

Licensed Electrical Inspector RE conditional Class Theory Assessment

Sample Paper Marking Guide Applicable from December 2023

Questions 1-6: Standards

Q.1

Answer: Not less than two openings or doorways, spaced well apart, shall be provided (2 marks)

Clause number: 3.2.3.2 (2 marks)

Q.2

Answer: No. (2 marks)

Clause number: 2.7.9 (2 marks)

Q.3

Answer: The requirements for synchronization shall be obtained from the electricity distributor. (2 marks)

Clause number: 2.4.3 (2 marks)

Q.4

Answer: Yes. (2 marks)

Clause number: 2.7.11 (2 marks)

Q.5

Answer: All generator switchboards shall be—
(a) installed in accordance with the requirements of AS/NZS 3000; and
(b) constructed in accordance with AS/NZS 3439 or AS/NZS 61439 (series). (2 marks)

Clause/Table number: 2.9 (2 mark)

Q.6

Answer: On the main switchboard (2 marks)

Clause: 3.5.6 (2 marks)

Q.7a

Answer: C (2 marks)

Reasoning: Fault occurs on Generator active to frame that is at earth potential, fault current must flow through generator earth and then submain earth conductor to MEN connection at main Switchboard and then return via submain Neutral and the Generator Neutral to generator windings to operate protective device.

Q.7b

Part i) Calculate conductor impedances:

Table 34

$R_c = 0.668 \Omega/\text{km}$ for 35mm^2 cables (1 mark)

$R_c = 2.33 \Omega/\text{km}$ for 10mm^2 cables (1 mark)

Generator internal cabling

Active: 35mm^2 Table 34 $1\text{m} \times 0.668/1000 = 0.00067\Omega$ (1 mark)

Neutral: 35mm^2 Table 34 $1\text{m} \times 0.668/1000 = 0.00067\Omega$ (1 mark)

Generator Mains (Consumer mains).

Active: 35mm^2 Table 34 $25\text{m} \times (0.668/1000) = 0.01670\Omega$

Neutral: 35mm^2 Table 34 $25\text{m} \times (0.668/1000) = 0.01670\Omega$ (1 mark)

Earth: 10mm^2 Table 34 $27\text{m} \times (2.33/1000) = 0.06291\Omega$ (1 mark)

Tenancy Submains

Active: 35mm^2 Table 34 $35\text{m} \times (0.668/1000) = 0.02338\Omega$

Neutral: 35mm^2 Table 34 $35\text{m} \times (0.668/1000) = 0.02338\Omega$ (1 mark)

Earth: 10mm^2 Table 34 $35\text{m} \times (2.33/1000) = 0.08155\Omega$ (1 mark)

Fault current path impedance

Generator Active internal + Generator Mains Earth + Submains Earth + Submains Neutral + Generator mains Neutral + Generator Neutral Internal

$$0.00067\Omega + 0.06291\Omega + 0.08155\Omega + 0.02338\Omega + 0.01670\Omega + 0.00067\Omega =$$

Total fault current path impedance = 0.18588Ω (1 mark)

Part ii) Calculate Generator internal impedance

$$Z_{int} = U_o / I_a = 230\text{V}/3250\text{A} = 0.07077 \Omega \quad (1 \text{ mark})$$

The installation is not compliant. Fault loop impedance fails as the fault loop cable resistances are greater than the internal resistance of the Generator and will not provide enough fault current to the Generator protective device to operate in the fault condition. (1 mark)

***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.

Q.8 -1

Is this compliant? No (2 marks)

Clause No. 2.7.1 and Figure 2.1 note 1. (1 mark)

Q. 8-2

Answer: No (2 marks)

Clause: 2.6.3 Exception 2 (1 mark)

Q. 9

Answer:

(a) "Warning—this premises contains an electricity generation system"; and

(b) with the location of isolation switches for all electricity generation systems installed or connected to the premises.

(2 marks)

Regulation: 211 (2 marks)