



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

TRADESPERSON ELECTRICAL WORK CERTIFICATE EXAMINATION

19 September 2009

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 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 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) **or** AS/NZS 3000:2007; NZS 3019:2004 **or** AS/NZS 3019:2007; AS/NZS 3760:2003 and Amendment 1.

**PLEASE HAND THIS PAPER TO THE SUPERVISOR BEFORE LEAVING THE ROOM
(turn over)**

Question 1

(a) State the term used for:

(i) The electrical output of an appliance.

(1 mark)

(ii) The flow of electricity.

(1 mark)

(b) What is the minimum output voltage required from an insulation resistance tester when testing the insulation resistance of a Class I, 230V electrical appliance:

(i) That has an MOV connected?

(1 mark)

(ii) That does not have an MOV connected?

(1 mark)

(c) Briefly state **TWO** 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.

(2 marks)

(1) _____

(2) _____

(turn over)

Question 1 continued

(d) Describe how to measure voltage at the socket outlet for a plug-in electrical appliance.

(2 marks)

(e) State the meaning of the term "breaking capacity" for fuses or circuit breakers.

(2 marks)

(f) The Electricity Regulations and state that four subjects that must be covered in refresher courses for the holders of a Tradespersons Electrical Work Certificate. Two of those subjects are CPR and basic first aid. Refer to the Electricity Regulations and state the other **TWO** subjects:

(2 marks)

(1) _____

(2) _____

Ref:

(turn over)

Question 1 continued

- (g) State the advantage of using an isolating transformer with a **double insulated** appliance in an outdoor situation.

(2 marks)

- (h) An HRC fuse, that protects a circuit, blows every time the correct fuse link is inserted. State **TWO** undesirable effects that may occur if the fuse link is replaced with one of a higher current rating.

(2 marks)

(1) _____

(2) _____

- (i) Calculate the resistance of an electrical appliance with a rating of 1500 watts when it is supplied at 230V.

(2 marks)

- (j) An electric drill is used in an earthed situation. How would you know that the drill is a double-insulated appliance?

(2 marks)

(turn over)

Question 2

A 230V, single phase circuit is controlled by a double pole switch that controls 3 resistors. The resistors are in two branches connected in parallel across the supply

- The first branch contains only resistor R_1 , 30Ω
- The second branch contains resistors R_2 , 50Ω and R_3 , 40Ω in series.

(a) Draw and label a circuit diagram of the 230V, single phase circuit.

Include a fuse that protects the entire circuit. The correct polarity must be shown.

(3 marks)

(turn over)

Question 2 continued

(b) Calculate the current drawn by the circuit

(5 marks)

(c) Calculate the total power used by the resistors.

(2 marks)

(turn over)

Question 3 continued

(b) Refer to AS/NZS 3760 and state the insulation resistance permitted between the live supply conductors and earthed exposed metal parts of a Class I portable isolating transformer. State a reference to support your answer.

(1 mark)

Ref:

(c) A polarity test should be carried out on a plug-in Class I electrical appliance after a replacement flexible cord has been fitted. The appliance is controlled by a single-pole switch. What **FOUR** important points will this polarity test confirm?

(4 marks)

(1) _____

(2) _____

(3) _____

(4) _____

(turn over)

Question 4

- (a) You are connecting test instruments to measure voltage and current values of a 230V circuit that you know is live.

State **FOUR** actions you should take that relate specifically to the test instruments.

(4 marks)

(1) _____

(2) _____

(3) _____

(4) _____

- (b) The prove-test-prove method of testing is used for checking that isolation has been achieved.

- (i) What are the **TWO** conditions that the prove-test-prove method is intended to verify?

(2 marks)

(1) _____

(2) _____

(turn over)

Question 4 continued

- (ii) Explain how the prove-test-prove method of testing is carried out. (3 marks)

- (c) Explain the **main** purpose of using a Danger Tag system. (1 mark)

(turn over)

Question 6

- (a) A single phase 230V Class I, plug-in electrical appliance is supplied via a flexible cord. State the **TWO** sets of colour coding, either of which can be used for the flexible cord. State the polarity for each colour.

Note: To gain marks for each set you must state the all the colours and polarity accurately.

(6 marks)

Set 1

Set 2

- (b) An electrical appliance is being supplied from a 25 metre three core flexible extension cord. The extension cord has been wound on a cable drum to provide a convenient means of storage.

State the **TWO** precautions, either of which could be taken to prevent the extension cord failing when in use.

(2 marks)

(1) _____

(2) _____

(turn over)

Question 6 continued

- (c) If the phrase "it is the maximum current that it is designed to carry safely" is used in respect to a flexible cord, what characteristic is being described?
(1 mark)

- (d) Explain why the voltage at the load end of a flexible cord extension set supplying current to an electrical appliance is less than that at the supply end of the cord?
(1 mark)

(turn over)

Question 7

(a) Fuses and RCDS are found on switchboards.

(i) What is the main purpose of a fuse on a switchboard?

(2 marks)

(ii) What is the main purpose of an RCD on a switchboard?

(2 marks)

(b) Each HRC cartridge fuse carries a label bearing information about its manufacture and operating characteristics. A new fuse carries the following information:

- 45 Amps.
- 415 Volt.
- AC 40.

Briefly describe the meaning of each of these items of information.

(3 marks)

45 amps

415 volts

AC40

(turn over)

Question 7 continued

- (c) 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) _____

- (d) State the primary purpose of using an HRC fuse to protect a circuit.

(1 mark)

(turn over)

Question 9

- (a) List **THREE** possible causes of exposed basic insulation or live terminals on a gas fired boiler supplied by a TPS cable, a surface mounted switch, starter unit and flexible conduit enclosing PVC conduit wire.

(3 marks)

(1) _____

(2) _____

(3) _____

- (b) Give **TWO** reasons why the flexible conduit used to supply a 230V gas heater must be securely clamped.

(2 marks)

(1) _____

(2) _____

- (c) State **TWO** reasons why you should not complete a permanent isolation of a circuit by removing only the fuse carrier.

(2 marks)

(1) _____

(2) _____

(turn over)

Question 9 continued

- (d) State **THREE** reasons why covers must be in place and secured before returning a repaired plug-in electrical appliance to service.

(3 marks)

(1) _____

(2) _____

(3) _____

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		
3		
4		
5		
6		
7		
8		
9		
TOTAL		