

# Licensed Electrician's Theory (LET) Assessment Sample Paper (2022)



Candidate Surname	
Candidate Given Names	

## Reference Material

- AS/NZS 3000:2018 Wiring Rules
- AS/NZS 3012:2019 Electrical installations – Demolition and Construction sites
- AS/NZS 3008.1.1:2017 Electrical installations – Selection of cables
- Electricity Safety (General) Regulations 2019
- AS/NZS 4836:2011 Safe working on or near low voltage electrical installations and equipment

## 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.
- Units must be shown to obtain full marks.

## 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.
- do not have any unauthorised materials in my possession
- have not attempted the Licensed Electrician's Theory Assessment at any venue within the past 14 days.

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

**Working Time:** 2 hours and 15 minutes

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

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Mark																			

Final Percentage	Pass/Fail

Supervisor	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Print name	Signature	Date
Assessor	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Print name	Signature	Date
Reviewed by (If necessary)	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Print name	Signature	Date

**AS/NZS 3000 WIRING RULES**

In the following **four** Wiring Rules questions:

- You are required to write the Wiring Rules Clause and/or Table number in the space provided.
- The correct Wiring Rules Clause and Subclause must be given, e.g. 3.5.2(b)(i).

**The correct answer to both parts must be given to obtain full marks.**

**Question 1.** What is the minimum distance a cable must be from any moving parts, if it is located in an indoor area and supported by catenary wire?

.....  
.....

Wiring Rules Clause Number: ..... [2 + 2 = 4 marks]

**Question 2.** Where an appliance has an open cooking surface incorporating gas and electric cooking, a switching device is required. Which conductors must the switching device operate?

.....  
.....

Wiring Rules Clause Number: ..... [2 + 2 = 4 marks]

**Question 3.** An electricity generation system shall be controlled by a main switch or switches. Where must this switch be installed?

.....  
.....  
.....  
.....

Wiring Rules Clause Number: ..... [2 + 2 = 4 marks]

**Question 4.** If any part of an electrical installation fails a test, what must occur once the fault has been rectified to that part of the circuit, and any part of the circuit that was influenced by the test?

.....  
.....

Wiring Rules Clause Number: ..... [2 + 2 = 4 marks]

**AS/NZS 3012 CONSTRUCTION AND DEMOLITION SITES**

In the following **two** AS/NZS 3012 questions:

- You are required to write the Standard's Clause number and/or Table number in the space provided.
- The correct Clause and Sub-clause number must be given. e.g. 2.10.2 (f).

**The correct answer to both parts must be given to obtain full marks.**

**Question 5.** If a visual inspection of construction wiring identifies damage or a non-compliance, what must occur to that part of the installation?

.....

.....

Standard Clause Number: ..... [2 + 2 = 4 marks]

**Question 6.** On a construction site every switchboard, or part of a switchboard, that is supplied from a separate source of supply must be marked to identify the source of supply from which it originates. How is the switchboard to be marked?

.....

.....

.....

Standard Clause Number: ..... [2 + 2 = 4 marks]

**ELECTRICITY SAFETY (GENERAL) REGULATIONS 2019**

In the following Regulation question, you are required to:

- write your answers on the line/s below each question
- write the complete Regulation and Sub-regulation number, if applicable, in the space provided, e.g. 401(e)(3).

**The correct answer to both parts must be given to obtain full marks.**

**Question 7.** Underground consumer's mains must have what type of insulation from the connection point at the distribution supply network, to the electrical installation's first protection device?

.....

Regulation Number: ..... [2 + 2 = 4 marks]

**ELECTRIC SHOCK SURVIVAL**

**Question 8.** You are applying CPR to a person who has received an electric shock. If the casualty’s normal breathing returns, what should you do?

1. \_\_\_\_\_
2. \_\_\_\_\_

[2 + 2 = 4 marks]

**CABLE SELECTION**

**Question 9.**

**TWO four** core and earth V90 insulated and sheathed copper cables, are connected in parallel to supply a three-phase distribution board with a total maximum demand of 310A.

The cables are installed underground in conduit at a depth of 0.8m and are spaced 0.3m apart. The soil thermal resistivity is 1.2°C.m/W at an ambient soil temperature of 25° The cable is protected by a circuit breaker.

- (i) Neglecting voltage drop, what is the minimum cable size which can be installed for this circuit.
- (ii) If the cables were buried at a depth of 0.6 instead of 0.8m, what is the minimum cable size which can be installed for this circuit?

