higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

## NATIONAL CERTIFICATE

## RADIO THEORY N1

## 13 April 2021

**This marking guideline consists of 6 pages.**

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## QUESTION 1

1.1 False
1.2 False
1.3 True
1.4 False
1.5 True
1.6 False
1.7 True
1.8 True
1.9 True
1.10 True

(10 × 1) **[10]**

## QUESTION 2

2.1 Force of attraction✓
- The negatively charged electrons are attracted to the positively charged nucleus.✓✓

Centrifugal force✓
- The electrons revolve around the nucleus at high velocities and as a result are forced away from the nucleus.✓✓ (6)

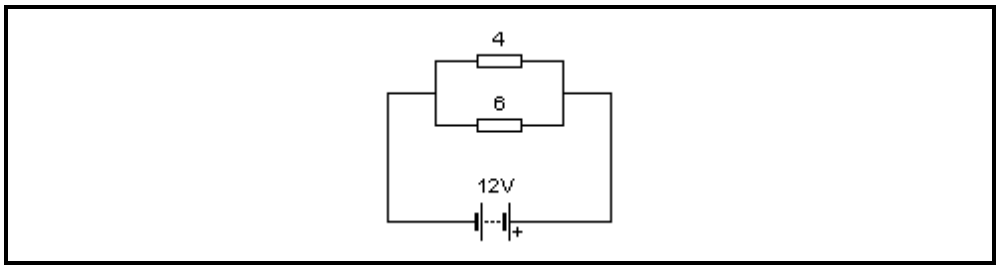
2.2 Electrons in the outer orbit or shell. (2)

2.3
- Current cannot flow in an insulator.
- It can neither gain nor lose an electron. (2)

**[10]**

## QUESTION 3

3.1 3.1.1




(2)

3.1.2 $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + ...$

1/Rt = ¼ + 1/6✓
1/Rt = 0,417✓
Rt = 2,4 Ω✓ (3)

3.1.3 I = V/R = 12/2,4✓ = 5 A✓ (2)

3.1.4 V = I x R = 5 x 2,4 = 12 V (1)

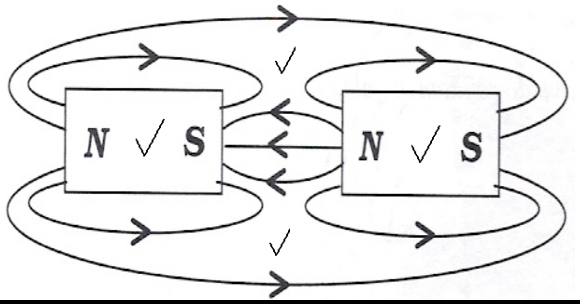
3.2
- EMF of a cell is the voltage of the cell with no load.
- Potential difference of a cell is the voltage with a load. (2)

**[10]**

## QUESTION 4

4.1
- The forefinger represents the direction of the magnetic field.
- The thumb represents the direction of the motion of the conductor.
- The center finger shows the direction of the current. (3)

4.2




(4)

4.3
- Inductance is the ability of a conductor
- to produce induced voltage
- when the current varies. (3)

**[10]**

## QUESTION 5

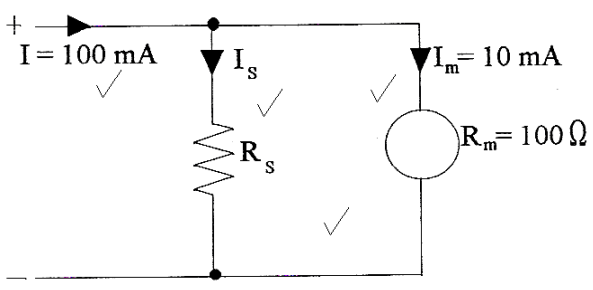
5.1

$$Rp = \frac{Im \times Rm}{It - Im}$$

$R_p = (10 \times 10^{-3} \times 100) \div (100 \times 10^{-3} - 10 \times 10^{-3})$✓

$R_p = 11{,}11\Omega$✓ (3)

