MARKING GUIDELINE

NATIONAL CERTIFICATE

AUGUST EXAMINATION

INDUSTRIAL ELECTRONICS N1

1 AUGUST 2012

This marking guideline consists of 6 pages.
MARKING GUIDELINE

NATIONAL CERTIFICATE AUGUST EXAMINATION

INDUSTRIAL ELECTRONICS IN

1 AUGUST 2011
QUESTION 1

1.1.1 H
1.1.2 D
1.1.3 G
1.1.4 F
1.1.5 I
1.1.6 E
1.1.7 C
1.1.8 A
1.1.9 K
1.1.10 N

1.2.1 \[ P = V \times I \]
\[ P = 12 \times (15 \times 10^{-3}) \]
\[ P = 0,18W \]

1.2.2 \[ R = \frac{V^2}{P} \]
\[ R = \frac{12^2}{0,18} \]
\[ R = 800\Omega \]

1.3

FIGURE 1
1.4 Hold the conductor with the left hand; with the thumb pointing in the direction of electron current flow, the fingers will point in the direction of the magnetic field.

1.5 Like charges repel each other and unlike charges attract each other.

QUESTION 2

2.1

2.1.1 Volts

2.1.2 Coulomb

2.1.3 Hertz

2.1.4 Ohm per degree Celcius

2.1.5 Henry

2.2

2.2.1

2.2.2

2.2.3

2.2.4

2.2.5
2.3

2.3.1

\[
\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}
\]

\[
\frac{1}{R_T} = \frac{1}{5} + \frac{1}{15} + \frac{1}{15}
\]

\[
\frac{1}{R_T} = \frac{15 + 5 + 3}{75}
\]

\[
R_T = 75
\]

\[
\frac{1}{R_T} = \frac{23}{75}
\]

\[
R_T = \frac{75}{23}
\]

\[
R_T = 3.26\Omega
\]

2.3.2

\[
I_T = \frac{V_T}{R_T}
\]

\[
R = \frac{36}{3.26}
\]

\[
R = 11.04\Omega
\]

2.3.3

\[
V_2 = V_T = 36\text{ V}
\]

2.3.4

\[
I_2 = \frac{V}{R_2}
\]

\[
I_2 = \frac{36}{15}
\]

\[
I_2 = 2.4\text{ A}
\]

2.3.5

\[
P = \frac{V^2}{R_2}
\]

\[
P = \frac{36^2}{15}
\]

\[
P = 36 \times 2.4
\]

\[
P = 86.4\text{ W}
\]

\[
P = V \times I
\]

\[
P = I^2 R_2
\]

\[
P = 2.4^2 \times 15
\]

\[
P = 86.4\text{ W}
\]

\[
P = 86.4\text{ W}
\]

QUESTION 3

3.1

- The length of a conductor
- The cross-sectional area of a conductor
- The temperature of the conductor
- The type material of the conductor

3.2

- The area of the plates
- The distance between the plates
- The type of dielectric used between the plates
3.3  
- The strength of the magnetic field
- The length of the conductor in the field
- The speed of the conductor with respect to the field
- The angle at which the conductor cuts the field

$$R = \frac{B \times l}{A}$$

$$R = 1.7 \times 10^{-6} \times 65 \times 28 \times 10^{-6}$$

$$R = 3.946 \Omega$$

3.4

$$R_T = R_o (1 + \alpha \sigma t)$$

$$R_T = 23 (1 + 0.0042 \times 45)$$

$$R_T = 27.347 \Omega$$

3.5

$$V_s = \frac{V_p \times 1}{2}$$

$$V_s = \frac{220 \times 1}{2}$$

$$V_s = 110V$$

3.6 3.6.1

$$i_s = \frac{I_p \times 2}{1}$$

$$i_s = \frac{20 \times 10^{-3} \times 2}{1}$$

$$i_s = 0.04A$$

3.6.2

$$i_s = \frac{I_p \times V_p}{V_s}$$

$$i_s = \frac{20 \times 10^{-3} \times 220}{110}$$

$$i_s = 0.04A$$

QUESTION 4

4.1 4.1.1 0.6 V

4.1.2 8.4 V

4.2 Four

4.3 It is when TWO atoms combine or link.

4.4 When the anode is more positive with respect to the cathode and the applied voltage is higher than the junction potential of the diode.

4.5
- Digital
- Analogue
4.6 The ability of a conductor to induce a voltage when the current changes.

4.7 The voltage measured through a component when the current flows through a component.

![Voltage vs. Time Graph](FIGURE 2)

4.9

![Diode Circuit](FIGURE 3)

TOTAL: 100