higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

RADIO THEORY N1

3 August 2021

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 H
1.2 E
1.3 A
1.4 J
1.5 B
1.6 D
1.7 C
1.8 F
1.9 G
1.10 I

(10 × 1) **[10]**

QUESTION 2

2.1 Current can flow in a conductor✓ as conductors have free electrons.✓ Current cannot flow in an insulator✓ as insulators do not have free electrons.✓ (4)

2.2 Protons✓ and neutrons✓ (2)

2.3 2✓ (1)

2.4
- Solids
- Liquids
- Plasma
- Gas

(Any 3 × 1) (3)
[10]

QUESTION 3

3.1 3.1.1 $R_S = R_1 + R_2$
$Rs = 3 + 2$✓
$= 5\ \Omega$✓
$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{2} + \frac{1}{5} = 0,7$✓
$R_T = 1,43\ \Omega$✓ (4)

3.1.2 $I_T = \frac{V}{R} = \frac{10}{1,43}$ ✓= 7A✓ (2)

3.1.3 $I = \frac{V}{R_S} = \frac{10}{5}$✓ = 2A✓ (2)

3.2 $V_T = 6 \times 2$✓
$= 12$ V✓ (2)
[10]

QUESTION 4

4.1 When current flows in a coil,✓ a magnetic field is formed.✓ If this magnetic field cuts into another coil ✓an EMF is induced in that coil.✓ (4)

4.2 The direction of the lines of flux is north seeking.
Each line forms a closed path.
They never intersect.
They always try to shorten themselves.
Lines that go in the same direction will repel one another. (Any 4 × 1) (4)

4.3 North pole ✓and south pole. ✓ (2)
[10]

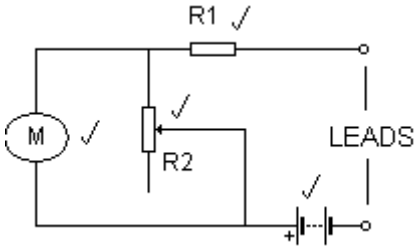
QUESTION 5

5.1 $Rp = \frac{Im\,xRm}{It - Im}$ $Rp = \frac{12x10^{-3}\,x100}{2 - 12x10^{-3}}$ ✓

$Rp = \frac{1,2}{1,99}$ ✓

R_p =0,603 Ω✓ (3)

5.2



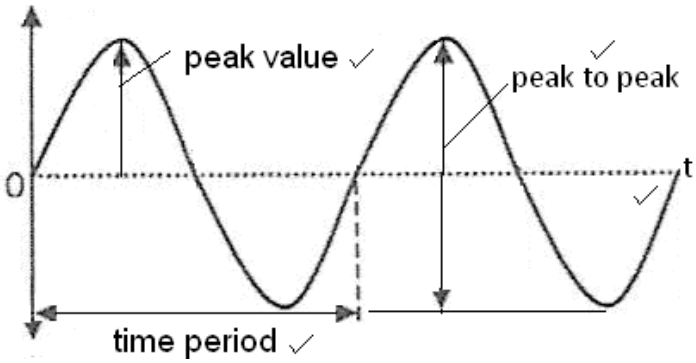
(4)

5.3
- Not accurate
- Not robust
- Parallax error (3)

[10]

QUESTION 6

6.1



(4)

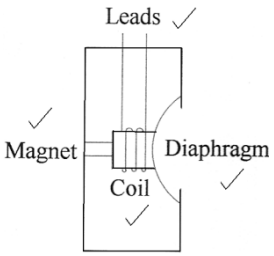
6.2
- DC flows only in one direction.
- AC continuously changes direction.
- DC does not change polarity; it stays either positive or negative.
- AC continuously changes from positive to negative and back. (4)

6.3 Number of cycles✓ per second✓ (2)

[10]

QUESTION 7

7.1



(4)

7.2 300×10^6 meter/second (2)

7.3
7.3.1 Electromagnetic
7.3.2 Longitudinal
7.3.3 Longitudinal
7.3.4 Electromagnetic

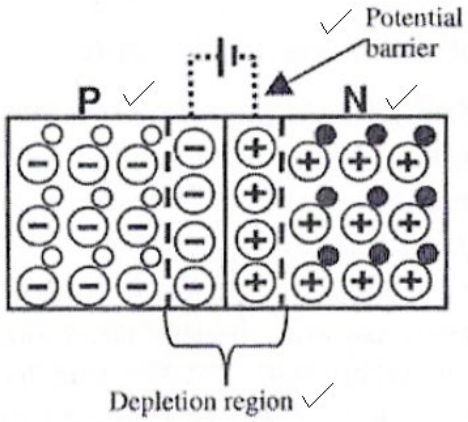
(4 × 1) (4)

[10]

QUESTION 8

8.1 P-type semiconductor material is made by adding a trivalent atom, which has three valence electrons, to pure silicon or germanium, which has four valence electrons.✓✓ This generates holes called acceptor doping.✓ (3)

8.2



(4)

8.3
- Base
- Collector
- Emitter

(3)
[10]

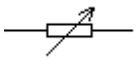
QUESTION 9

9.1 9.1.1



9.1.2

9.1.3



(3 × 1) (3)

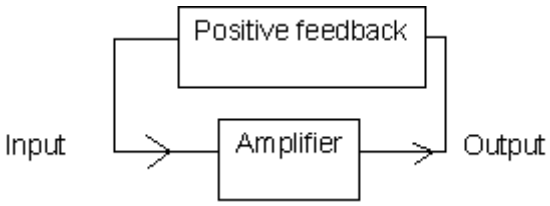
9.2
- Red
- Violet
- Yellow
- Gold

(4)

9.3 Distance between plates,✓ area of plates,✓ dielectric between plates✓ (3)
[10]

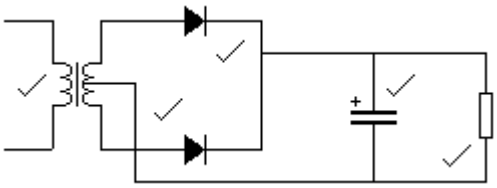
QUESTION 10

10.1 The output✓ is fed back to the input.✓



(TWO marks for the explanation and THREE marks for the diagram) (5)

10.2



(5)
[10]

TOTAL: 100

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