All calculations including the final answer must be completed to a maximum of **two decimal places**.

**Table details and units must be shown below to obtain full marks. Part (ii) is over the page.**

Part (i)

	Answer		Answer
Table 3 ( _____?)		Item	
Table		Column	
Derate/rating table		Column	Factor
Derate/rating table		Column	Factor

**Part (i) Answer:** \_\_\_\_\_

Question 9. Part (ii)

	Answer		Answer		Answer
Derate/rating table		Column		Factor	

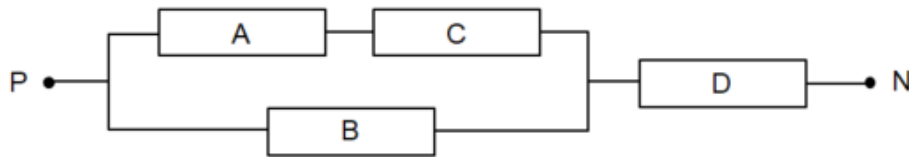
SAMPLE

Part (ii) Answer:

[1 + 2 + 1 + 1 + 2 + 1 = 8 marks]

## DC CIRCUITS

## Question 10.



The following values apply to the diagram above:

The total current in the circuit is 8A

A is 50V B is 3A C is  $20\Omega$  and D is 400W

Calculate:

- (i) the current flowing through resistor C
- (ii) the value of resistor B
- (iii) the total power dissipated by the circuit

All calculations including the final answer must be completed to a maximum of **two decimal places**.

(i) Current:		(ii) Voltage:		(iii) Power:	
--------------	--	---------------	--	--------------	--

[2 + 2 + 2 = 6 marks]

**MAXIMUM DEMAND**

**Question 11.**

Calculate the Maximum Demand for the mains of a single phase 230V domestic residence.

The load connected to the switchboard is:

- 2 - single 15A socket outlet installed over two circuits
- 1 - 16A space heater
- 37 - 15W LED lighting points installed over two circuits
- 2 - 1.8kW outdoor lights
- 15 - 10A double socket outlets installed over two circuits

All calculations including the final answer must be completed to a maximum of **two decimal places**.

**All relevant table details, including table, column and load groups used.**

**Calculations and units must be shown to obtain full marks.**

Table		Column	
Equipment	Load Group	Calculation	Maximum Demand
<b>Total Maximum Demand:</b>			

[1 + 1 + 1 + 1 + 1 + 1 + 2 + 1 = 8 marks]

**VOLTAGE DROP**

**Question 12.**

In a 400/230V, three-phase commercial installation, a three-phase power factor corrected 27A appliance which operates continuously is supplied from a sub-circuit originating at a distribution board.

All the cables are:

- X90 copper conductors
- protected by circuit breakers
- laid flat and not installed with other cables

The circuit details are:

**Consumer Mains - Single Double Insulated**

MD current	105A
Length	25m
Size	35mm <sup>2</sup>

**Sub-mains - Single Double Insulated**

MD current	46A
Length	30m
Size	25mm <sup>2</sup>

**Final sub-circuit - multi-core cable with circular copper conductors**

Length	25m
Size	4mm <sup>2</sup>

The Consumer Mains and Sub-mains are operating at their normal operating temperatures.

The final sub-circuit cables have an operating temperature of 45°C.

Calculate the total voltage drop from the point of supply to the appliance terminals.

All calculations including the final answer must be completed to a maximum of **two decimal places**.

All relevant table details, calculations and units must be show to obtain full marks.

Cable	Table	Column	Vc	Calculation	Vd
Consumer Mains					
Sub-mains					
Final Sub-circuit					

