

Licensed Electrical Inspector RE Class (Internal Combustion Engines only) Theory Assessment

Sample Paper - Applicable from 1 January 2024



Candidate Surname	
Candidate Given Names	

Instructions

- Personal notepads, paper, or electronic devices are not permitted (non-programmable calculators are 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 and table numbers (where required) must be shown to obtain full marks.
- Reference material listed on the following page. Reference material will be supplied. Do not mark, fold, or write on the reference material

Working Time: 1 hour 15 minutes

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

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

Question	1	2	3	4	5	6	7a	7b	8	9	Total
Mark											

Paper total is 44 marks. Candidates need to obtain 75% or more (33 marks or more) to pass this assessment.

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

Reference Material – to be provided to the candidate by the assessment venue:

- **Electricity Safety (General) Regulations 2019**
- **AS/NZS3008.1.1: 2017 Electrical installations – Selection of cables**
- **AS/NZS 3010: 2017 Electrical Installations - Generating Sets**

All Standards include amendments if applicable

In questions 1-6 you are required to:

- answer the question based on the relevant clause from AS/NZS 3010: 2017
- write the Clause and/or Table number in the space provided
- the correct Clause and Subclause must be given (e.g. 3.5.2(b)(i)). Including if it is an exception or note.

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

***Note:** Two versions of Question 8 (8-1 and 8-2) are provided on this sample paper to show the type of questions that may be supplied. Only one of these will appear on the assessment. Marks for Qu 8 should only be counted for one version of this question.

Question N°1.

Where a permanently connected 125 kVA petrol engine generating set is installed in a room or enclosure, what are the egress requirements concerning the number of openings?

Answer:

Clause number:

[2 + 2 = 4 Marks]

Question N°2.

Is it permissible to use electronic touch screens, programmable control systems or the like to operate the Automatic Transfer Switch (ATS) when used as a main switch?

Answer:

Clause number:

[2 + 2 = 4 Marks]

Question N°3.

Where generating sets are to be synchronized with an electricity distributor's network, from whom shall the requirements for synchronization shall be obtained from?

Answer:

Clause Number:

[2 + 2 = 4 Marks]

Question N°4.

Is it permissible to use a three-pole/three-pole changeover device to connect a generating set at a switchboard with a MEN link??

Answer:

Clause:

[2 + 2 = 4 Marks]

Question N°5.

What are the two requirements for generator switchboards?

(a)

and

(b)

Clause number:

[2 + 2 = 4 Marks]

Question N°6.

Where an alternative supply is provided, an automatic changeover switch shall be installed to allow supply for the alternative system to be connected to the safety services. Where shall this automatic changeover switch be located?

Answer:

Clause number:

[2 + 2 = 4 Marks]

Question N°7.

An electrical installation is supplied from a kiosk sub-station located in a street reserve (not onsite). The consumer's mains are two sets of four single core 95 mm² XLPE X-90 insulated and sheathed copper cables, connected in parallel to supply a three phase main switchboard onsite which then supplies three tenancies.

Tenancy 3 is a separate outbuilding, and the sub-mains are four single core 35mm² X90 insulated and sheathed copper conductors installed in heavy duty conduit in the ground and are protected at their origin by a 100 Amp circuit breaker. Cable length is 35m with a 10mm² carried earth of the same length. The out of balance load on each phase is intermittent and values are as follows: red phase 86A, white phase 82A, blue phase 83A.

