higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRONIC AND DIGITAL CONCEPTS FOR ROBOTICS

(First paper)

NQF LEVEL 2

16 November 2023

This marking guideline consists of 6 pages.

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SECTION A

QUESTION 1

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

(10 × 1) [**10**]

QUESTION 2

2.1 False
2.2 True
2.3 True
2.4 False
2.5 True

(5 × 1) **[5]**

QUESTION 3

3.1 C
3.2 I
3.3 K
3.4 F
3.5 B
3.6 J
3.7 E
3.8 D
3.9 G
3.10 H

(10 × 1) **[10]**

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QUESTION 4

4.1 Torque
4.2 Insulator
4.3 Oscillator
4.4 Op-amps
4.5 Ammeter

(5 × 1) **[5]**

TOTAL SECTION A: 30

SECTION B

QUESTION 5

5.1 5.1.1 1100 000 = $1,1 \times 10^6$
5.1.2 256 000 = $2,56 \times 10^5$
5.1.3 75 600 = $7,56 \times 10^4$

(3 × 1) (3)

5.2 v = distance/time ✓

= 240/3✓

= 80 km/h✓ (3)

5.3 Θ = 30/360 ✓

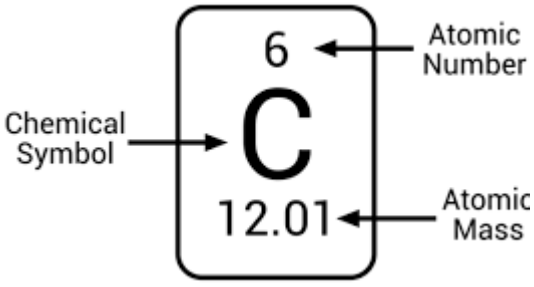
= 0.083 rad ✓

PLEASE COMPARE WITH ENVELOPE.
l = Θ* 2□r ✓

= 0.083 * 2*□* 50 ✓

= 26.075 cm✓ (5)

5.4



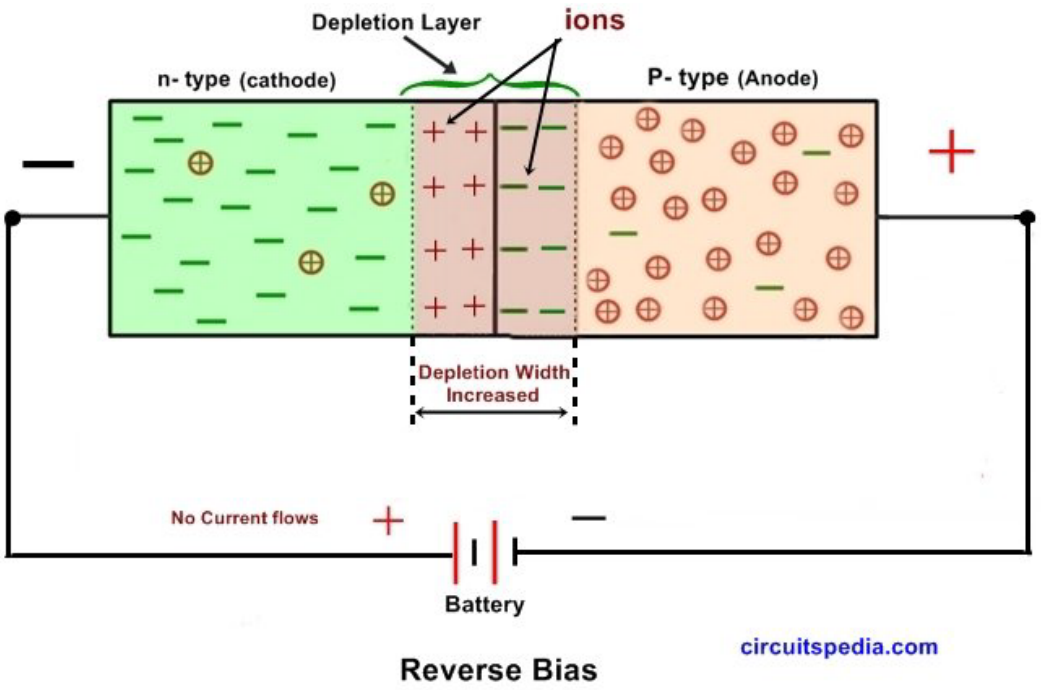
(4)
[15]

QUESTION 6

6.1 6.1.1 Cell
6.1.2 Battery
6.1.3 Switch
6.1.4 Diode
6.1.5 Inductor

(5 × 1) (5)

6.2



(8)
[13]

QUESTION 7

7.1 7.1.1 SI Unit – is the international standard for basic measurement.

