

1006- 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.

Text in underlined italics are the changes made post-moderation

Section One

Question 1

AS /NZS 3760

multi-choice answer – (a)
(5 marks)

Question 2

10 metres of 0.75mm² cord

multi-choice answer – (c)
(5 marks)

Question 3

20A

multi-choice answer – (b)
(5 marks)

Question 4

0V - 50V a.c.
0V - 120V ripple-free d.c.

multi-choice answer – (b)
(5 marks)

Question 5

Current and resistance

multi-choice answer –(c)

Question 6

A clear airway to the patients lungs

multi-choice answer – (b)
(5 marks)

Question 7

Light duty two core tough plastic sheathed

multi-choice answer - (d)
(5 marks)

Question 8

1 ohm

multi-choice answer – (d)
(5 marks)

Question 9

Just up to the terminals

multi-choice answer – (a)
(5 marks)

Question 10

The same

multi-choice answer – (d)
(5 marks)

Section Two

Question 11

(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 12

(a) Current flowing I = $\frac{V}{R}$
= $\frac{230}{22.6}$ (1 mark)
= 10.18 amps fault current would flow (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 2342 W. (1 mark)

Question 13

(a) (i) Three (1 marks)

(ii) Brown, light blue (or blue), green/yellow

or

Red, black and green

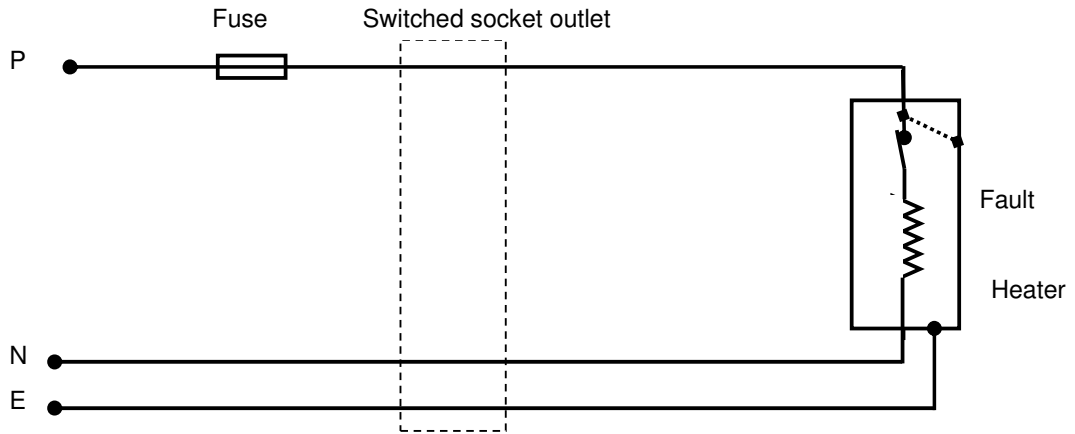
(3 marks)

(b) 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)

Question 14

(a)



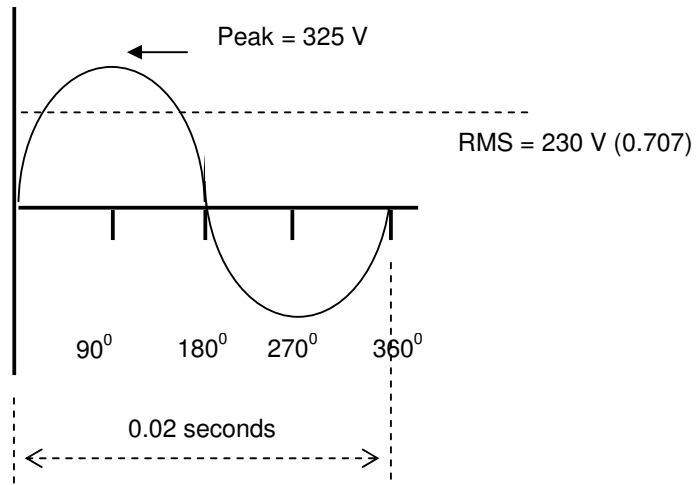
- Correct polarity (½ mark)
 - Heater switch correctly connected (½ mark)
 - Correctly connected fuse (½ mark)
 - Fault correctly shown (½ mark)
- (b)
- The combined fault (10A) and heater (8.7A) currents would exceed the fuse minimum fusing current (15A) and the fuse would operate. (1 mark)
 - The heater frame would be alive until the fuse operated. (1 mark)
 - A large amount of energy will be dissipated at the point of the fault. (1 mark)

Question 15

(a) The number of complete changes/cycles per second.

