

1004- Electrical Service Technician “A” Answer Schedule Amendment 1 – 5 July

Note: (1 mark) means that the preceding statement earns 1 mark.

This schedule sets out the expected answers to the examination questions. The marker can exercise their discretion and decide on the overall adequacy of any answer that is presented in the candidate’s own words.

Section One

Question 1

Disconnect a large fault current

multi-choice answer –(a)
(5 marks)

Question 2

10 amps.

Multichoice answers – (b)
(5 marks)

Question 3

A sustained overload

multi-choice answer – (a)
(5 marks)

Question 4

4A

Multichoice answer – (b)
(5 marks)

Question 5

Reverse the connections of the start windings or the run windings

multi-choice answer – (c)
(5 marks)

Question 6

Withdraw the appliance plug flexible cord from the socket.

Multichoice answer – (c)
(5 marks)

Question 7

0.4A

multi-choice answer – (a)
(5 marks)

Question 8

AS/NZS 3760

Multichoice answer – (d)
(5 marks)

Question 9

Highest heating effect

multi-choice answer – (c)
(5 marks)

Question 10

2 Kw

Multichoice answer – (b)
(5 marks)

Section Two

Question 11

- (a)
 - To ensure that the control switch is connected in the phase conductor.
 - P – P terminal, N – N terminal, PEC – frame.
 - To ensure that the metal framework is connected to the earth conductor.(3 marks)

- (b) (i) Low reading ohmmeter or multimeter or any test instrument that incorporates a low ohms range.
(1 mark)

- (ii) Lowest ohms range
(1 mark)

Question 12

- (a) 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
(1 mark)

- (b) (1) Before beginning the work, to check that any associated equipment and personal protective equipment to be used by that person is in good order and condition, and is safe for its intended use

ER 36(2)(a)
(1 mark)

- (2) To use the associated equipment and the personal protective equipment provided in a competent manner.

ER 36(2)(c)
(1 mark)

- (b) Any FOUR of:

- Safety glasses or face shield
- Rubber insulating gloves
- Apron
- Safety boots
- Full body cover overalls
- Ladder (safe working platform)

(2 marks)

Question 13

(a) Current flowing I = $V \div R$
= $230 \div 16.7$
= 13.77 amps fault current would flow

(1 mark)

(1 mark)

- (b) • The fault current would not operate the fuse. (1 mark)
- The heater frame would be alive at 230 volts (1 mark)
- The earth fault circuit would overheat due to the I^2R or V^2/R of 2859 W (1 mark)

Question 14

- (a) (1) • Ensure that no voltage can occur between the two appliances
• Under fault conditions. (2 marks)

- (2) • Sufficient current will flow under fault conditions
• To operate the protection in the secondary circuit. (2 marks)

- (b) 1 Mohm (1 mark)

AS/NZS 3760:2001: 2.3.3.3
AS/NZS 3760:2003: 2.3.3.3.1

Question 15

Any TWO of - from AS/NZS 3760:2001:

- Connect phase and neutral together, and test between this linked pair and earth, or
- Bridge out the semi-conductors before testing.
- Test in accordance with manufacturers instructions
AS/NZS 3760:1.1(e)(Note 3)
- The voltage applied between live parts and earth may be 250 V d.c
AS/NZS 3760: 2.3.3.2(d)(Note 1)
- Not greater than 5mA (Class I) leakage current in the protective earth conductor
AS/NZS 3760: 2.3.3.2(a)
- Not greater than 1mA (Class II) leakage current to any external metal
AS/NZS 3760: 2.3.3.2(b)

(2½ marks per answer – Total 5 marks)

Or

Any TWO of - from AS/NZS 3760:2003:

- Connect phase and neutral together, and test between this linked pair and earth, or
- Bridge out the semi-conductors before testing.
- Test in accordance with manufacturers instructions
AS/NZS 3760: 2.3.3.2.1
- The voltage applied between live parts and earth may be 250 V d.c
AS/NZS 3760: 2.3.3.2(b)
- The voltage applied between live parts and earth may be 500 V d.c
AS/NZS 3760: 2.3.3.2(b)
 - Not greater than 5mA (Class I) leakage current in the protective earth conductor
AS/NZS 3760: 2.3.3.2(a)
- Not greater than 1mA (Class II) leakage current to any external metal
AS/NZS 3760: 2.3.3.2(b)

(2½ marks per answer – Total 5 marks)

Question 16

- (a) An ohmmeter set on the lowest ohms range or any test instrument that incorporates a low ohms range. (2 marks)
- (b) Measure the resistance between the earth pin and the exposed metal of the appliance frame. (2 marks)
- (c) 1 ohm (1 mark)

Question 17

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 18

- (a)
- It eliminates any residual resistance in the test leads. (1 mark)
 - To compensate for variations in the internal battery voltages. (1 mark)
- (b)
- Select the appropriate ohm scale to be used. (1 mark)
 - Short out the test probes by bringing them together. (1 mark)
 - Then adjust the meter to produce a zero reading. (1 mark)

Question 19

- (a) • Immerse affected area in cold water or under cool running water to relieve pain. Check for / remove watch, rings and or bracelets.

(1 mark)

- For up to 10 -15 minutes
(accept periods up to 20 minutes)

(1 mark)

- (b) (i) Any ONE of:

- Lightly cover with a sterile dressing
- Gently remove non-adhering clothing or jewellery from affected area
- Leave blisters intact
- Cover with clean non-fluffy dressing or cling film after cooling
- Apply appropriate powder

(1 mark)

- (ii) Any TWO of:

- **Do not** puncture blisters and –
- **Do not** apply oils, lotions, ointments
- **Do not** remove clothing

(2 marks)

Question 20

- (a)
- The voltmeter is a high resistance instrument (1 mark)
 - If connected in series with the load resistance it will restrict current flow (2 marks)
 - The appliance will not operate (1 mark)

OR

- If the appliance control switch is in the "off" position (1 mark)
- The voltmeter will have a zero reading (1 mark)
- But the supply side of the switch is still live (2 marks)

OR

- If the appliance circuit is open-circuited (1 Mark)
 - The voltmeter will have a zero reading (1 mark)
 - But parts of the internal components of the appliance are still live (2 marks)
- (b) The highest range of the meter. (1 mark)