5.2



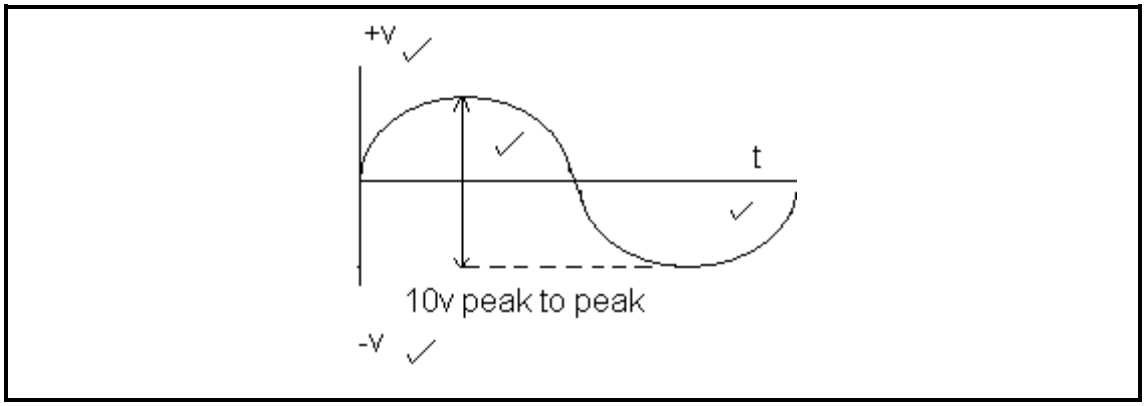

(4)

5.3
- Always connect an amperemeter in series.
- Observe the correct polarity.
- Start from the highest range. (3)

**[10]**

## QUESTION 6

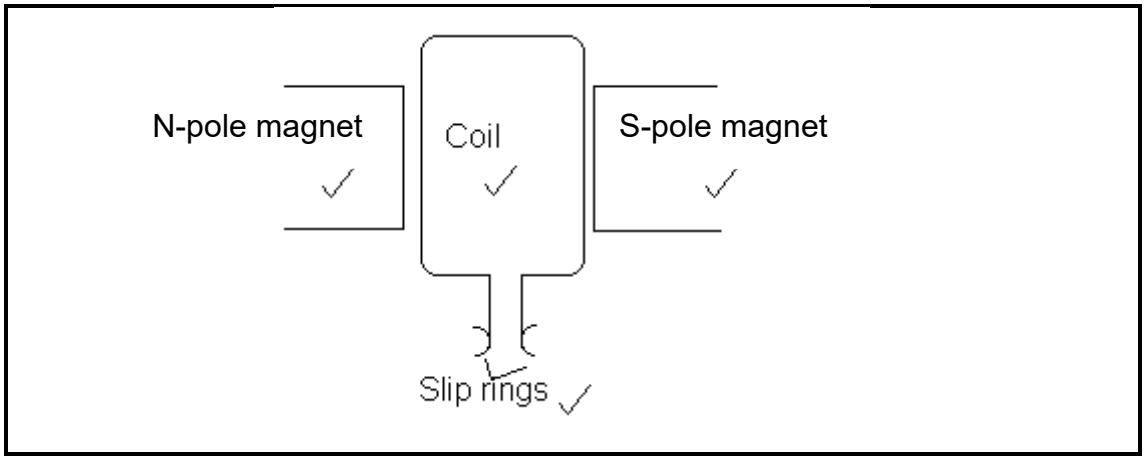
6.1




(4)

