

1008- Electrical Service Technician “A” Answer Schedule

- Notes:1. (1 mark) means that the preceding statement/answer earns 1 mark.
2. This schedule sets out the expected answers to the examination questions. The marker can exercise their discretion and decide on the overall accuracy of any answer that is presented in the candidate’s own words.
3. Symbols
Power W or P
Voltage V or E or U
4. Key to abbreviated terms:
EA Electricity Act 1992
ER Electricity Regulations 1997
AS/NZS Australia and New Zealand Joint Standard
NZS New Zealand Standard
AS Australian Standard
ECP New Zealand Electrical Code of Practice
GK General Knowledge

Section One

Each part in this section is worth 5 marks.

Question 1

The same

multi-choice answer – (d)

Question 2

2645 watts

multi-choice answer – (d)

Question 3

16A

multi-choice answer – (c)

Question 4

0V - 50V a.c.

0V - 120V ripple-free d.c.

multi-choice answer – (b)

Question 5

Two elements in series

multi-choice answer – (a)

Question 6

10A

multi-choice answer – (d)

Question 7

Water - gas expelled

multi-choice answer – (c)

Question 8

(h) 1 Megohm

multi-choice answer – (b)

Question 9

A sustained overload

multi-choice answer – (a)

Question 10

2300 watts

multi-choice answer – (c)

Question 11

$$\begin{aligned} \text{(a) (i) } I &= \frac{V}{R} \\ &= \frac{230}{92} \\ &= 2.5 \text{ amps} \end{aligned}$$

(1 mark)

$$\begin{aligned} \text{(ii) } W &= I^2 R \\ &= 2.5 \times 2.5 \times 92 \\ &= 575 \text{ watts} \end{aligned}$$

(1 mark)

$$\begin{aligned} \text{(b) (i) } R_t &= \frac{\text{Product}}{\text{Sum}} \\ &= \frac{46 \times 46}{46 + 46} \\ &= 23 \text{ ohms} \end{aligned}$$

(1 mark)

$$\begin{aligned} \text{(ii) } I &= \frac{V}{R} \\ &= \frac{230}{23} \\ &= 10 \text{ amps} \end{aligned}$$

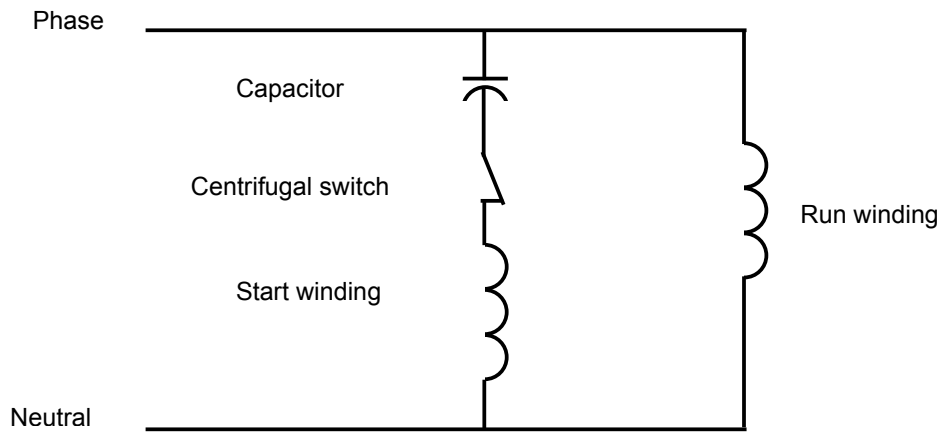
(1 mark)

$$\begin{aligned} \text{(iii) } W &= I^2 R \\ &= 10 \times 10 \times 23 \\ &= 2300 \text{ watts} \end{aligned}$$

(1 mark)

Question 12

(a)



- Correctly connected start winding, capacitor and centrifugal switch (1½ marks)
- Correctly connected run winding (½ mark)

(b) Reverse the connections on the start winding or the run winding but not both (2 marks)

(c) Any ONE of:

- Saw bench
- Refrigerator
- Pumps
- Air compressors
- Concrete mixers

(1 mark)

Question 13

(a) 1 ohm

(1 mark)

- (b)
- To ensure the rapid operation of the protective device.
 - Holds the frame at earth potential.

