higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRONICS
NQF LEVEL 2

21 November 2023

This marking guideline consists of 6 pages.

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QUESTION 1

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

(10 × 1) **[10]**

QUESTION 2

2.1
- Each magnetic flux line is closed loop. ✓
- Each magnetic flux line starts from north pole of a magnet and comes to the south pole through the field and continues from south pole to north pole in the body of the magnet. ✓
- No two flux lines cross each other. ✓
- Two similar lines of force travel side by side but repel each other. ✓
- The lines of force are stretched like elastic cord. ✓
- The direction of the magnetic field at any point is given by the tangent to the field lines at this point.
- Density of the magnetic field lines gives the intensity of the magnetic field at any point on the space. (Any 5 × 1) (5)

2.2  (2)

2.3 The current flow will decrease.✓ Current flow in a circuit is inversely proportional to resistance.✓ (2)

2.4 **Instructions to marker:**
The candidate must show the calculations as follows:

Series	**Parallel**
$R_T = R_1 + R_2$	$1/R_T = 1/R_1 + 1/R_2$
$= 2\ \Omega + 2\Omega$	$= 1/2\Omega + 1/2\Omega$
$= 4\Omega$✓	$= 1\Omega$ ✓
$I = V/R$	$I = V/R$
$= 4/4$	$= 4/1$
$= 1$ Amp✓	$= 4$ Amps✓

The resistors must therefore be placed in series to achieve the 1Amp current flow required.✓ (5)
[14]

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QUESTION 3

3.1 An electron within a conducting substance (as a metal) but not permanently attached to any atom (2)

Or

An electron moving in a vacuum

3.2 3.2.1 Air core Inductor
3.2.2 Iron Core Inductor
3.2.3 Preset Inductor

(3 × 1) (3)

3.3
- LED – Light Emitting Diode emits light /gives off light
- Photodiode – A photodiode functions when light is absorbed by the diode through an external light source. (2)

3.3 The crucial difference between Half Wave and Full Wave Rectifier is that a half wave rectifier converts only one-half cycle of the Alternating Current (AC) input supplied into pulsating Direct Current (DC) signal.✓ As against a full wave, rectifier converts both halves of the applied input signal (AC) into pulsating DC.✓ (2)

[9]

QUESTION 4

4.1 Accident means an accident arising out of and in the course of an employee's employment and resulting in a personal injury, illness or the death of the employee (2)

4.2 Earthing is used to protect us from an electric shock. ✓ This is achieved by providing an alternate path (a protective conductor) ✓ for a fault current to flow to earth instead of passing through the human body.✓ (3)

4.3
- Faulty or damaged electrical appliances,
- Damaged or frayed cords or extension cables
- Electrical appliances in contact with water.
- Incorrect, damaged, or deteriorated household wiring
- Downed powerlines,
- Lightning strike

Alternative suitable answers also to be considered (Any 5 × 1) (5)

[10]

QUESTION 5

5.1 Ohms✓ and the symbol used is Ω✓ (2)

5.2 No (1)

5.3 A multimeter determines capacitance by charging a capacitor with a known current,✓ measuring the resulting voltage,✓ then calculating the capacitance.✓ (3)
[6]

QUESTION 6

6.1
- Safety glasses or goggles
- Protective gloves
- Long sleeve shirts or lab coats
- Pants that are made of natural fibers (such as cotton)
- Closed toed shoes or boots.

Alternative suitable answers also to be considered. (Any 3 × 1) (3)

6.2 By placing it into a container marked as hazardous waste and then disposing of it as per the procedure of the company. If soldering at home, ensure you dispose of it at a centre which collects hazardous waste. (2)

6.3 A brass or steel brush is the most common method of scrubbing off oxidation, although for sensitive contacts nylon is preferred. You can also use a fast-drying contact cleaner (2)

6.4
- Gas (powered) soldering iron.
- Battery powered soldering iron (2)

[9]

QUESTION 7

7.1 A - Single Pole, Single Throw Switch / SPST Switch
B - Single Pole, Single Throw Switch / SPST Switch
R – Resistor
X – Globe/Light (4)

7.2 Gas Powered Soldering Irons✓ are different from the rest as they don't need an electrical power source, instead, they rely on chemical energy generated through the combustion of a flammable liquid or gas. In most cases, an open flame is directly used to heat a tip to temperature. ✓ (2)

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7.3 You can wipe dirt and other particles from the outside casing with a good cleaning cloth.✓ Compressed air is the best option to clean the particles from the tool's vents; cleaning your tool's exhaust vents with a brush could push the dirt farther into the tool and inadvertently cause more damage later.✓ (2)

7.4 A job card is a detailed description of work✓ that is performed for a work order.✓ (2)

7.5
- Control dust✓
- Eliminate fire hazards✓
- Prevent slips, trips and falls✓
- Avoid tracking materials✓
- Prevent falling objects✓
- Store materials properly✓
- Clear clutter in area✓
- Use and inspect personal protective equipment and tools✓
- Create written rules for housekeeping✓**(Any 3 x 1)** (3)

[13]

QUESTION 8

8.1 The base for the Decimal Number System is 10✓ and the base for the Binary Number System is 2.✓ (2)

8.2

A (input)	B (input)	C (input)	X (output)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

½ a mark per correct row (4)

[6]

QUESTION 9

9.1 A digital signal that senses or sends either ON or OFF signals. ✓✓ (2)

9.2 Input field devices include switches, encoders, and transmitters for example. Typical output field devices are relays, lamps, and proportional valves. ✓✓ (2)

9.3 A code that can be remembered comparatively easily and that aids its user in recalling the information it represents✓✓ (2)

9.4
- Normally Open Contact,
- Normally Closed Contact
- Output Energize
- Output Latch
- Output Unlatch (5)

9.5 Ladder Diagram is a graphical programming language✓ that you use to develop software✓ for programmable logic controllers (PLCs). (2)
[13]

QUESTION 10

10.1 Modulation is the process of influencing data information on the carrier,✓✓ while demodulation is the recovery of original information at the distant end of the carrier.✓✓ (4)

10.2 a device which controls access to separately stored files, as part of a multi-user system (2)

Or

A file server is a computer responsible for the storage and management of data files so that other computers on the same network can access the files.

Or any other relevant answer

10.3 Modulator-demodulator (2)

10.4 Glass✓ and plastic✓ (2)
[10]

TOTAL: 100

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