



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

TRADESPERSON ELECTRICAL WORK CERTIFICATE EXAMINATION

22 November 2008

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 (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) List **TWO** examples of an "earthed situation". (2 marks)

(1) _____

(2) _____

- (b) List any **TWO** tests using instruments that should be carried out on a Class I electrical appliance after it has been repaired. (2 marks)

(1) _____

(2) _____

- (c) Repairs have been carried out on a fixed wired electrical appliance rated at 1500W, 230V. Calculate the current drawn by the appliance. (2 marks)

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

(turn over)

Question 1 continued

(e) 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) _____

Ref:

(f) Refer to the Electricity Act and state **TWO** actions that may be taken by the Electrical Workers Registration Board against the holder of a Tradespersons Electrical Work Certificate who is found guilty of a disciplinary offence.

(2 marks)

(1) _____

(2) _____

Ref:

(g) 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) _____

(turn over)

Question 1 continued

(h) 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)

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

(j) A handheld electrical appliance used on a building or structure under construction must be used in conjunction with an appropriate safeguard. Refer to the Electricity Regulations 1997 and state **TWO** such safeguards. (2 marks)

(1) _____

(2) _____

Ref:

(turn over)

Question 2

(a) Draw and label a circuit diagram for a circuit supplying a Class 1, single phase electrical appliance rated at 1500W, 230V that includes the following:

- A fuse
- A single pole switch that controls the whole circuit.
- An ammeter that measures the current drawn by the appliance.
- A voltmeter that measures the voltage.
- Polarity of the supply.

(6 marks)

(turn over)

Question 2 continued

(b) Calculate the resistance of the appliance.

(2 marks)

(c) Calculate the current drawn by the appliance.

(2 marks)

(turn over)

Question 3

(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 46.

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

(3 marks)

45 amps

415 volts

AC46

(turn over)

Question 3 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 4

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

(2 marks)

(1) _____

(2) _____

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

(3 marks)

(1) _____

(2) _____

(3) _____

(turn over)

Question 4 continued

(c) A fixed wired Class I electrical appliance is supplied from a surface mounted isolating switch via PVC conduit wire enclosed in PVC flexible conduit.

(i) State **THREE** possible causes of exposed basic insulation in this situation.

(3 marks)

(1) _____

(2) _____

(3) _____

(ii) State **TWO** reasons why the PVC flexible conduit must be securely clamped.

(2 marks)

(1) _____

(2) _____

(turn over)

Question 5

- (a) Electrical equipment designed for use in damp situations has an **IP rating** – an International Protection rating or Ingress protection rating. An **IP rating** consists of the initials IP followed by two numbers.

Refer to AS1939; AS 60529 or AS/NZS 3000 and answer the following:

- (i) What is an IP rating?

(2 marks)

Ref:

- (ii) Explain what the first number after the letters IP indicates.

(2 marks)

Ref:

- (iii) Explain what the second number after the letters IP indicates.

(2 marks)

Ref:

(turn over)

Question 5 continued

(b) Refer to AS1939, AS 60529 or AS/NZS 3000 and describe the level of protection offered by fittings rated at **IP34**.

(2 marks)

3 _____

4 _____

Ref:

(c) Refer to AS/NZS 3000 and state what is meant by the term "damp situation".

(2 marks)

Ref:

(turn over)

Question 6

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

- (a) Explain the meaning of the term **current rating**. (2 marks)

- (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)

- (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) _____

(2) _____

(3) _____

(4) _____

(turn over)

Question 6 continued

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

(2 marks)

(turn over)

Question 7

- (a) When selecting a replacement cartridge for an open circuit HRC fuse, it is necessary to consider its **Utilisation category (fusing factor)**. State what is meant by **Utilisation category (fusing factor)**.

(2 marks)

- (b) A circuit supplies a fixed wired electrical appliance rated at 3000W, 230V. The HRC fuse protecting the circuit has blown. Show by calculation, the rating of the HRC fuse cartridge that would be purchased to replace the blown one.

(3 marks)

(turn over)

Question 7 continued

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

(5 marks)

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

Ref:

(turn over)

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?

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

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

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

(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)

(ii) Explain what could happen if the protective earthing conductor was shorter than the phase and neutral conductors.

(2 marks)

(turn over)

Question 9 continued

- (ii) After completing the prove-test-prove test in (a)(i) above you find that the gas-fired boiler is still live. Describe the procedure you would follow to prove that the boiler is isolated.

(4 marks)

- (b) Describe what you would do to leave the site safe.

(2 marks)

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		
Questions Answered	Marks	
1		
2		
3		
4		
5		
6		
7		
8		
9		
TOTAL		