



Candidate Code No.	
For Board Use Only	
Result	Result
Date	Date
Int	Int

ELECTRONIC SECURITY **THEORY/REGULATIONS EXAMINATION**

21 June 2008

QUESTION AND ANSWER BOOKLET

Time Allowed: 3 Hours

INSTRUCTIONS – READ CAREFULLY

You have 10 minutes to read this paper but do not start writing until instructed to do so by the supervisor.

Write your Candidate Code Number in the box provided above. Your name must NOT appear anywhere in this paper.

Answer all questions.

The pass mark for this examination is 60 marks.

Use a pen for written answers. **Do not** use a pencil or a red pen.

Drawing instruments and pencils may be used when diagrams are required. Marks are allocated on the basis of correctness.

Do not use correcting fluid or correcting tape.

Non-programmable calculators may be used.

It is recommended that the reference source for your answers be included in the space provided if a question can be answered from the Act, Regulations, Standard or Code. However, just stating a reference only will earn no marks.

For calculation questions all workings, including formulae, must be shown to gain full marks.

Warning – You could get 0 marks for any question, or part of a question, if you show anything hazardous or dangerous in your answer.

You will need to use some of the following documents in this examination:

- The Electricity Act 1992 reprint dated 19 August 2005.
- The Electricity Regulations 1997 reprint dated 5 September 2005.
- AS 1939 supplement 1 – 1990; AS/NZS 3000:2000 (including amendments 1, 2, 3 and A) or AS/NZS 3000:2007; NZS 3019 (Int):2002 or NZS 3019:2004; AS/NZS 3760:2001 or AS/NZS 3760:2003.

PLEASE HAND THIS PAPER TO THE SUPERVISOR BEFORE LEAVING THE ROOM

(turn over)

SECTION 1 – THEORY

Question 1

- (a) State **TWO** advantages that HRC fuses have when compared to rewirable fuses.

(2 marks)

(1) _____

(2) _____

- (b) (i) What test voltage is required when carrying out an insulation resistance test on a 230 V, final subcircuit to a security alarm panel?

(1 mark)

- (ii) What is the minimum value of the permitted test result for the insulation resistance test on the cable?

(1 mark)

- (c) Briefly describe how earthing the metal frame of a Class I electrical appliance prevents electric shock hazards under fault conditions.

(2 marks)

(turn over)

Question 1 continued

- (d) Which type of protective device is specifically designed to operate when it detects a sustained overload in a final subcircuit?

(2 marks)

- (e) One method of identifying a double insulated appliance is by the words "double insulated" on the appliance name plate. State **TWO** other methods that are used to identify a double insulated appliance.

(2 marks)

(1) _____

(2) _____

(turn over)

Question 2

You have to fit a new three-pin plug to a three-core PVC sheathed flexible cord supplying a Class I security alarm panel.

- (a) Briefly state the main sequence of actions involved in fitting the three-pin plug.

(2 marks)

(1) _____

(2) _____

(3) _____

(4) _____

- (b) State the visual inspections you would make before fitting the cover to the plug.

(2½ marks)

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

- (c) State the visual inspection you would make after fitting the cover to the plug.

(½ mark)

(turn over)

Question 3

- (a) A fuse has blown on a switchboard circuit supplying a single-phase plug-in security alarm panel. The panel has been taken away to be tested. Before the fuse is replaced, the main switch on the switchboard is turned off. Why would the main switch be turned off before replacing the fuse?

(1 mark)

- (b) Other than environmental, list **TWO** factors that determine the cross-sectional area of a flexible cable used to supply a security alarm panel.

(2 marks)

(1) _____

(2) _____

- (c) (i) What is the essential safety difference between switching an electrical appliance off and isolating an electrical appliance?

(2 marks)

- (ii) Describe a method of safely ensuring the continued isolation of a plug-in electrical appliance.

(1 mark)

(turn over)

Question 3 continued

- (d) You are connecting test instruments to measure voltage and current values of a live 230V security alarm panel. When doing this work it is important to observe set procedures to ensure personal safety. Briefly describe **FOUR** important electrical precautions relating to the test instruments that will promote personal safety.

- Note:
1. All the necessary safety equipment (overalls, rubber mats etc.) is available.
 2. Set procedures are available.
 3. All conductive items (e.g., rings) have been removed.

(4 marks)

(1) _____

(2) _____

(3) _____

(4) _____

(turn over)

Question 4

(a) You are required to carry out a protective earthing conductor test on a 230V, Class I plug-in security alarm panel.

(i) State the instrument that should be used for this test. (1 mark)

(ii) Briefly explain how the test should be carried out. (2 marks)

(iii) (1) What is the permitted resistance for this test? (1 mark)

(2) Is this resistance a minimum or maximum value? (1 mark)

(b) Briefly explain why an ohmmeter is not the correct instrument to carry out an insulation resistance test on a security alarm panel. (2 marks)

(turn over)

Question 4 continued

- (c) You are using an ammeter to measure the current drawn by a security alarm panel. Describe what would happen if you connected the ammeter in parallel with that panel.

(3 marks)

(turn over)

Question 5

- (a) What is meant by the term "testing" when applied to electrical installations and appliances?

(2 marks)

- (b) A single phase socket outlet has been installed for a new security alarm panel. A new cable has been run between an existing socket outlet and the new outlet – but it is not connected to the existing outlet.

Describe in detail how each of the following tests/checks should be carried out on the new cable. Include in your answer, where applicable, the type of meter used and any minimum or maximum test result values that are permitted.

