higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRONICS
NQF LEVEL 2

10 November 2022

This marking guideline consists of 6 pages.

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QUESTION 1

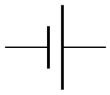
1.1 D
1.2 A
1.3 B
1.4 B
1.5 C
1.6 A
1.7 B
1.8 D
1.9 A
1.10 D

(10 × 1) **[10]**

QUESTION 2

2.1
- Positive polarity (+)
- Negative polarity (-) (2)

2.2



✓✓ (2)

2.3 An intrinsic material is an almost pure semiconductor. In other words, no impurities have been added to it and its electron and hole densities are equal at thermal equilibrium.✓ Doping allows researchers to exploit the properties of sets of elements, referred to as dopants,✓ in order to modulate the conductivity of a semiconductor. There are two types of dopants: n-type and p-type dopants. N-type dopants act as electron donors✓ whereas p-type dopants act as electron acceptors.✓ (4)

2.4
- Carbon resistors
- Metal glaze resistors
- Precision wire-wound resistors
- Adjustable resistors
- Variable resistors
- Trimmer resistors (pre-set potentiometers) (Any 2 × 1) (2)

2.5 $Q = CE$✓
$= 5 \times 10^{-6} \times 60$✓
$= 300 \times 10^{-6}$ C✓
$= 300\ \mu C$ (3)
[13]

QUESTION 3

3.1
- The strength of the current flowing through it.
- The number of turns in the coils.
- The ratio of the length of the coil to the diameter of the coil.
- The type of material used in the core. (4)

3.2
3.2.1 True
3.2.2 True
3.2.3 False
(3 × 1) (3)

3.3
- Change (increase or decrease) the magnetic field over the surface area.
- Change the area of the loop.
- Change the angle between the surface defined by the loop and the magnetic field. (3)

3.4 Cardiopulmonary resuscitation (CPR)✓ is when mouth-to-mouth breathing and heart massage is applied to revive someone who is not breathing and has no pulse.✓ (2)
[15]

QUESTION 4

4.1
- An injury that gives rise to medical expenses.
- Any injury that results in a worker being absent from work for more than three days. (2)

4.2 An oscilloscope is an electronic device that measures voltage, frequency and other parameters. It displays them as waveforms on the screen of a cathode ray tube. (3)
[5]

QUESTION 5

5.1
- First, you must read the instructions provided by the manufacturer.
- Switch off the instrument.
- If the battery is of the rechargeable type, the instrument may have a socket where a special transformer must be plugged in to charge the battery.
- Make sure that the instrument is not connected to an external circuit before you attempt to remove the battery.
- Ensure that you have the correct screwdriver to remove the cover.
- When the container is open, remove the battery.
- If the terminals are corroded, clean and replace them.
- Cover up the battery container. (Any 6 × 1) (6)

5.2
- Point-to-point
- Nuclear
- Meshed (3)

5.3 Because the earth lead for a circuit is normally continuous, it is easier to make this the nucleus of a board and all the components lead to the power rail, which is part of the perimeter of the board.✓✓✓

OR

Another way is to form the earth strip around the perimeter and have the components leading towards the central area.✓✓

The nuclear layout is very compact and eliminates most earthing difficulties.✓ (3)
[12]

QUESTION 6

6.1 A solder sucker is used to desolder a component and suck up the excess molten solder.

6.2 A flux is a wax-like substance that helps the molten solder to flow around components and wire to ensure a good joint.

6.3 In the case of PVC-covered cables, the insulation must preferably be removed from the conductors and placed in a separate container.

6.4 Daily tasks that must be done and general rules that must be followed to keep the workshop running smoothly and safely.

(4 × 2) **[8]**

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QUESTION 7

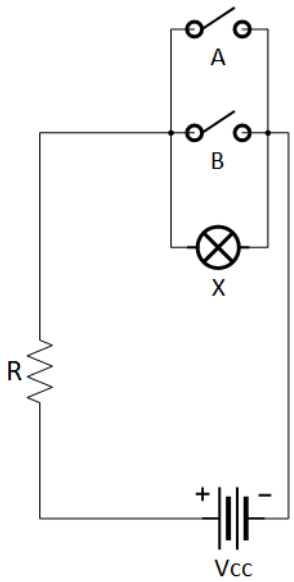
7.1
- Check all wiring visually.
- Check that the correct colour code was followed for the power leads.
- Look for obvious faults such as unsoldered components, loose wires, wrong values, components in wrong places, all components mounted.
- If the device works from the mains supply, check that the fuse has the correct value. Check that the connection to the mains is correct and according to specifications, and that a good earth connection is made.
- Visually pre-inspect the circuit by using a multimeter and check strategic points for short-circuits, resistance, and open circuits. (5)

7.2
- Long-nose pliers/Thin-nose pliers
- Wire cutter
- Solder sucker
- Wire stripper (4)

[9]

QUESTION 8

8.1



✓✓

8.2

2	11111	
2	5555	r1
2	2777	r1
2	1388	r1
2	694	r0
2	347	r0
2	173	r1
2	86	r1
2	43	r0
2	21	r1
2	10	r1
2	5	r0
2	2	r1
2	1	r0
	0	r1



✓

$11111_{10} = 10101101100111_2$✓

(2 × 2) **[4]**

QUESTION 9

Status	LED Colour	Activity	Meaning
Run√	Green√	Flashes√ On√ Off√	Processor not configured√ Run mode√ Processor mode other than RUN√
CPU Fault√	Red√	Flashes√ On√ Off√	Processor not configured√ Fatal error, e.g., no communication√ No error√
I/O√	Red√	On√ Off√	Configuration error√ No Error√
Memory√	Red√	On√ Off√	Program Corrupt√ OK√
Battery√	Red√	On√ Off√	Battery voltage fallen below a threshold√ Battery is functional√

[17]

QUESTION 10

10.1 Sound is a form of energy given off by a vibrating object.

OR

Sound is a compressional disturbance travelling through a material in such a way that it is capable of causing the human eardrum to vibrate and causing the sensation of hearing.

10.2 Wavelength is the perpendicular distance between TWO wave fronts whose displacement have a difference in phase of one period.

OR

It is the distance travelled by a wave in one period and is equal to the ratio of phase velocity (speed) to frequency.

10.3 Also called a personal computer or PC, it is an electronic device for storing and processing data, typically in binary form according to instructions given to it in a variable program.

10.4 Crosstalk is the unwanted transfer of signals between communication channels.

OR

Crosstalk is any phenomenon by which a signal transmitted on one circuit or channel of a transmission system creates an undesired effect in another circuit or channel.

10.5 Attenuation is the reduction of the amplitude of a signal, electric current, or other oscillation.

OR

Attenuation is the loss of signal strength in networking cables or connections.

(5 × 2) **[10]**

TOTAL: 100

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