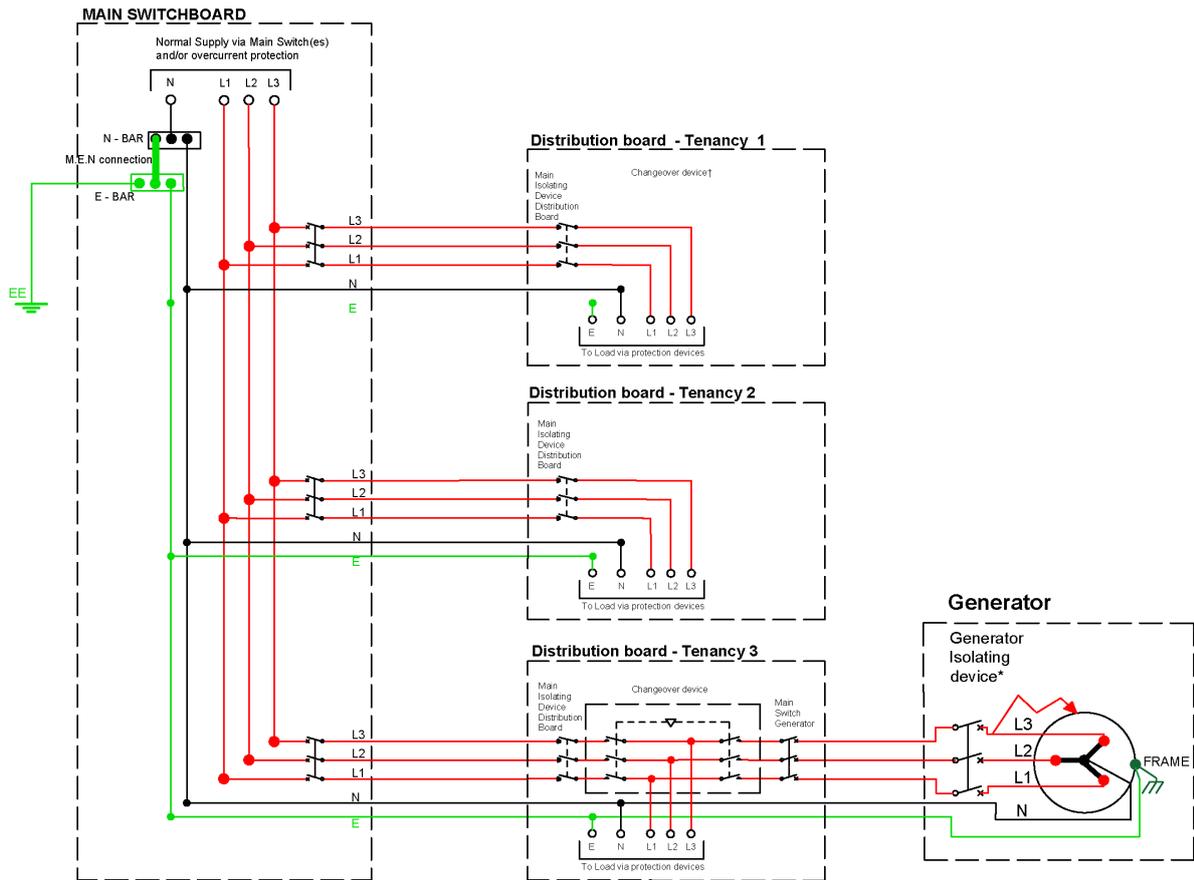
Tenancy 3 also has an internal combustion engine generator recently installed as a standby supply currently awaiting inspection. The generator is a 25kVA three phase generator set with one set of four single core 35 mm² XLPE X-90 insulated and sheathed copper cables, connected to the tenancy distribution board through an automatic transfer switch. Cable length is 25m to the generator terminals. A 10mm² XLPE X-90 carried earth connects directly to the generator frame and is 27m in length. All the generator internal cabling is single core XLPE X-90 35mm² and 1m in length.

Following the connection of the generator into the installation, there is a concern that the resistance of the earthing conductor connected from the generator to the Tenancy 3 distribution board will not be low enough to cause the circuit protection device located at the generator to operate within the required time of 0.4 seconds.

Please refer to the drawing on the next page. A fault is shown at the generator, which is a short between L3 and the frame of the generator.

Notes

1. *Refer below figure for further information.*
2. *The isolation device at the generator is a circuit breaker. The fault current required to operate this circuit breaker protection on the generator within the required time is 3250 Amps.*
3. *In calculating the fault current path impedance, you may need to consider more than the earthing conductors.*
4. *Work all impedances to 5 decimal places*



Part a.

Identify the correct fault current path if there is a fault on one of the active conductors between the windings and protective device in the generator (as shown on the diagram).

- a) Generator earth conductor, Submains Earth conductor, Generator active conductor, Submains Neutral conductor, Generator Neutral conductor.
- b) Submains Neutral conductor, Generator Neutral conductor, Generator active conductor, Generator earth conductor, Submains Earth conductor.
- a) Generator active conductor, Generator earth conductor, Submains Earth conductor, Submains Neutral conductor, Generator Neutral conductor.
- b) Generator Neutral conductor, Submains Neutral conductor, Generator active, Generator earth conductor, Submains Earth conductor.
- c) Submains Earth conductor, Generator earth conductor, Submains Neutral conductor, Generator Neutral conductor, Generator active conductor.