6.2 Number of cycles✓ per second✓ (2)

6.3

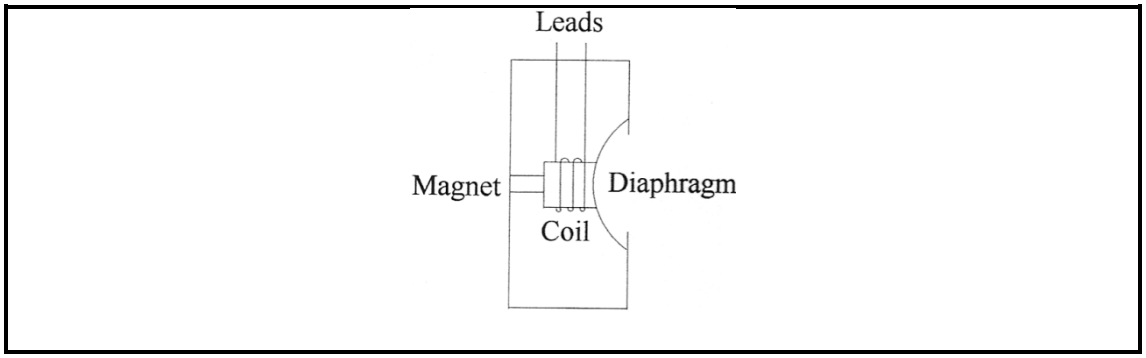



(4)
**[10]**

## QUESTION 7

7.1 Transverse (1)

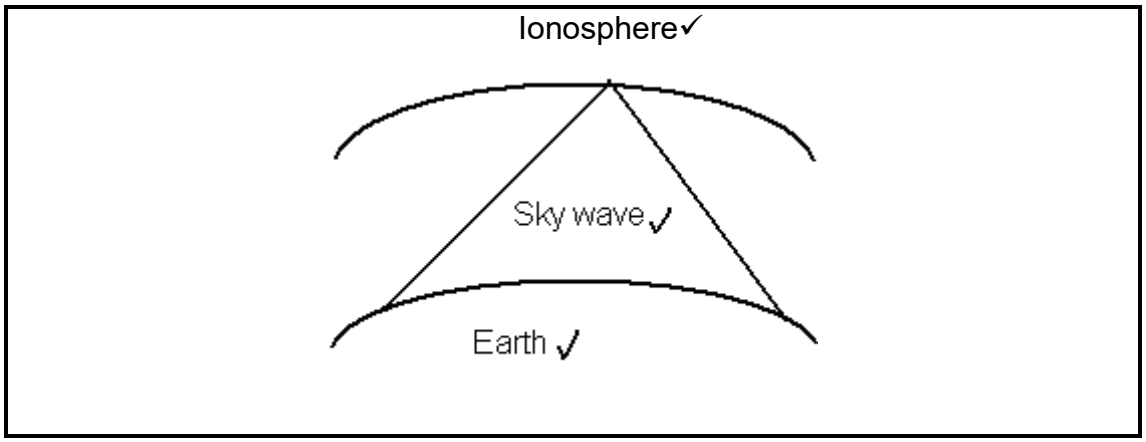
7.2




(One mark for each label) (4 × 1) (4)

7.3 Amplitude✓ modulation✓ (2)

7.4




(3)
**[10]**

**QUESTION 8**

8.1
- The base is the control.
- The collector collects the charge carriers.
- The emitter emits the charge carriers. (3)

8.2
- As the electrons move in one direction
- the holes move in the opposite direction.
- Hole flow is from positive to negative. (3)

8.3 It changes AC to DC. (1)

8.4
- The deliberate addition
- of controlled amounts of foreign atoms or impurities
- to a pure semiconductor is called doping. (3)

**[10]**

**QUESTION 9**

9.1 9.1.1



9.1.2



9.1.3




(3)

9.2 Green, blue, brown, gold (4)

| | | |
|---|---|---|
| 9.3 | Variable resistor | (1) |
| 9.4 | It can be used as a switch✓ or an amplifier.✓ | (2) |
| | | **[10]** |

**QUESTION 10**

| | | |
|---|---|---|
| 10.1 | Common emitter amplifier | (1) |
| 10.2 | Changes sound waves to electric waves | (1) |
| 10.3 | Changes electric waves to sound waves | (1) |
| 10.4 | A capacitor | (1) |
| 10.5 | Act as voltage divider✓ to bias the transistor✓ | (2) |
| 10.6 | Collector✓ base✓ emitter✓ | (3) |
| 10.7 | Blocks the DC and only allows AC though to the speaker | (1) |
| | | **[10]** |

**TOTAL: 100**

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