



higher education & training

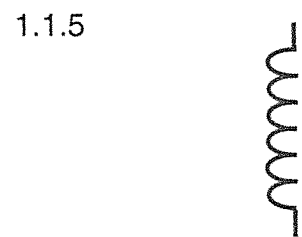
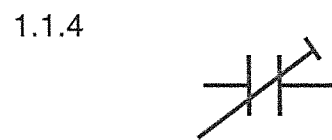
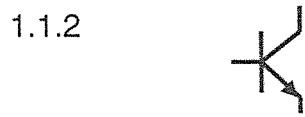
Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE
NOVEMBER EXAMINATION
INDUSTRIAL ELECTRONICS N1
24 NOVEMBER 2014

This marking guideline consists of 6 pages.

QUESTION 1



(5 x 1) (5)

1.2

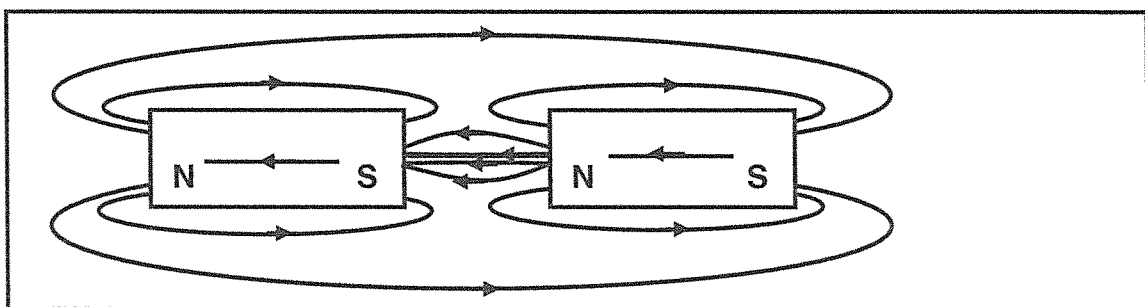


FIGURE 1

(5)

- 1.3 1.3.1 Voltmeter
- 1.3.2 Ionisation
- 1.3.3 Shells
- 1.3.4 Anode
- 1.3.5 0,6 V
- 1.3.6 Forward
- 1.3.7 Positive
- 1.3.8 Galvanometer
- 1.3.9 Positive
- 1.3.10 Dielectric

(10 x 1) (10)
[20]

QUESTION 2

2.1 Hydrometer (1)

2.2

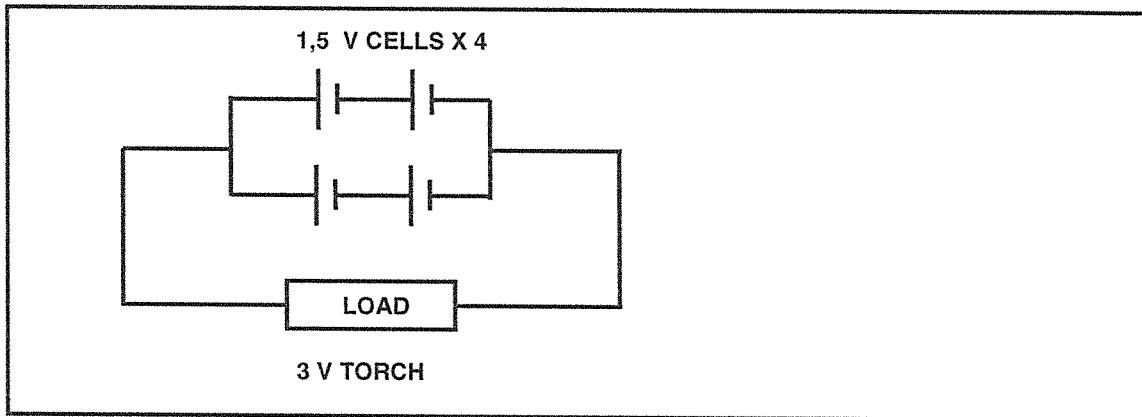


FIGURE 2

(5)

