1005- Electrical Service Technician "A" Answer Schedule

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

559.5 watts

multi-choice answer – (c)
(5 marks)

Question 2

7.36 kWh

multi-choice answer – (b)
(5 marks)

Question 3

10 amps

multi-choice answers – (b)
(5 marks)

Question 4

The cross sectional area of the flexible cord conductors

multi-choice answer – (b)
(5 marks)

Question 5

1 Megohm

multi-choice answer – (c)
(5 marks)

Question 6

Reduce the expected current flow through the element and indicate 230V

multi-choice answers – (d)
(5 marks)

Question 7

A 230/230 volt isolating transformer

multi-choice answer – (b)
(5 marks)

Question 8

To minimise the possibility of electric shock.

multi-choice answer – (b)
(5 marks)

Question 9

250 volts

multi-choice answer – (a)
(5 marks)

Question 10

A double insulated appliance

multi-choice answer – (c)
(5 marks)

Section Two

Question 11

(a)
- Normally the currents in the phase and neutral are equal (1 mark)
- 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 which trips and disconnects the supply to the load (1 mark)

(b) RCD

- To ensure the tripping mechanism has not become stuck or "frozen"

or

- To ensure it works correctly

PRCD

- To ensure the tripping mechanism has not become stuck or "frozen"

or

- To ensure PRCD does not reset to the “on” position after loss of supply.

(1 mark)

Question 12

Current rating	Utilisation category (fusing factor)	Minimum fusing current	Class
15 amps	1.5	***22.5 amps***	***Q1***
20 amps	1.25	25 amps	Q1
16 amps	***2***	32 amps	***R***

(5 marks)

Question 13

(a) (i)
- Fully unwind the cord from the drum, or
- Reduce the load to under the de-rated current carrying capacity for the cord

(2 marks)

(ii) Failure will be by melting of sheath and/or insulation deterioration due to heat build-up

(1 mark)

(c)
- By minimising the risk of contact with the active (phase) conductor when changing a lamp with the power supply, energised

(1 mark)

- By minimising the risk of contact with the active (phase) conductor when the lamp is removed and the terminals are exposed

(1 mark)

Question 14

(a) In respect of electricity supplied by either as single-phase MEN system or multiple-phase MEN system, a nominal voltage of 230 volts a.c. between phase and neutral

ER2
(1 mark)

(b)

Type of appliance	Phase colour	Neutral colour	Earth colour	No. of cores required
Earthed electrical appliance	***Red or Brown***	***Black or Light Blue***	***Green/Yellow Or Green***	***Three***
Double insulated electrical appliance	***Red or Brown***	***Black or Light Blue***	***N/A***	***Two***

(4 marks)

Question 15

(a) Any ONE of:

- The load current is likely to arc across the micro gap as the switch contacts are opened and damage them.
- It is easier to extinguish an a.c. arc as the current goes through zero in each half-cycle.

(2 marks)

(b) If strain is applied to the flexible cord the PEC will be the last to pull away from the terminals.

(1 mark)

(c) Any TWO of:

- No guarantee of polarity
- No earthing facility
- Insufficient current rating

(2 marks)

Question 16

(a) (i) 250 V d.c.

AS/NZS 3760:2001 2.3.3.2(d) Note (1)
AS/NZS 3760:2003 2.3.3.2(b)
(1 mark)

(ii)
- To avoid triggering the MOV
- To ensure the equipment does not fail the test

AS/NZS 3760:2001 2.3.3.2(d) Note (1)
AS/NZS 3760:2003 2.3.3.2(b)
(2 marks)

(b) Any TWO 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

(2 marks)

Question 17

(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 18

(a) (i) To check the instrument is functional and zero the meter leads to ensure accuracy

(2 marks)

(ii) Should a high resistance range be selected, it may show an apparent reading of zero and could be inaccurate

(2 marks)

(b) 1 ohm

AS/NZS 3760:2001: 2.3.3.1(b)
AS/NZS 3760:2003: 2.3.3.1
(1 mark)

Question 19

(a) $I_{R1} = \frac{V}{R}$

$= \frac{230}{60}$

$= 3.83$ Amps

(2 marks)

(b) $I_{R2} = \frac{V}{R}$

$= \frac{230}{30}$

$= 7.66$ Amps

(2 marks)

(c) $I_T = I_{R1} + I_{R2}$

$= 3.83 + 7.66$

$= 11.49$ Amps

(1 mark)

Question 20

(a) Reverse connections to either the field windings or armature windings (or brush-holder connections), but not to both with respect to the incoming supply conductors.

(2 marks)

(b) Any TWO of:

- Vacuum cleaner
- Sewing machine
- Powered portable hand tools

(2 marks)

(c) Any ONE of:

- Tape deck
- Turn table
- Animated displays
- Desk fan

(1 mark)