



<b>Candidate Code No.</b>	
<b>For Board Use Only</b>	
Result	Result
Date	Date
Int	Int

## TRADESPERSON ELECTRICAL WORK CERTIFICATE EXAMINATION

**24 November 2007**

**PLUMBERS/GASFITTERS**

### **QUESTION AND ANSWER BOOKLET**

**Time Allowed      Two hours and 30 minutes**

#### **INSTRUCTIONS – READ CAREFULLY**

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

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

**The pass 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. Show all working to THREE significant places**

**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 may need to use the following documents in this examination:**

- The Electricity Act 1992 reprinted at 19 August 2005.
- The Electricity Regulations 1997 reprinted at 5 September 2005.
- AS 60529 or AS 1939 supplement 1 – 1990; AS/NZS 3000:2000 (including amendments 1, 2, A and 3); 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)**

## Question 1

- (a) Describe how to measure voltage at the supply terminals of a fixed-wired single phase appliance.

(2 marks)

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- (b) State what is meant by the symbol of a **square within a square** on an electrical appliance.

(2 marks)

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- (c) (i) State the unit of power used by an electrical appliance.

(1 mark)

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- (ii) State another common term used to describe the **phase** conductor.

(1 mark)

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- (d) A Class I electrical appliance is controlled by a single-pole switch. State why safety could be affected if the switch was placed in the neutral conductor.

(2 marks)

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**(turn over)**

## Question 1 continued

- (e) Calculate the current that will be drawn by a 230/240V plug-in electrical appliance rated at 1,500W, when operating at 240v.

(2 marks)

- (f) Draw circuit symbols illustrating:

- (i) A single pole switch in the **on** position.

(1 mark)

- (ii) A double pole switch in the **off** position.

(1 mark)

- (g) State **TWO** ways of identifying a double insulated appliance.

(2 marks)

(1) \_\_\_\_\_

(2) \_\_\_\_\_

**(turn over)**

**Question 1 continued**

(h) Explain what is meant by the term "open circuit". (2 marks)

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(i) State **ONE** method of minimising the possibility of exposing basic insulation when connecting a flexible cord to an appliance. (2 marks)

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(j) Refer to the Electricity Regulations and state what is meant by the term **Standard Low Voltage** for a single phase MEN system. (2 marks)

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Ref:: .....

**(turn over)**

## Question 2

- (a) Rewireable fuses and HRC fuses may be found on switchboards. What is the main function of a fuse?

(2 marks)

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- (b) State the meaning of the term **breaking capacity** for fuses or circuit breakers.

(2 marks)

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- (c) When an HRC cartridge fuse is replaced, the replacement cartridge must have similar characteristics to the original.

State the **FOUR** electrical characteristics to be checked for similarity.

(4 marks)

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_
- (4) \_\_\_\_\_

**(turn over)**

## Question 2 continued

- (d) State **TWO** reasons why it is important to thread the fuse wire from terminal to terminal through the **tortuous path** in the fuse carrier when reloading a rewirable fuse.

(2 marks)

(1) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(turn over)**



### Question 3 continued

- (c) Briefly state **THREE** reasons why it is not permitted to bridge the terminals of HRC fuse carriers with fuse wire of the same current rating as the blown cartridge.

(3 marks)

(1) \_\_\_\_\_

\_\_\_\_\_

(2) \_\_\_\_\_

\_\_\_\_\_

(3) \_\_\_\_\_

\_\_\_\_\_

- (d) State why is it important when selecting a fuse link to ensure that the correct category of duty is chosen.

(2 marks)

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**(turn over)**

## Question 4

Instruments used to test **THREE** separate resistive circuits indicate the values listed in the table below. Using this information, calculate the missing values numbered 1 to 5.

<b>Circuit</b>	<b>Supply Volts</b>	<b>Total Ohms resistance</b>	<b>Current</b>	<b>Watts</b>
<b>One</b>	230	<i>Value 1</i>	10	<i>Value 2</i>
<b>Two</b>	200	<i>Value 4</i>	<i>Value 3</i>	1000
<b>Three</b>	<i>Value 5</i>	46	5	1150

(a) Value 1

(2 marks)

(b) Value 2

(2 marks)

(c) Value 3

(2 marks)

**(turn over)**

## **Question 4 continued**

(d) Value 4

(2 marks)

(e) Value 5

(2 marks)

**(turn over)**

## Question 5

Before a Class I plug-in dishwasher is returned to service after being repaired, AS/NZS 3760 requires that it must be inspected and two tests carried out using test instruments. Refer to AS/NZS 3760 and:

- (a) State **FOUR** visual checks that must be carried out. The visual checks **must** relate only to the Class I appliance.