2.3 Both Series connected cells provide higher applied voltage and parallel connected cells provide higher current capacity (4)

2.4 Like poles repel each other; unlike poles attract each other. (2)

2.5 Saw tooth wave; Square wave; Sine wave (3)

- 2.6
- Outside the magnet they move from the north pole to the south pole
 - Inside the magnet they move from the south pole to the north pole
 - They are continuous and form a complete path.
 - They never intersect i.e. they never cross one another
 - They are parallel
 - They are invisible and pass through all materials
 - They always enter or leave a magnetic material at right angles

(Any 3 x 1) (3)

- 2.7 A conductor has an excess of free electrons and an insulator has a deficiency of free electrons.

(2)
[20]

QUESTION 3

3.1 3.1.1

$$A = \frac{\pi D^2}{4}$$

$$A = \frac{\pi(10 \times 10^{-3})^2}{4}$$

$$A = 7,85 \times 10^{-5} m^2 \quad (5)$$

3.1.2

$$R = \frac{\rho L}{A}$$

$$R = \frac{0,017 \times 10^{-6} \times 45}{7,85 \times 10^{-5}}$$

$$R = 0,0097 \Omega \quad (3)$$

3.2 3.2.1

$$R_T = R_1 + R_2 + R_3 + R_4$$

$$R_T = 2000 + 180 + 56 + 27$$

$$R_T = 2263 \Omega$$

3.2.2

$$I_T = \frac{V}{R}$$

$$I_T = \frac{240}{2263}$$

$$I_T = 0,11 A$$

3.2.3

$$P = V \times I$$

$$P = 240 \times 0,11$$

$$P = 26,4 W$$

3.2.4

Brown
Grey
Brown

(4 x 3) (12)
[20]

QUESTION 4

4.1 An ability of a conductor to induce a voltage when the current changes. (3)

4.2 To separate the circuits. OR To separate the input and the load. (2)

4.3

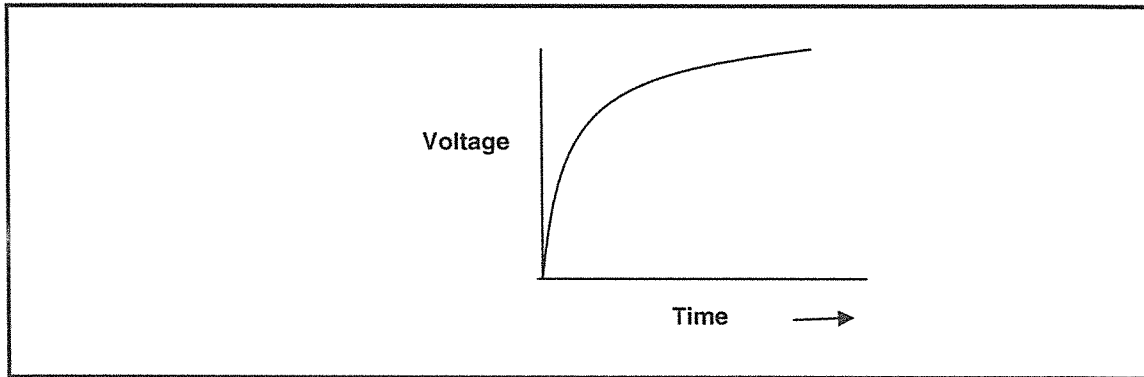


FIGURE 3

(3)

4.4 $R_T = R_0(1 + \alpha_0 t)$
 $R_T = 11(1 + 0,0043 \times 25)$
 $R_T = 12,18 \Omega$

(3)

4.5 $V = \frac{Q}{C}$
 $V = \frac{110}{0,5}$
 $V = 220 V$

(3)