**Answer Total Voltage Drop:**

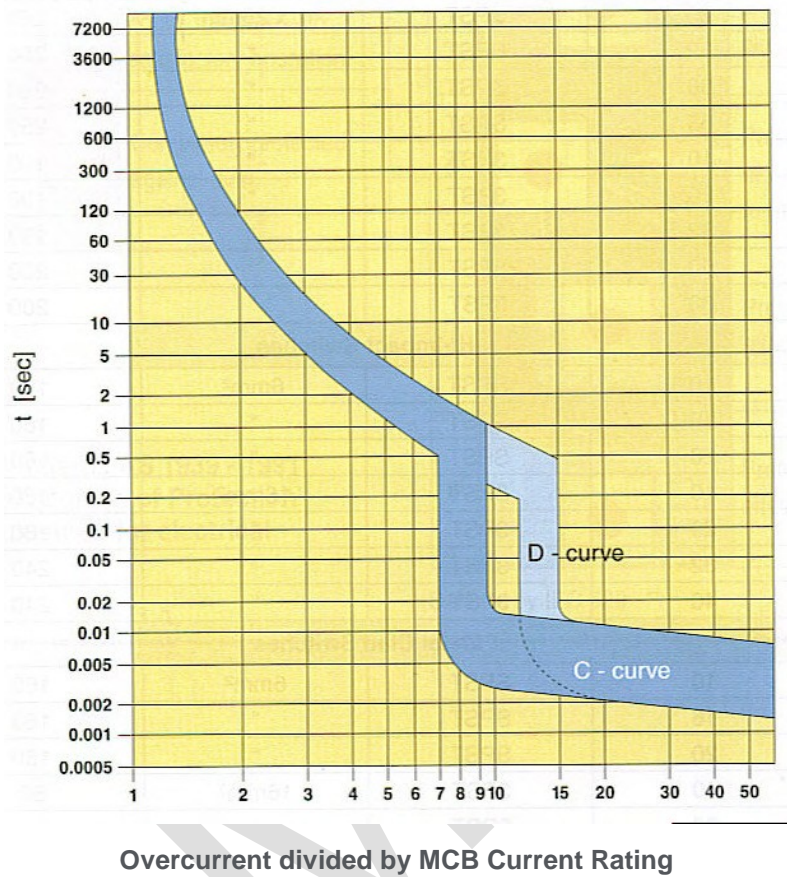
[1+1+1+1+1+1+1+1+1+1 = 10 marks]



**OVERLOAD AND SHORT CIRCUIT CALCULATIONS**

**Question 13.**

What are the minimum and maximum tripping times for a 50A Type D miniature over-current circuit breaker which is subjected to an over-current of 250A?



<b>Overcurrent divided by MCB current rating:</b>	
<b>Minimum time:</b>	<b>Maximum time:</b>

[1 + 1 + 1 = 3 marks]

**OVERLOAD AND SHORT CIRCUIT CALCULATIONS**

**Question 14.**

The main switchboard of a 400/230V industrial installation is directly supplied from a 500KVA transformer which has a prospective fault current of 12,600A per phase.

Submains supply a distribution board from the main switchboard.

The following information is known:

- Impedance of the Consumer Mains =  $0.0037\Omega$
- Impedance of the Sub-mains cables =  $0.0097\Omega$

Determine the prospective fault current at:

- (i) the main switchboard; and
- (ii) the distribution board.

Work impedances to 5 decimal places.

**All calculations must be shown to obtain full marks.**



<b>Transformer Impedance:</b>	
<b>Main Switchboard:</b>	
<b>Distribution Board:</b>	

[(2+1) + (2+1) + (2+1) = 9 marks]

## RESIDUAL CURRENT DEVICES

### Question 15.

A 30mA Residual Current Device is to be installed to protect two (2) lighting circuits and a 20A socket outlet. The maximum demand of the three circuits is 20A. The circuits are protected by two 10A circuit breakers and a 25A circuit breaker.

State the minimum current rating of the Residual Current Device.

.....  
Wiring Rules Clause Number: ..... [1 + 2 = 3 marks]

## MOTORS AND STARTERS

### Question 16.

**CIRCLE** the letter in front of the statement you consider to be the most correct.

In a primary resistance starter, what percentage of the rated speed of a motor is required before the resistors will be disconnected?

- A. 55 - 60%
- B. 65 - 70%
- C. 75 - 80%
- D. 85 - 90%

[2 marks]