Answer:

[2 marks]

Part b.

- i) Using AS/NZS 3008.1.1: 2017, calculate the total fault current path impedance
- ii) Calculate the generator internal impedance and determine if the installation is compliant.

[9 + 2 = 11 Marks]

Answers:

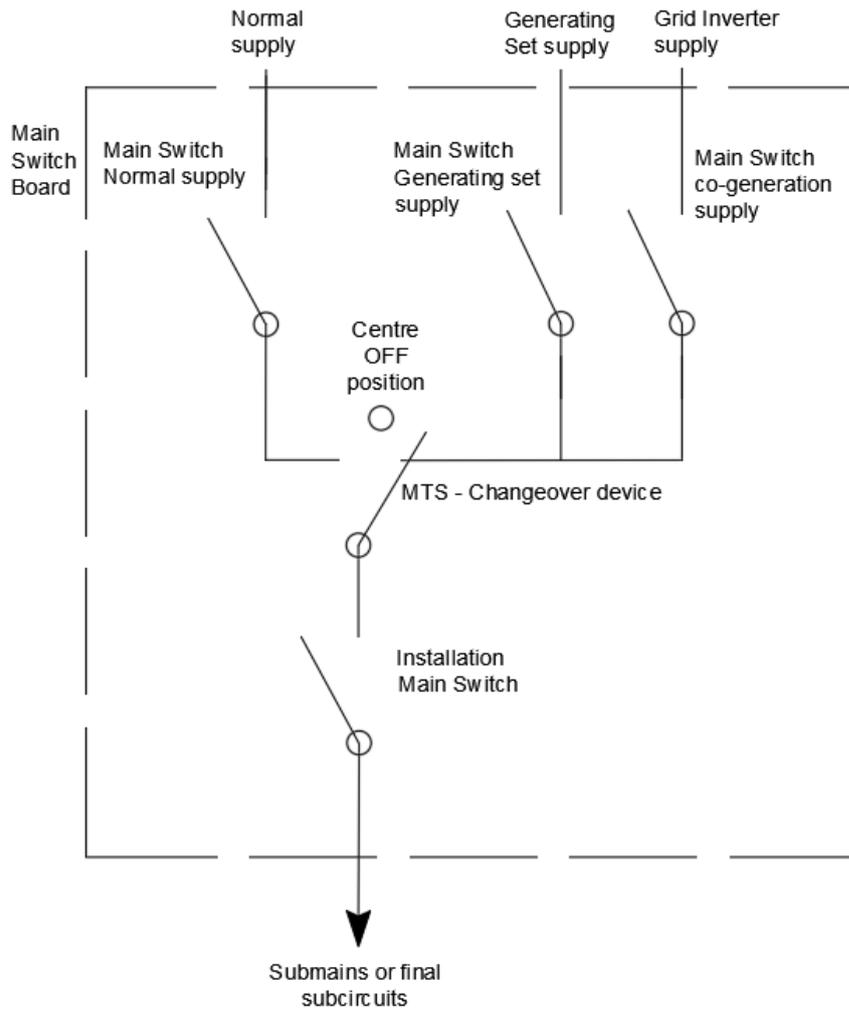
a) Fault current path impedance =

b) The installation is compliant Yes / No

***Note:** Two versions of Question 8 (8-1 and 8-2) are provided on this sample paper to show the type of questions that may be supplied. Only one of these will appear on the assessment. Marks for Qu 8 should only be counted for one version of this question.

Question N°8 -1 (choose one of the following questions only)

Confirm if the design of the following layout of the switching of a multiple supply installation is compliant.



Is this compliant? Yes / No

Clause and Figure No:

[2 + 1 = 3 Marks]

Question N°8 -2

Refer to AS/NZS 3010: 2017 + A1 figure 2.10.

The 3 pole short circuit protection device at the generator as shown in Figure 2.10 is also being used as the isolating switch for the generator. Can this be replaced with a 4 pole protection device which also switches the neutral?

Answer:

Clause:

[2 + 1 = 3 Marks]

Question N°9

A premises has a motor generator installed as a consumer electricity generation system. According to the Electricity Safety (General) Regulations 2019, what are the labelling requirements at the main switchboard?

Answer:

Regulation:

[2 + 2 = 4 Marks]