

INSTRUCTION:

This section consists of **FOUR (4)** questions. Answers **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

- CLO1 (a) Define Ohm's Law using the Ohm's Law formula.
Definisikan Hukum Ohm menggunakan formula Hukum Ohm.
- [4 marks]
[4 markah]
- CLO1 (b) Approximate the value of the following entities based on the circuit in Figure 1(b).
Anggarkan nilai entiti-entiti berikut dengan merujuk kepada litar pada Rajah 1(b).

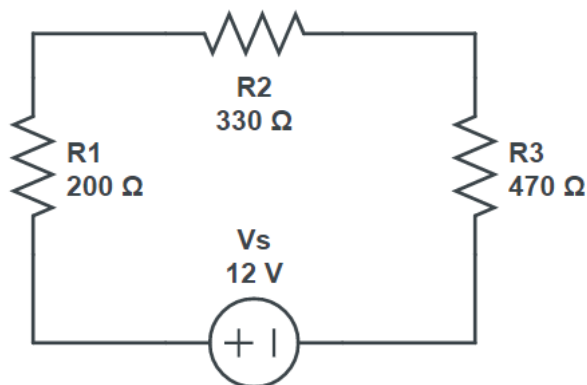


Figure 1(b) / Rajah 1(b)

- (i) The total current, I_T .
Arus total, I_T .

[3 marks]
[3 markah]

- (ii) The current at R2, I_{R2} .

Arus pada R2, I_{R2} .

[2 marks]

[2 markah]

- (iii) The voltage at R3, V_{R3} .

Voltan pada R3, V_{R3} .

[3 marks]

[3 markah]

CLO2

- (c) Calculate current I_1 , I_2 dan I_3 based on the circuit given in Figure 1(c) using the Kirchoff Law's method.

Kira arus I_1 , I_2 dan I_3 dengan merujuk kepada Rajah 1(c), dengan menggunakan kaedah Hukum Kirchoff.

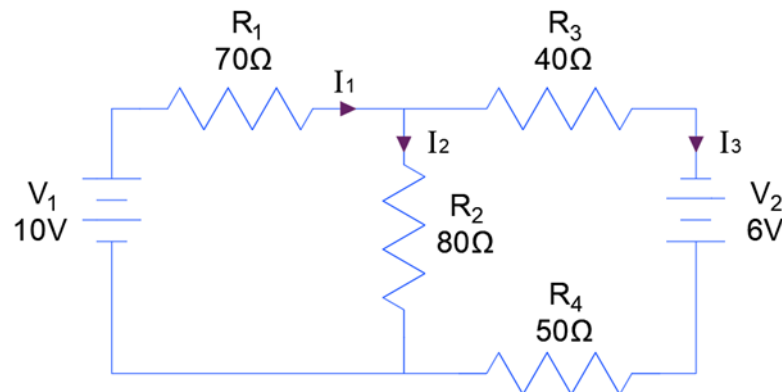


Figure 1(c) / Rajah 1(c)

[13 marks]

[13 markah]

QUESTION 2**SOALAN 2**

CLO1

- (a) Define Self Inductance.
Takrifkan Aruhan Kendiri.

[3 marks]

[3 markah]

CLO1

- (b) Approximate the Total Inductance, L_T for both circuits in Figure 2(b)(i) and Figure 2(b)(ii).

Anggarkan nilai Aruhan Total, L_T bagi dua litar di Rajah 2(b)(i) dan Rajah 2(b)(ii).

(i)

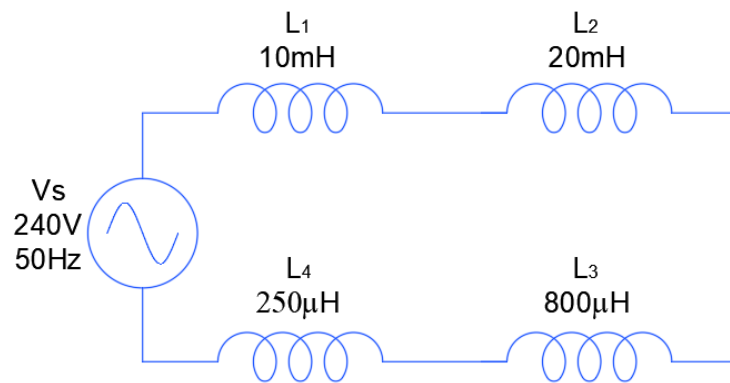


Figure 2(b)(i) / Rajah 2(b)(i)