7.1.2 Luminous intensity – is the measure of the amount of light radiated from a light source in each direction.

7.1.3 Magnetic field – is a field that describes the magnetic influence on moving electric charges.

7.1.4 Ionic bond – is the attraction between oppositely charged ions (positive ions and negative ions) which forms a bond.

7.1.5 Boolean logic – a subset of algebra where all values are either true (value 1) or false (value 0).

(5 × 1) (5)

7.2
- A transducer is a device which converts one form of energy to another form of energy. Transducers are classified as either active transducers or passive transducers.
- A sensor is a device that detects and responds to a physical quality in the environment and converts it into an output signal. This physical quality can be either measured or transmitted for operating a control. (2 × 2) (4)

7.3 The set-up of a breadboard:
- The holes in the first row, marked with a red line above it and a positive sign are all connected.
- The holes in the second row, marked with the blue line below it and negative sign, are all connected.
- The same applies to the two bottom rows.
- Only the five holes in the column marked A, B, C, D and E are connected. The same applies to each of the A, B, C, D and E columns.
- Only the five holes in the column marked F, G, H, I and J are connected.

(5 × 1) (5)
[14]

QUESTION 8

8.1
- Multi meter
- Voltmeter
- Ammeter
- Ohmmeter
- Wattmeter
- Clampmeter
- Continuity tester
- Frequency meter

(Any 5 × 1) (5)

8.2 8.2.1

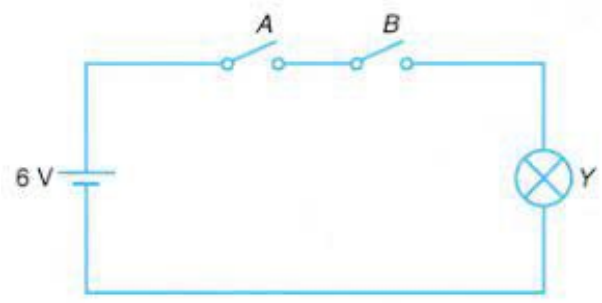
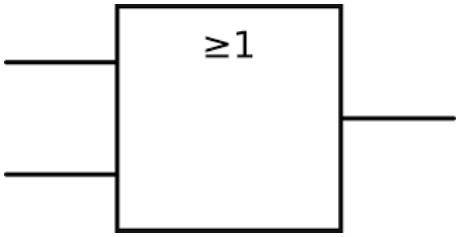


Figure *Circuit diagram for AND gate*

(5)

8.2.2



(3)
[13]

QUESTION 9

9.1 9.1.1 $EMF_T/\varepsilon_T = E_1 + E_2 + E_3 + E_5 + E_6$✓
$= 2.1 + 2.1 + 2.1 + 2.1 + 2.1 + 2.1$✓
$= 12,6\ V$✓

9.1.2 $r_T = r_1 + r_2 + r_3 + r_4 + r_5 + r_6$✓
$= 0.4 + 0.4 + 0.4 + 0.4 + 0.4 + 0.4$✓
$= 2.4\ \Omega$✓

(3 × 2) (6)

9.2
- Prohibition-/Danger sign
- Mandatory sign
- Warning-/Caution sign
- Emergency-/Safety sign
- Fire safety sign
- Informative sign
- Compulsory sign
- Regulatory sign

(Any 4 × 1) (4)

9.3
- Push back the spring-loaded plunger until it locks in place.
- Heat the solder by putting a soldering iron against the solder to melt it.
- Put the nozzle of the desoldering pump up to the melted solder and press the button on the desoldering pump.
- Repeat the process if all the solder was not removed.
- Clean the desoldering pump by pushing back the plunger a few times to let the hardened pieces of solder fall out. (5)

[15]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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