## AS/NZS 4836:2011

### Question 17.

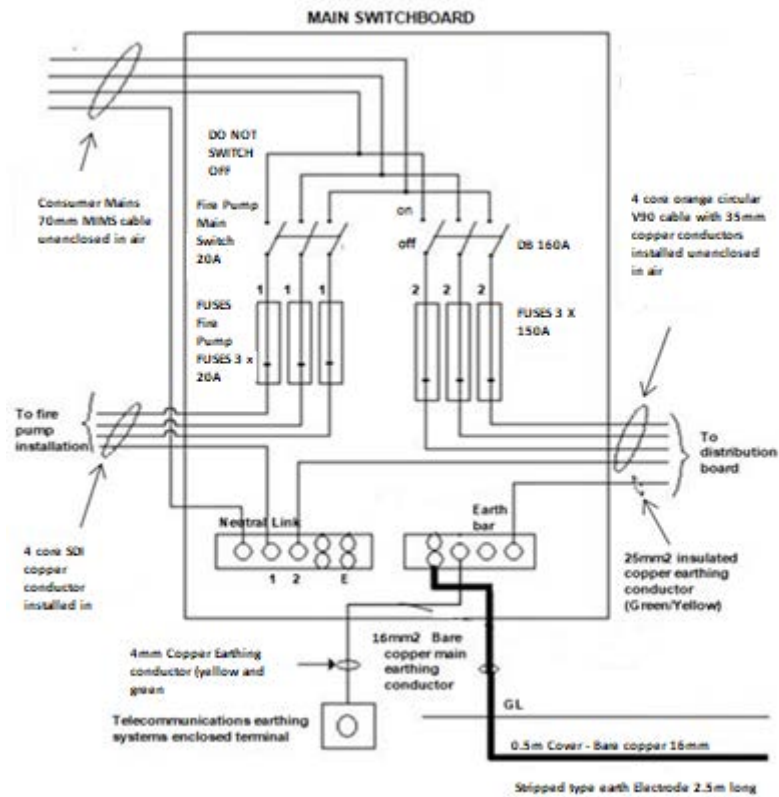
This question relates to AS/NZS 4836:2011.

When excavating cables that may be energised, a safety observer shall be used. What is the only task the safety observer may carry out?

.....  
.....  
Standard Clause Number: ..... [2 + 2 = 4 marks]

**INSTALLATION DEFECTS - NON DOMESTIC**

Question 18.



The drawing above shows the MAIN SWITCHBOARD of an industrial installation originating at the consumers mains and contains contraventions to the Wiring Rules.

The MAIN SWITCHBOARD is supplied direct from a substation via consumers mains installed underground in a non-metallic wiring enclosure and enters directly into the switchboard enclosure.

The MEN connection is located within the substation enclosure.

It supplies a distribution board having a connected load with a calculated maximum demand of 160A per phase and an automatically controlled 3 phase fire pump motor having a current rating of 20A per phase. The fire pump is not required to be RCD protected.

The supply authority has provided short circuit protection for the consumers mains.

The safety services main switch and the main switch for the general electrical installation are separated by a metal partition.

All screws in bars or links are all 80% of the tunnel diameter.

Assume the MIMS cables are earthed in accordance with the Wiring Rules and are capable of maintaining supply to the equipment even when exposed to fire and mechanical damage.

All fuses shown are HRC type.

**Complete the table on the following page.**

**Question 18. Continued.**

Use the diagram on the previous page.

List **FIVE different defects** together with the contravened Wiring Rules Clause/Table number in the table provided below.

**Note: Only the first five defects will be considered.**

DEFECT DETAILS	WIRING RULE CLAUSE/TABLE No.

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

SAMPLE

APPENDIX L  
ELECTRIC SHOCK SURVIVAL—Australia

A

EMERGENCY !—Electric shock may cause cardiac arrest.

**DANGERS**

Check for your own safety and the safety of the casualty and bystanders.

**HIGH VOLTAGE**—Wait until the power is turned off.

**LOW VOLTAGE**—Immediately switch off the power. If this is not practicable, pull or push the casualty clear of the electrical contact using material, such as wood, rope, clothing, plastic or rubber. Do not use metal or anything moist.

**RESPONSIVENESS**

Check for response (verbal and tactile stimuli), touch and talk.

**SEND/Shout FOR HELP**

Send a bystander to DIAL 000 Ambulance

If available send for Automatic External Defibrillator (AED)

If alone shout for help.

**AIRWAY** Place the casualty on his/her back.

Tilt the head back and raise the chin forward.

**BREATHING** Check for normal breathing, observe chest movement, listen and feel for breathing.

Give two initial breaths.

In the absence of normal breathing, if no one has gone for help, place casualty in recovery position and go for help.

**CIRCULATION**

Position hands on centre of the chest.

Give 30 chest compressions followed by 2 breaths. Depress breastbone 1/3 the chest depth (approx 4 cm or 5 cm) at the rate of 100 compressions a minute.

As soon as available attach AED and follow its instructions.

Continue CPR, 30 compressions: 2 breaths.

When casualty's normal breathing returns cease resuscitation and move the casualty into the **recovery** or **coma** position.

Keep a constant watch on the casualty, to ensure that they do not stop breathing again, until trained assistants take over.

This information is provided for guidance only. It is recommended that persons associated with the installation of electrical equipment or repair of electrical installations obtain Australian Resuscitation Council approved training in current resuscitation methods.