[5 marks]

[5 markah]

(ii)

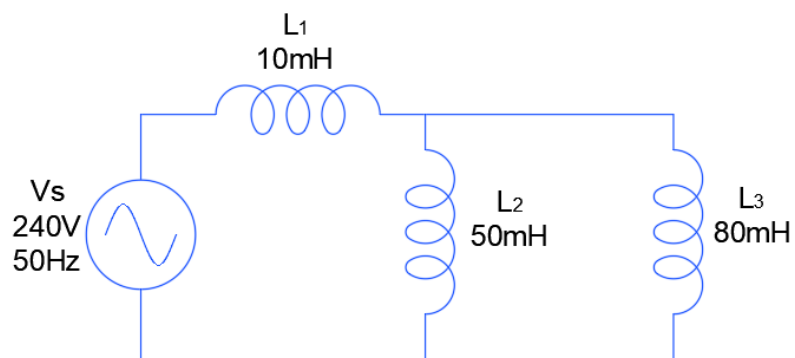


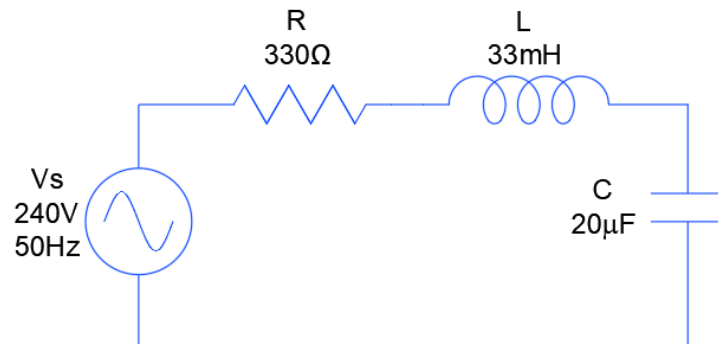
Figure 2(b)(ii) / Rajah 2(b)(ii)

[6 marks]

[6 markah]

CLO2

- (c) Refer to Figure 2(c) below.
Rujuk Rajah 2(c) di bawah.

Figure 2(c) / *Rajah 2(c)*

- (i) Calculate the Impedance, Z .
Kira Galangan, Z .
- (ii) Sketch the Impedance Triangle with complete labeling.
Lakarkan Segitiga Galangan yang lengkap berlabel.

[9 marks]
 [9 markah]

[2 marks]
 [2 markah]

QUESTION 3**SOALAN 3**

CLO1

- (a) Describe Magnetic Flux.
Jelaskan Fluks Magnetik.

[4 marks]
 [4 markah]

CLO1

- (b) Explain Lenz Law with the aid of a suitable diagram.
Terangkan Hukum Lenz dengan bantuan rajah yang sesuai.

[9 marks]
 [9 markah]

- CLO2 (c) A Current of 30mA is passing through a 700 turns Coil wound with a radius of 4cm.
Suatu Arus 30mA melalui satu Gegelung yang mempunyai 700 lingkaran dengan jejari 4cm.
- (i) Calculate Average Length, l
Kira Panjang Purata, l
- [4 marks]
[4 markah]
- (ii) Calculate Magnetomotive Force, F_m
Kira Kuasa Magnetomotif, F_m
- [4 marks]
[4 markah]
- (iii) Calculate Magnetic Field Strength, H
Kira Kekuatan Medan Magnet, H
- [4 marks]
[4 markah]

QUESTION 4**SOALAN 4**

- CLO1 (a) Describe **TWO (2)** functions of Transformer.
*Terangkan **DUA (2)** fungsi Pengubah.*
- [4 marks]
[4 markah]
- CLO1 (b) Compare Step-Down Transformer to Step-Up Transformer using a suitable diagram.
Bandingkan Pengubah Langkah-Naik dengan Pengubah Langkah-Turun menggunakan rajah yang sesuai.
- [10 marks]
[10 markah]