- (i) Insulation resistance

(3 marks)

- (ii) Polarity

(1 mark)

(turn over)

Question 5 continued

(iii) Protective earth continuity

(3 marks)

(iv) Visual check

(1 mark)

(turn over)

SECTION 2 – SAFETY AND LEGISLATION

Question 6

- (a) A trainee may assist with prescribed electrical work subject to supervision. Refer to the Electricity Regulations and state **ONE** category of person who can provide this supervision.

(2 marks)

Ref:

- (b) Refer to AS/NZS 3000 and state:

- (i) The colours permitted to identify the phase conductor of a single-phase final subcircuit?

(1 mark)

Ref:

- (ii) The colours permitted to identify earthing conductors of a single-phase final subcircuit?

(1 mark)

Ref:

(turn over)

Question 6 continued

(c) Refer to the Electricity Regulations and state

- (i) What is meant by the term "standard low voltage" when applied to a multi-phase MEN system.

(1 mark)

- (ii) What is meant by the term "low voltage" when applied to a multi-phase MEN system.

(1 mark)

Ref:

(d) Refer AS/NZS 3000 and state **TWO** of the methods of providing protection against indirect contact.

(2 marks)

(1) _____

(2) _____

Ref:

(e) Refer to AS/NZS 3000 and state the requirements for flexible cords used as fixed wiring.

(2 marks)

Ref:

(turn over)

Question 7

- (a) Refer to the Electricity Regulations and state the Standard to which a Class I, 230V plug-in security alarm panel must be tested following completion of repairs?

(1 mark)

Ref:

- (b) Refer to the Standard required in (a) above and complete the following table by stating:

- (i) The type of instrument required for each test,
(ii) The appropriate test result which is acceptable to comply. Also state whether the test result is a minimum or maximum value.

(4 marks)

(i) Type of test	(ii) Type of instrument	(iii) Test result

Ref:

(turn over)

Question 7 continued

- (c) Refer to the Standard required in (a) above and **briefly** describe **FIVE** of the specific visual checks that should be carried out of the Class I, 230V plug-in security alarm panel.

Note: The visual checks must be specific to the Class I, 230V plug-in security alarm panel

(5 marks)

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

Ref:

(turn over)

Question 8

Refer to AS/NZS 3000 and answer the following:

- (a) List **FOUR** mandatory checks using test instruments that are required for the testing of electrical work after that work has been carried out on a low voltage electrical installation

(2 marks)

(1) _____

(2) _____

(3) _____

(4) _____

Ref:

- (b) State the primary reason for carrying out insulation resistance tests on electrical work carried out in a low voltage electrical installation

(2 marks)

Ref:

- (c) State the required voltage of the insulation resistance tester when testing a low voltage electrical installation.

(1 mark)

Ref:

(turn over)

Question 8 continued

(d) State the performance criteria for an insulation resistance tester. (2 marks)

Ref:

(e) State **ONE** reason why it is necessary to ensure correct circuit connections in a final subcircuit. (1 mark)

Ref:

(f) State the **TWO** reasons for testing the continuity of a protective earthing conductor. (2 marks)

(1) _____

(2) _____

Ref:

(turn over)

Question 9

A registered security alarm installer has installed a security alarm system which included the installation of a 1.5 mm² twin and earth TPS cable between an existing socket outlet and a new socket outlet for the alarm panel. With reference to the Electricity Regulations answer the following:

- (a) (i) What is the name of the document the security alarm installer is required to complete. (1 mark)

Ref:

- (ii) When must this document be completed? (1 mark)

Ref:

- (iii) To whom must a copy of this document be given? (1 mark)

Ref:

- (iv) When must the document be given to that person? (1 mark)

Ref:

- (v) For how long must the security alarm installer retain a copy of this document? (1 mark)

Ref:

(turn over)

Question 9 continued

(vi) What action must be taken if the security alarm installer does not wish to retain the copy of the document?

(1 mark)

Ref:

(vii) Name **ONE** other class of person who can issue this type of document.

(1 mark)

Ref:

(b) (i) The testing of this installation must be carried out in accordance with which section of which document?

(1 mark)

Ref:

(ii) When must this testing be carried out?

(2 marks)

Ref:

(turn over)

Question 10

Refer to the Electricity Regulations and answer the following:

- (a) No person shall assist to carry out prescribed electrical work for the first time unless that person has satisfactorily completed safety tuition in **FOUR** specific subjects. What are those subjects?

(2 marks)

(1) _____

(2) _____

(3) _____

(4) _____

Ref:

- (b) At what intervals must a registered security alarm installer complete the tuition in the subjects in (a).

(2 marks)

Ref:

- (c) An employer may have employees who assist to carry out prescribed electrical work. What responsibility does the employer have with respect to the competency of the employees who are doing this work?

(2 marks)

Ref:

(turn over)

Question 10 continued

- (d) Whilst carrying out prescribed electrical work, a registered security alarm installer finds part of an installation which he/she believes on reasonable grounds, presents an immediate danger to life. Who is the security alarm installer required to advise of the danger?

(2 marks)

Ref:

- (e) State **TWO** of the details of an electrical accident that must be reported to the Secretary.

(2 marks)

(1)

(2)

Ref:

For Candidate's Use

In the box, write the number of **EXTRA** sheets you have used. Write **NIL** if you have not used any

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Questions Answered	Marks	
1		
2		
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