

# Licensed Electricians Assessment (LEA)

## Licensed Electricians Theory Assessment Sample Paper Marking guide (2020)



### AS/NZS 3000 Wiring Rules

#### Q.1

A modification to part(s) of an electrical installation. (2 marks)

Clause 1.4.8 (2 marks)

#### Q.2

Manufactured from materials resistant to such substances. (2 marks)

Clause 3.3.2.5 (2 marks)

#### Q.3

An isolating switch (lockable) in accordance with Clause 2.3.2.2, installed adjacent to but not on the unit, which isolates all parts of the system, including ancillary equipment, such as head units, from the same location. (2 marks)

Clause 4.19 (2 marks)

#### Q.4

The insulation on a conductor shall not be removed any further than is necessary to make the connection. (2 marks)

Clause 3.7.2.2 (2 marks)

### AS/NZS 3012 Construction & Demolition Sites.

#### Q.5

IP2X (2 marks)

Clause 2.7.7(a) (2 marks)

#### Q.6

0.6m below the lowest point of the overhead electrical cables or lower (2 marks)

Clause 2.5.6(b) (2 marks)

### Electrical Safety (General) Regulations 2019

#### Q.7

No (2 marks)

Clause 207(2)(a) (2 marks)

## Electrical Shock Survival

### Q.8

Observe chest movement (2 marks)

Listen and feel for breathing (2 marks)

## Cable Selection

### Q.9

Table 3(4) Item 4 (1 mark)

Table 13 Col 25 (2 marks, one for table and one for column)

Derating factor Table 26(2) 0.93 (1 mark)

Derating factor Table 28(2) 0.97 (1 mark)

Part (i) Answer: 50mm<sup>2</sup> (2 marks)

Part (ii) Derating factor Table 26(2) 0.90

Answer: 70mm<sup>2</sup> (1 mark)

(Deduct 1 mark for no or incorrect units on final answers. Only deduct one mark regardless of number of missing units)

## DC Circuits

### Q.10

$I = 4A$  (2 marks)

$V_T = 240V$  (2 marks)

$P_T = 1920W$  (2 marks)

(Deduct 1 Mark for no or incorrect units)

## Maximum Demand

### Q.11

Table C1 Column 2 (1 mark)

#### Domestic Residence.

Equipment	Load Group	Calculation	Maximum Demand
10A Socket outlets 36 Points total	B(i)	10A for 1-20 points and 5A for each additional 20 points = 15A	15A (1 mark)
2 15 A socket outlets	B(ii)	10A	10A (1 mark)
16 A electric vehicle charger 2 outlets total	J(iv)	Full Connected Load 16A	16A (1 mark)
Lights 48 Points Total	A(i)	3A for 1-20 points and 2A for each additional 20 points = 7A	7A (1 mark)
4.3kW air conditioner	D	75% connected load $4300/230 = 18.7 \times 0.75 = 14A$	14A (2 marks)
		Total Maximum Demand	62A (1 mark)

(Deduct 1 Mark for no or incorrect units on total, deduct 1 mark for no or incorrect load groups)

## Voltage Drop

### Q.12

#### Consumer Mains

Table 41 Column 6 (1 mark)

Vc 1.12 (1 mark)

Vd 1.82 (1 mark)

#### Sub-mains

Table 41 Column 6 (1 mark)

Vc 1.55 (1 mark)

Vd 2.6 (1 mark)

#### Final Sub-circuit

Table 42 Column 4 (1 mark)

Vc 3.67 (1 mark)

Vd 1.93 (1 mark)

Total Voltage Drop=  $1.82+2.52+1.93=6.27V$  (1 mark)

(Deduct 1 Mark for no or incorrect units on total. Deduct 1 mark for no or incorrect table number/s)

## Overload & Short Circuit Calculations

### Q.13

Overcurrent divided by MCB current rating = 4 (1 mark)

Minimum Time = Accept 2-3 seconds (1 mark)

Maximum Time = Accept 6-8 seconds (1 mark)

(Deduct 1 mark for no or incorrect time unit)

### Q.14

#### Transformer impedance

230/18,850 (2 marks)

0.01220Ω (1 mark) Answer must be to 5 decimal places.

#### Main switchboard prospective fault

230/ (0.01220 +0.0068) (2 marks)

12105A (1 mark)

#### Distribution board prospective fault

230/ (0.01220 + 0.0068+ 0.037) (2 marks)

4107A (1 mark)

(Deduct 1 Mark for no or incorrect units in final answer)

## Residual Current Devices

### Q.15

35A (1 Mark)

AS/NZS 3000 Clause 2.6.2.1 (a) (2 marks)

## Motor and Starters

### Q.16

B (2 Marks)

## AS/NZS 4836:2011

### Q.17

Positively identified (2 marks)

Clause number: 3.2.2 (2 marks)

## Installation Defects- Non Domestic

### Q.18

(2 marks for correct defect one mark for the correct clause)

(Only accept the first 5 defects candidate has listed)

1. Consumers' mains are not installed in a manner to maintain supply when exposed to fire 7.2.2.1
2. The cable to the distribution board is undersized – 3.4.1
3. Main switch distribution board not labelled 'Main Switch' not labelled – 2.3.3.5(b)
4. The main neutral connection at the neutral bar is not labelled – 2.10.5.4
5. The telecommunications earthing conductor is undersized, 6mm<sup>2</sup> minimum - 5.6.2.7 (iv)
6. Main switch fire pump not labelled 'IN THE EVENT OF FIRE DO NOT SWITCH OFF' 7.2.4.4(b)
7. 'Main switch fire pump' label not in uppercase 7.2.4.4(a)
8. Strip earth electrode not at minimum horizontal length 5.3.6.3(i)
9. Strip earth electrode not at minimum depth 5.3.6.3