- CLO2 (c) A Transformer has 1500 primary turns connected to a 1.1 kV supply and the Expected Ratio of the Transformer is 0.2. By assuming the Transformer is ideal,
- Sebuah Pengubah yang mempunyai 1500 lilitan utama bersambung dengan bekalan 1.1kV dan Nisbah Terjangka ialah 0.2. Dengan menganggap Pengubah adalah ideal,*
- (i) Calculate the Secondary Turns and Secondary Voltage.
Kira Lilitan Sekunder dan Voltan Sekunder.
- [5 marks]
[5 markah]
- (ii) Sketch the Transformer with complete labelling.
Lakarkan Pengubah dengan label yang lengkap.
- [4 marks]
[4 markah]
- (iii) Write the type of Transformer.
Tuliskan jenis Pengubah.
- [2 marks]
[2 markah]

SOALAN TAMAT

FORMULA FOR BASIC ELECTRICAL PRINCIPLES**Ohm's Law:**

$$V = IR \text{ or } I = \frac{V}{R} \text{ or } R = \frac{V}{I}$$

Charge:

$$Q = It$$

Resistivity:

$$R = \frac{\rho l}{A} \text{ or } R = k \frac{l}{A} \text{ or } R = kl$$

Power:

$$P = I^2 R \text{ or } P = IV \text{ or } P = \frac{V^2}{R}$$

Electrical Energy: $E = Pt$ **Resistance in Series Circuit:**

$$R_T = R_1 + R_2 + \dots + R_N$$

Resistance in Parallel Circuit:

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_N}}$$

Resistance in Parallel for 2 Branches:

$$R_T = \frac{R_1 R_2}{R_1 + R_2}$$

Voltage Divider Rule (VDR):

$$V_N = \left(\frac{R_N}{R_T} \right) V_T$$

Current Divider Rule (CDR):

$$I_N = \left(\frac{R_T}{R_N} \right) I_T$$

Current Divider Rule for 2 Branches:

$$I_1 = \left(\frac{R_2}{R_1 + R_2} \right) I_T \text{ or } I_2 = \left(\frac{R_1}{R_1 + R_2} \right) I_T$$

Charge on Capacitor:

$$Q = CV \text{ or } C = \frac{Q}{V} \text{ or } V = \frac{Q}{C}$$

$$E = \frac{1}{2} QV$$

Capacitor in Series Circuit:

$$C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots + \frac{1}{C_N}}$$

Capacitor in Parallel Circuit:

$$C_T = C_1 + C_2 + \dots + C_N$$

Inductor in Series Circuit:

$$L_T = L_1 + L_2 + \dots + L_N$$

Inductor in Parallel Circuit:

$$L_T = \frac{1}{\frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} + \dots + \frac{1}{L_N}}$$

Capacitive Reactance:

$$X_C = \frac{1}{2\pi f C}$$

Inductive Reactance:

$$X_L = 2\pi f L$$

R-C Series Circuit:

$$Z = \sqrt{R^2 + X_C^2}$$

R-L Series Circuit:

$$Z = \sqrt{R^2 + X_L^2}$$

R-L-C Series Circuit:

$$Z = \sqrt{R^2 + (X_C - X_L)^2}$$

Or

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

Electromagnetic Induction:

$$E = Blv \sin \theta$$

$$F_m = Hl, F_m = IN, F_m = S\phi$$

$$B = \frac{\phi}{A}, \mu = \mu_o \mu_r, \mu = \frac{B}{H}$$

$$S = \frac{F_m}{\phi} = \frac{Hl}{BA} = \frac{l}{\left(\frac{B}{H} \right) A} = \frac{l}{\mu_o \mu_r A}$$

Transformer:

$$\frac{N_2}{N_1} = \frac{V_2}{V_1} \text{ or } \frac{V_1}{V_2} = \frac{N_1}{N_2}$$

$$\frac{V_1}{V_2} = \frac{N_1}{N_2} = \frac{I_2}{I_1}$$

$$S = V_1 I_1 = V_2 I_2$$

$$K = \frac{N_s}{N_p} = \frac{E_s}{E_p} = \frac{V_s}{V_p}$$