniature circuit breakers. The nominal supply voltage of the electrical installation is 230 volts.

Complete the table below, and determine Pass or Fail using Table 8.2 of AS/NZS3000:2018 Wiring Rules

Test Point	Conductor Size		Type C Circuit Breaker Rating	Measured Value and Units	Value of $R_{phe}$ and Units From T8.2	Indicate if Test is a Pass or Fail
	Active mm <sup>2</sup>	Earth mm <sup>2</sup>				
Appliance socket outlet	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>				

(2 marks)

## 2.8 Testing of Operation of RCDs

Using the RCD tester provided, test the three (3) RCD's and record their trip time and trip current at zero degrees.

RCD Under Test	Earth Leakage	
	Trip Time Value and Units	Trip Current Value and Units
1		
2		
3		

(1 + 1 + 1) = 3 marks

When replacing only a single luminaire with an equivalent item in the same location that is not currently protected by an RCD, shall RCD protection be provided?

<b>Answer:</b>	
<b>Wiring Rules Clause Number:</b>	

1 mark

(3 + 1 = 4 marks)

## Question 3

### MEN System Voltage Measurements

A mark will be deducted for each missing or incorrect unit where required.

The equipment on this test panel consists of:

- The earth electrode from the 400/230V distribution system substation MEN star point.
- A single phase electrical installation with earth electrode and bonding to a metallic underground water pipe.



Using the instrument provided, carry out the following tests. On the simulated MEN electrical installation, you are required to take voltage measurements, as follows:

**Question 3.1**

- i. With the main switch “ON” and all circuit breakers in the “OFF” position, take a voltage measurement across the terminals of the point of supply.
- ii. Measure the voltage between the:
  - independent earth and frame of the appliance (refrigerator)
  - independent earth and water tap/pipe
  - appliance terminals

in each of the switchboard conditions outlined in the table below.

The main switch is to be in the “ON” position in all cases.

On the following page:

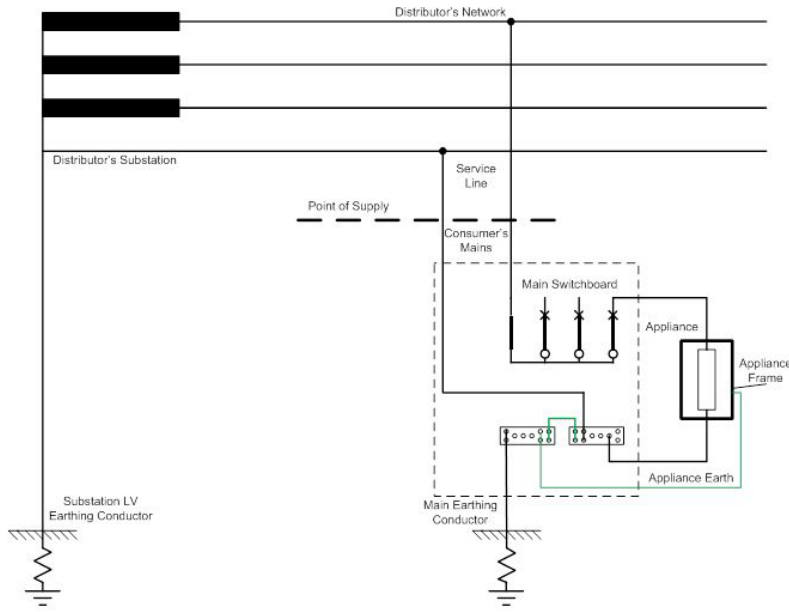
- a) Record the voltage readings and units and write them in the table.
- b) Answer the two questions in relation to your readings.
- c) Draw the current path, and the location of the fault (if any) on the diagram supplied.

Measure and record the supply voltage at the point of supply (Main switch on, all circuit breakers off)				_____ Volts		
Test Condition	Circuit Breaker 1	Circuit Breaker 2	Circuit Breaker 3	Independent Earth and Appliance Frame (refrigerator)	Independent Earth and Water Tap/Pipe	Appliance Terminals (refrigerator)
1	ON	Off	Off			
2	ON	ON	Off			
3	ON	ON	ON			

Is the electrical installation you have measured above safe? Yes / No

Draw the current path of your measured circuit on the diagram below, and indicate on the diagram the location of the fault (if any). Indicate if you have drawn a:

High impedance circuit / Open circuit / No fault circuit (Cross out those not applicable.)



(3 + 1 + 2 + 4 = 10 marks)

SAMPLE

## Question 3.2

Answer the following four (4) questions about the MEN system.

**Note:** These questions do not relate to your measurements or diagram on the previous page.

1. Select the correct statement for the scenario below.

You are running single-phase sub-mains to an outbuilding from a main switchboard. The distribution board is to be supplied by active and neutral conductors without a protective earthing conductor (PEN):

- a) Without a protective earthing conductor alongside the sub-mains, fault current will not have an effective path and protection devices may not operate.
- b) An MEN link must be installed but no electrode.
- c) An MEN link and earth electrode must be installed at the distribution board.
- d) This is non-compliant, as all sub-mains require a protective earthing conductor.

2. One single phase electrical load that is connected across the supply within the M.E.N. system is in \_\_\_\_\_ with the consumers mains neutral:

- a) Series
- b) Parallel
- c) Phase
- d) Series and parallel

**Questions 3 and 4 are in relation to the following scenario:**

You have been called to an installation where a customer has reported that appliances are not operating correctly and they are feeling a tingling sensation when touching metal appliances around the home.

It is a domestic installation with an overhead supply that you cannot easily access due to foot traffic. When you visually inspect the main switchboard, it appears in a satisfactory state. You isolate the supply and ensure that all terminals in the switchboard are secure.

Upon re-energising the installation, you notice incandescent lights are dim, flickering and LED downlights will not light up.

You have taken the following voltage readings.

- Main switchboard: **active** to neutral & **earth** bar – **103V**
- Resistive cooktop: **active** to neutral – **100V**
- Light switch: **active** to neutral – **90V**
- Electric water heater: **active** to neutral – **108V**
- Independent **earth** to main switch **active** – **230V**
- Independent **earth** to neutral & earth bar – **127V**

3. The most likely cause of this problem is:

- a) A loose connection in the cooktop or water heater.
- b) A high impedance on the consumer's mains neutral.
- c) High impedance main earthing conductor not providing a proper reference for the meter.
- d) An open circuit on the consumer's mains neutral.

4. The most likely cause of voltages not adding exactly to 230V would be:

- a) Your voltmeter is faulty.
- b) The MEN link is broken or not adequately fastened.
- c) Connected loads switching in and out causing voltage drops around the installation to fluctuate.
- d) Protective devices tripping intermittently.

(2 + 2 + 2 + 2 = 8 marks)

SAMPLE

## Question 4

Your workstation to inspect is:

### Visual Defects

When instructed by the assessor, carry out a visual inspection of the installation.

You are to find five (5) installation defects and record them in the table below. **A maximum of three (3) defects may be taken from the switchboard enclosure.**

- Record five **different** instances of non-compliance with the Wiring Rules AS/NZS3000:2018.
- Record the defect in the column provided. (1 mark)
- Record the complete Wiring Rules Clause. (2 marks)
- Indicate the switch or socket outlet number and panel location when recording the defect.
- Only the first five recorded defects will be marked.

Panel Location	Wiring Defect	Wiring Rules Clause Number

[5 x (1 + 2) = 15 marks]