(4 marks)

(1) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(3) \_\_\_\_\_

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\_\_\_\_\_

(4) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Ref: .....

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## Question 5 continued

(b) Complete the following in relation to the tests using test instruments:

### Test No.1

(1) Type of test (1 mark)

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(2) Instrument used (1 mark)

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(3) Acceptable test result (1 mark)

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Ref: .....

### Test No.2

(1) Type of test (1 mark)

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(2) Instrument used (1 mark)

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(3) Acceptable test result (1 mark)

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Ref: .....

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## Question 6

All flexible cords are given a **current rating**.

- (a) Explain the meaning of the term **current rating**.

(2 marks)

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- (b) What could happen if the flexible cord was used to supply an electrical appliance that draws a current in excess of the cord's rating?

(2 marks)

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- (c) A flexible cord is to be fitted to a single phase electrical appliance. List **FOUR** considerations which may influence the selection of the cord.

(4 marks)

(1) \_\_\_\_\_

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(2) \_\_\_\_\_

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(3) \_\_\_\_\_

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(4) \_\_\_\_\_

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## Question 6 continued

- (d) The cores of a flexible cord are being terminated in an electrical appliance. Explain why this is important to remove the minimum amount of basic insulation from the cores?

(2 marks)

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## Question 7

A plumber is requested to replace an existing 1500W, 230V element in storage water heater with a new 3000W, 230V element to reduce the recovery time. The permanent connection unit supplying the storage water heater is rated at 230V, 10A.

- (a) Determine, by calculation, if the permanent connection unit has an adequate current rating to supply the 3000 watt element. (3 marks)

- (b) What other considerations are necessary before the plumber installs the new 3000W element? (3 marks)

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**Question 7 continued**

(c) Refer to AS/NZS 3760 and state **THREE** visual inspections of the hot water cylinder that are required to be carried out.

(3 marks)

(1) \_\_\_\_\_

\_\_\_\_\_

(2) \_\_\_\_\_

\_\_\_\_\_

(3) \_\_\_\_\_

\_\_\_\_\_

Ref: .....

(d) Who is responsible for checking and testing of the storage water heater for electrical safety after the replacement element is fitted?

(1 mark)

\_\_\_\_\_

\_\_\_\_\_

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## Question 8

(a) Replacement flexible cords are to be fitted to some electrical appliances:  
(7 marks)

(i) What is the minimum number of cores required for a flexible cord for a Class I electrical appliance?

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(ii) What is the colour coding required for the cores of a flexible cord for a Class I electrical appliance?

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(iii) What is the minimum number of cores required for a flexible cord for a Class II electrical appliance?

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(iv) What is the colour coding required for the cores of a flexible cord for a Class II electrical appliance?

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**(turn over)**

## Question 8 continued

(b) When a three core flexible cord is fitted to an appliance, it is recommended that the protective earthing conductor should be left longer than the phase and neutral conductors.

(i) State **ONE** reason why this is recommended.

(1 mark)

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(ii) Explain what could happen if the protective earthing conductor was the same length as the phase and neutral conductors.

(2 marks)

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**(turn over)**



## Question 9 continued

- (b) Refer to the Electricity Regulations and state the **THREE** categories of prescribed electrical work that can be carried out by a gasfitter who holds a Tradespersons Electrical Work Certificate issued by the Electrical Workers Registration Board.

(3 marks)

(1) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(3) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (c) Refer to the Electricity Regulations and state **TWO** subjects that must be covered in refresher courses for the holders of a Tradespersons Electrical Work Certificate.

(2 marks)

(1) \_\_\_\_\_

(2) \_\_\_\_\_

**For Candidate's Use**

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

**For Examiner's Use Only**

<b>Questions Answered</b>	<b>Marks</b>	
1		
2		
3		
4		
5		
6		
7		
8		
9		
<b>TOTAL</b>		