1009- 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 and terms - alternatives

Power	W or P
Voltage	V or E or U
Phase	Active

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

1.8 kW

multi-choice answer – (d)

Question 2

373 watts

multi-choice answer – (a)

Question 3

Cause damage to the circuit wiring

multi-choice answer – (a)

Question 4

Highest current

multi-choice answer – (b)

Question 5

Verify that the insulation of current carrying components is capable of withstanding the normal supply voltage

multi-choice answer – (b)

Question 6

5 metres of 1.0mm^2 cord

multi-choice answer – (c)

Question 7

435 mA

multi-choice answer – (b)

Question 8

250 volts

multi-choice answer – (a)

Question 9

20A

multi-choice answer – (c)

Question 10

115 cents

multi-choice answer – (a)

Question 11

(a) Any ONE of:

- To establish that a low resistance exists of no greater than 1 ohm.
- To ensure the appliance is effectively earthed.

(2 marks)

(b) Any ONE of:

- To ensure that the phase, neutral and earth conductors are terminated at the correct terminals.
- To ensure that a switch is in the phase (active) conductor.

(1 mark)

(c) To ensure the insulation resistance is not less than a minimum of 1 MΩ.

(2 marks)

Question 12

Any **FIVE** of – from AS/NZS 3760:2001:

- Check for obvious damage or defects in the accessories, connectors, plugs or extension outlet sockets.
- Check that flexible cords are effectively anchored to equipment, plugs and cord extension sockets.
- Check for damage to flexible cords -
  (i) the inner cores of flexible supply cords are not exposed or twisted;
  (ii) the external sheaths are not cut, abraded, twisted, or damaged to such an extent that the insulation of the inner cores is visible; and (In) unprotected conductors or insulation tape are not in evidence.
- For portable outlet devices, check that the warning indicating the maximum load to be connected to the device is intact and legible.
- Check that any controls are in good working order i.e. they are secure, aligned and appropriately identified.
- Check that covers, guards and the like are secured in the manner intended by the manufacturer or supplier.
- Check that safety facilities and devices are in good working order.
- Check that ventilation inlets and exhausts are unobstructed.

AS/NZS 3760: 2.3.2
(5 marks)

Or

Any **FIVE** of – from AS/NZS 3760:2003:

- Check for obvious damage or defects in the accessories, connectors, plugs or extension outlet sockets; and for discolouration that may indicate exposure to heat, chemicals and moisture.
- Check that flexible cords are effectively anchored to equipment, plugs and cord extension sockets.
- Check for damage to flexible cords -
  (i) the inner cores of flexible supply cords are not exposed or twisted;
  (ii) the external sheaths are not cut, abraded, twisted, or damaged to such an extent that the insulation of the inner cores is visible.
  (iii) unprotected conductors or banding insulation tape are not in evidence.
- For portable outlet devices (power boards), check that the warning indicating the maximum load to be connected to the device is intact and legible.
- Check that any operating controls are in good working order i.e. they are secure, aligned and appropriately identified.
- Check that covers, guards and the like are secured in the manner intended by the manufacturer or supplier.
- Check that ventilation inlets and exhausts are unobstructed.
- The pins of insulated pin plugs should be inspected for damage to the insulation of the pins, and, if fitted, the shroud on cord extension sockets.

AS/NZS 3760: 2.3.2
(5 marks)

Question 13

Existing cord conductor colours	**Polarity**	**New Colours**
Green	***Earth***	***Green/Yellow***
Black	***Neutral***	***Light Blue (or Blue)***
Red	Phase or Active or Live	***Brown***

(5 marks)

Question 14

- Strip about 50 mm of insulation from conductor ends.
- Apply cord clamp
- Terminate conductors to correct terminals.
- Assemble plug ensuring there are no exposed conductors or basic insulation.
- Carry of polarity, earth continuity and insulation resistance tests.

(Total 5 marks)

Question 15

(a) Any ONE of:

- The appliance is polarity sensitive.
- Most of the internal wiring will be alive at 230V to earth with the switch in the “OFF” position.
- If a phase – to – frame fault occurs, there could be a voltage to earth with the switch in the “OFF” position.

(2 marks)

(b) Any THREE of:

- The phase and neutral can be transposed at the plug on the flexible cord
- The phase and neutral can be transposed at the internal terminals in the appliance (other than at the switch)
- The phase and neutral can be transposed in an extension cord supplying the appliance.
- The phase and neutral can be transposed at the socket outlet supplying the appliance

(3 marks)

Question 16

(a)
- A fault in the fixed wiring

(1 mark)

- A registered electrician must be called to fix it

(1 mark)

(b) Any THREE of:

- Current rating
- Voltage rating
- Category of duty (Rupturing Capacity)
- Utilisation category (fusing factor) (Class)

(3 marks)

Question 17

(a)
- When an earth fault occurs, some current is diverted to earth (1 mark)
- This causes an imbalance between phase and neutral currents (1 mark)
- Which is detected by the sensing coil (1 mark)
- Which trips and disconnects the supply to the load (1 mark)

(b) Portable Residual Current Device (1 mark)

Question 18

(a) A low reading ohmmeter

(1 mark)

(b) A maximum value of 1 ohm.

(1 mark)

(c) A low protective earthing conductor. resistance ensures:

- No potential difference can develop across the protective earthing conductor.
- The appliance frame is held at 0 V and no shock hazard exists.
- The protection will operate.

(3 marks)

Question 19

(a) Any ONE of:

- Iron
- Oven
- Heater
- Water heater

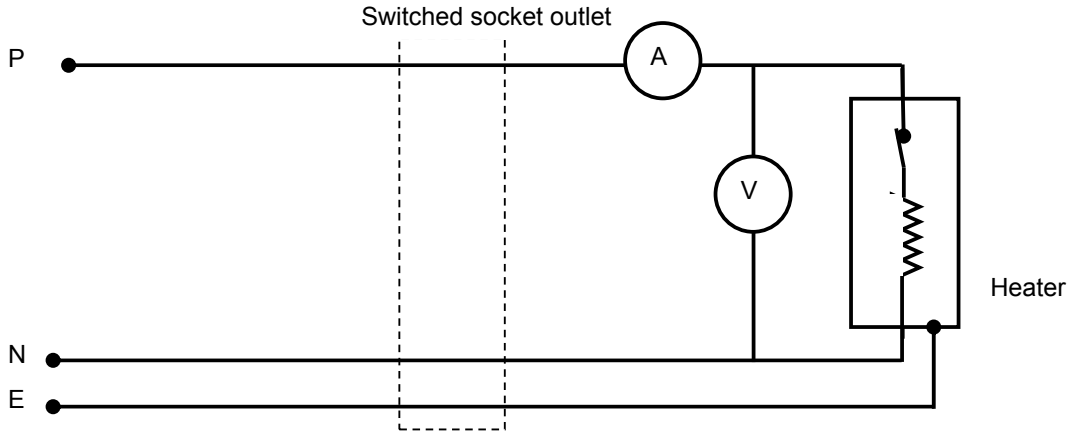
or similar

(b) (i) Simmerstat
Switches the load on/off on a selected time basis
(2 marks)

(ii) Thermostat
Opens/closes by the temperature of the environment
(2 marks)

Question 20

(a)



- Correct polarity (1½ marks)
- Correctly connect ammeter (½ mark)
- Correctly connected voltmeter (½ mark)
- Correctly connected heater (½ mark)

(b) $I = \frac{W}{V}$ (½ mark)

$= \frac{1500}{230}$ (½ mark)

$= 6.52$ (1 mark)