(2 marks)

(c) Any TWO of:

- Disconnect the protective earthing conductor from the appliance and test
- If the resistance of protective earthing conductor is more than 1 Ω , replace the flexible cord.
- If the resistance of protective earthing conductor is less than 1 Ω , re-terminate protective earthing conductor, ensuring that the termination is sound and clean.
- Re-test the protective earthing conductor to ensure resistance is 1 Ω , or less

(2 marks)

Question 14

(a) Any ONE of:

- Within 2.5 m in any direction from a conductive floor (such as earthen, concrete, tile or brickwork flooring), permanently damp surface, metallic conduit or pipe, metallic cable sheath or armour or any other conductive material on which a person may stand.
- External to a building, except for an isolated piece of equipment such as switchgear or a luminaire which is mounted more than 2.5 m from the ground and from any exposed conductive part or other conductive material which is in contact with earth.
- Within 2.5 m of the ground, floor or platform in rooms containing socket-outlets, the earthing terminals of which are earthed, and where there is a reasonable chance of a person making simultaneous contact with any exposed conductive part of electrical equipment and any exposed conductive part of an appliance connected to any of the socket-outlets.
- All parts of a bathroom, laundry, lavatory, toilet or kitchen.

(2 marks)

AS/NZS 3000: 1.4.41

(b) Under fault conditions the operator may be at risk if:

- Exposed metal parts become live.
- Insulation breaks down.
- Protective devices fail or are absent.

(3 marks)

Question 15

(a) Any TWO of:

- The high impedance of the voltmeter means the appliance will not operate.
- The reading obtained relates to the voltmeter, not the appliance.
- A 0V reading can lead to the conclusion that the circuit is dead when it is not.

(4 marks)

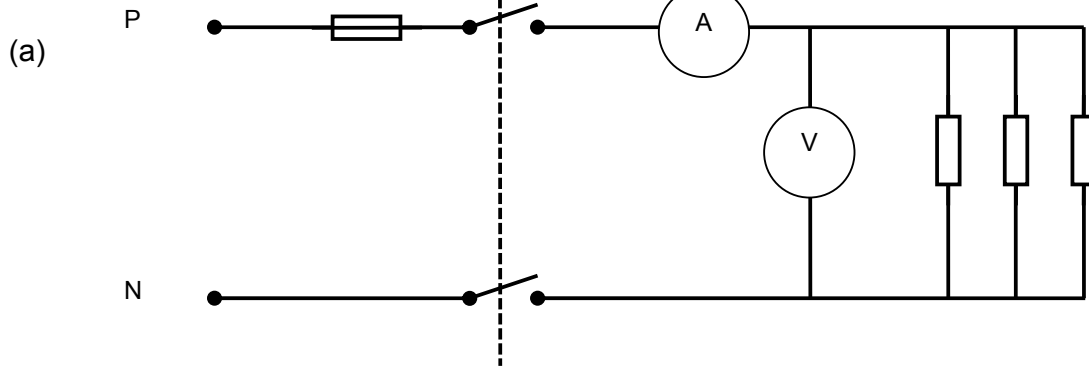
(b) The highest range of the meter.

(1 mark)

Question 16

- The supply and/or the appliance would be short-circuited because the ammeter is low impedance. (2 marks)
- Personal hazard – flash burns. (1 mark)
- Meter and/or circuit protection would operate. (1 mark)
- Meter and/or appliance components could be damaged. (1 mark)

Question 17



- Correct polarity (½ mark)
 - Correctly connected fuse (½ mark)
 - Correctly connected switch (½ mark)
 - Correctly connected voltmeter (½ mark)
 - Correctly connected ammeter (½ mark)
 - Correctly connected resistors. (½ mark)
- (Total 3 marks)

(b) (i) $I = \frac{V}{R}$
 $= \frac{230}{50}$ (½ mark)
 $= 4.6 \text{ amps}$ (½ mark)

(ii) $W = VA$
 $= 230 \times 4.6$ (½ mark)
 $= 1.058 \text{ kW or } 1058 \text{ watts}$ (½ mark)

Question 18

Test or check	Type of test instrument	Minimum or maximum values
<i>Earth continuity</i>	Any instrument with a low reading ohms scale	<i>Max 1 ohm</i>
<i>Insulation resistance</i>	<i>500V Insulation resistance tester</i>	<i>Min 1 Mohm</i>

(5 marks)

Question 19

Any TWO of:

- To avoid possible contact with a live terminal when removing or replacing the fuse carrier
- To avoid flash burns from the fuse if it "blows" again because the initial fault has not been cleared.
- The arc of the blown fuse can only be contained if the fuse is fully inserted into the fuse carrier

(5 marks)

Question 20

(a) An isolator cannot be inadvertently turned back on. (2 marks)

(b) Attaching a safety warning tag to the appliance. (1 mark)

(c) Items of apparel and equipment worn by a person that are intended either to prevent the occurrence of harm to the person or to minimise any harm that may occur from hazards that are present in the workplace or hazards that may arise in the course of work
ER 2
(2 marks)