(1 mark)

(b)



- Time interval correctly shown
- Peak voltage correctly shown
- RMS voltage correctly shown
- Axis's symmetrical and wave the correct shape

(1 mark)

(1 mark)

(1 mark)

(1 mark)

Question 16

Any FOUR of:

- Inspect instrument, clips, leads and probes to ensure they are in good condition.
- Don't energise circuit until all connections have been completed.
- Don't make any changes to circuit while power is on.
- Make sure environment is safe.
- Ensure supply is through an isolating transformer or RCD.
- Work on rubber mats *or use rubber apron or use safety glasses.*
- Avoid personal contact with either live conductors or earth when using instruments on live circuits.
- *Ensure correct range is selected on the instrument.*
- *Ensure leads are correctly connected.*
- *Have competent assistance.*
- *Work with one hand in pocket*
- *Remove jewellery (watches, rings etc.)*

Note: If all four answers are correct – award an additional mark

(5 marks)

Question 17

(a) It is the maximum current that a flexible cord is designed to carry safely without overheating

(2 marks)

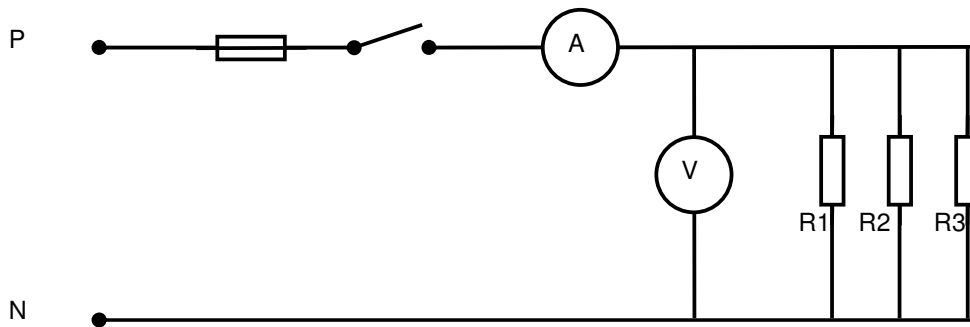
(b) • Current flow in excess of the rating will produce excess heat (1 mark)

• Which may cause the insulation to deteriorate and breakdown and create a fire risk

(2 marks)

Question 18

(a)



- 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)

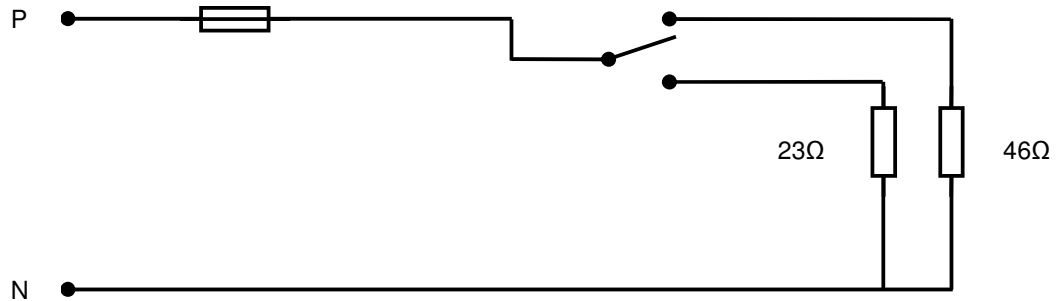
- (b) (i) 7.12 amps (1 mark)
- (ii) 1.634 kW or 1634 watts (1 mark)

Question 19

- So that it is first to make contact when inserted, (1 mark)
- And the last to break contact when the plug is withdrawn, (1 mark)
- This ensures that the earth is connected before and after the appliance is livened. (1 mark)
- And may protect the operator from electric shock if the appliance if the appliance being plugged in. (1 mark)
- Has or develops a phase to frame fault (1 mark)

Question 20

(a)



- Correct polarity (1 mark)
 - The fuse is in the phase and protects the resistors. (1 mark)
 - The two-position selector switch has two distinct positions. (1 mark)
 - The resistors are connected so two different load settings are achieved. (1 mark)
- (Total 4 marks)

(b) For 46 ohm resistor

$$\begin{aligned} A &= \frac{V}{I} \\ &= \frac{230}{46} \\ &= 5A \end{aligned}$$

(1 mark)