



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

**TRADESPERSON ELECTRICAL WORK CERTIFICATE
EXAMINATION
30 June 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

Each part of this question is worth 2 marks.

(a) In a circuit where a 30Ω resistor and a 20Ω resistor are connected in parallel:

(i) Which branch will have the highest heating effect?

(1 mark)

(ii) Which branch will have the lowest current flow?

(1 mark)

(b) 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.

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

(turn over)

Question 1 continued

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

- (e) Briefly explain the purpose of a pressure switch.

- (f) An electrical appliance has been repaired. The repair included the replacement of the flexible cord to the appliance. When the appliance is operated, the cord overheats. State **TWO** reasons why this could occur.

(1) _____

(2) _____

- (g) State the main characteristic that determines the maximum current a flexible cord can conduct safely.

(turn over)

Question 1 continued

(h) Briefly explain the purpose of a thermostat.

(i) 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)

(j) Repairs have been carried out on a fixed wired electrical appliance rated at 2000W, 230V. Calculate the current drawn by the appliance.

(turn over)

Question 2

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

(2 marks)

- (b) State **THREE** technical advantages which HRC fuses have over rewirable fuses.

(3 marks)

(1) _____

(2) _____

(3) _____

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

(2 marks)

(turn over)

Question 2 continued

(d) 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 Volt _____

AC 46 _____

(turn over)

Question 3

- (a) Replacement flexible cords are being fitted to a single phase Class I electrical appliance and a Class II electrical appliance.

(7 marks)

- (i) For the Class I appliance:

- (A) What is the minimum number of cores required in the flexible cord?

- (B) What colour coding is required for the cores of the flexible cord? State the polarity for each core.

- (ii) For the Class II appliance:

- (A) What is the minimum number of cores required in the flexible cord?

- (B) What colour coding is required for the cores of the flexible cord? State the polarity for each core.

(turn over)

Question 3 continued

- (b) A flexible cord is to be fitted to a single phase electrical appliance. List **THREE** considerations which may influence the selection of the cord. (3 marks)

(1) _____

(2) _____

(3) _____

(turn over)

Question 4

(a) In the space below, sketch a circuit diagram using all of the following electrical components connected to a 230V a.c. supply. The polarity must be shown.

- Two load resistors, one of 27 ohms and the other of 54 ohms.
- A two-position selector switch to connect the supply to either of the load resistors.
- A fuse that protects the whole circuit.
- A single pole switch that controls the circuit.

(5 marks)

(b) Calculate the maximum power dissipated in the circuit

(2 marks)

(turn over)

Question 4 continued

- (c) Find by calculation the most suitable rating for the fuse in above circuit.
(3 marks)

(turn over)

Question 5

(a) Electrical equipment designed for use in damp situations has an IP rating. An **IP rating** consists of the initials IP followed by two numbers. Refer to AS1939 or 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) What does the second number after the letters indicates.

(2 marks)

Ref:

(b) An electrical is labelled "**IP 23**". Refer to AS1939 or AS 60529 and state:

(i) The level of protection is specified by the number 2?

(1 mark)

Ref:

(turn over)

Question 5 continued

(ii) The level of protection is specified by the number 3?

(1 mark)

Ref:

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

(2 marks)

Ref:

(turn over)

Question 6 continued

(b) Describe the action you would take if you find that, when testing to ensure the appliance is safely isolated, the circuit is still live.

(2 marks)

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

(2 marks)

(d) State **TWO** tests using test instruments that should be carried out on the dishwasher before it is returned to service

(2 marks)

(1) _____

(2) _____

(turn over)

Question 7

A plumber is requested to replace an existing 1500W, 230V element in a 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 undertakes to install the new 3000 watt element?

(3 marks)

(turn over)

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 when a replacement element is fitted?

(1 mark)

(turn over)

Question 8

- (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 steel conduit used to supply a 230V gas heater must be securely clamped.

(2 marks)

(1) _____

(2) _____

- (c) State **TWO** reasons why it is not permitted to complete a permanent isolation of a circuit by only removing the carrier of a fuse.

(2 marks)

(1) _____

(2) _____

(turn over)

Question 8 continued

- (d) 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)

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		