4.6 4.6.1 The longer the conductor, the higher the resistance

4.6.2 When the temperature increases, the resistance increases

4.6.3 The bigger the cross-sectional area of the conductor, the lower the resistance

(3 x 2)

(6)
[20]

QUESTION 5

- 5.1 The voltage induced in the conductor is directly proportional to the rate at which the conductor cuts the magnetic lines of force. (3)
- 5.2 The material which has a deficiency of free electrons (2)
- 5.3 As an electronic switch; As an Amplifier (2)

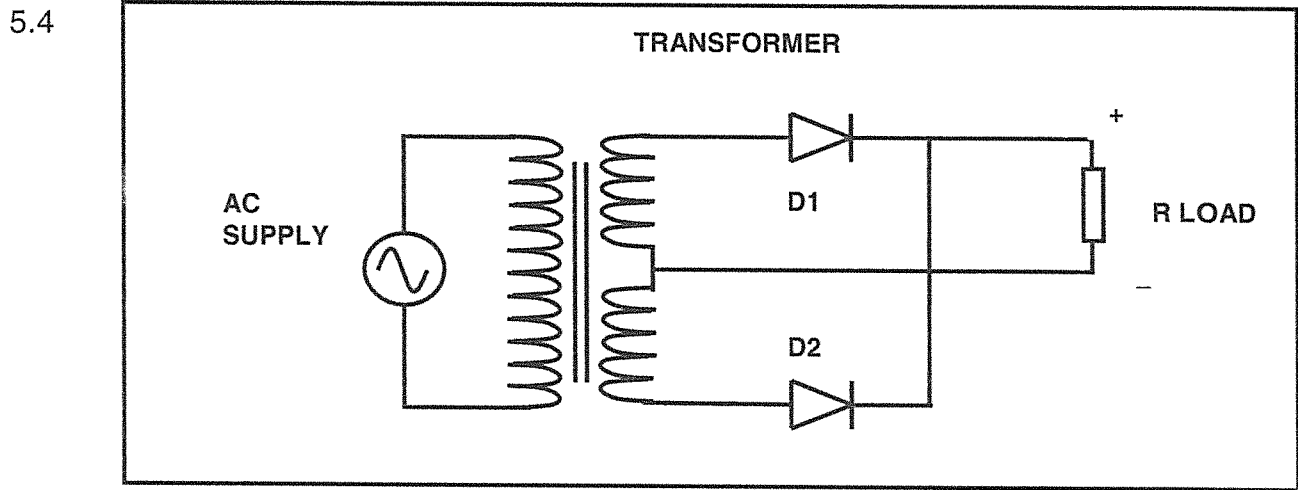


FIGURE 4 (5)

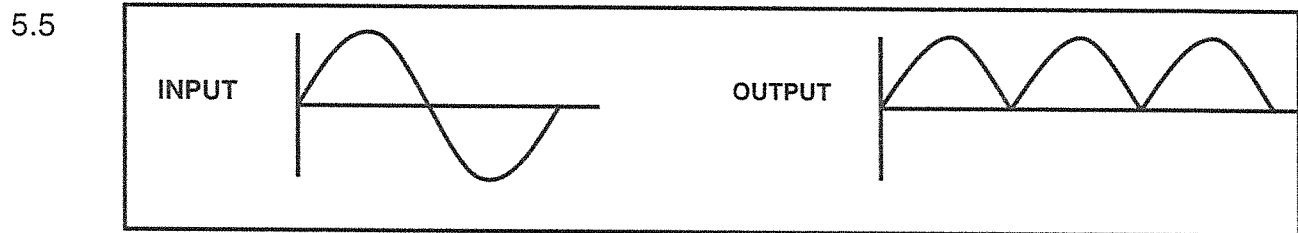


FIGURE 5 (4)

- 5.6 The holes will diffuse into the N-type semi-conductor while some of the valence electrons will diffuse into the P- type semi-conductor. (4)
[20]

TOTAL: 100