



UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**PEPERIKSAAN AKHIR
SEMESTER I
SESI 2013/2014**

NAMA KURSUS : ASAS ELEKTRIK DAN
ELEKTRONIK

KOD KURSUS : DAM 32103

PROGRAM : DAM

TARIKH PEPERIKSAAN : DISEMBER 2013 / JANUARI
2014

JANGKA MASA : 3 JAM

ARAHAN : JAWAB LIMA (5) SOALAN
SAHAJA

KERTAS SOALAN INI MENGANDUNGI TUJUH BELAS (17) MUKA SURAT

SOALAN DI DALAM BAHASA MELAYU

- S1 (a) Nyatakan **dua (2)** perbezaan ciri-ciri antara litar selari dan litar siri.
(2 Markah)
- (b) Rujuk **Rajah S1**, tunjukkan semua pengiraan untuk mencari nilai;
- (i) Jumlah rintangan, R_T
(2 Markah)
- (ii) Kejatuhan voltan pada perintang R_2 (V_{R2}), perintang R_4 (V_{R4}), perintang R_5 (V_{R5}), dan perintang R_6 (V_{R6}).
(8 Markah)
- (iii) Arus elektrik yang mengalir melalui perintang R_2 (V_{R2}), perintang R_4 (V_{R4}), perintang R_5 (V_{R5}), dan perintang R_6 (V_{R6}).
(8 Markah)
- S2 (a) Nyatakan tiga (3) faktor untuk menentukan jumlah voltan teraruh dengan pemotongan fluk pada lingkaran gegelung.
(3 Markah)
- (b) Suatu urat daya magnet Φ sebanyak $45 \mu\text{Wb}$ wujud pada luas permukaan 300000 mm^2 . Kirakan ketumpatan urat daya magnet, B dalam unit;
- (i) Gauss.
(ii) Tesla.
(4 Markah)
- (c) Kirakan keamatan medan, H bagi sebuah electromagnet jika ketumpatan flux, B bersamaan 0.504 Tesla dan ketelapan relatif (μ_r) teras adalah 200 .
(5 Markah)
- (d) Suatu gelung besi mempunyai purata panjang lilitan sebanyak 50cm dan keratan rentas kawasan 1cm^2 . Ianya dililit secara seragam dengan 700 lilitan wayar. Pengukuran dibuat dengan mendapati lilitan di dalam gelung menunjukkan bahawa arus dalam lilitan adalah 0.05A dan fluk di dalam gelung tersebut adalah $6 \times 10^{-6}\text{Wb}$. Carikan ketumpatan fluks, B dan medan intensity, H , kebolehtelapan μ , and kebolehtelapan relatif μ_r .
(8 Markah)

- S3 (a) Nyatakan **dua (2)** jenis kapasitor dan lakarkan gambarajah binaan kapasitor tersebut. (4 Markah)
- (b) Keluasan pada satu plat daripada dua plat kapasitor mica adalah 0.0025 m^2 dan jarak antara dia plat adalah 0.02 m . Jika dielektrik malar pada mica adalah 7, carikan nilai kapasitan kapasitor tersebut. (2 Markah)
- (c) Fluk pada suatu electromagnet adalah 6 Wb . Fluk tersebut meningkat sekata kepada 12 Wb dalam tempoh 2 saat . Kirakan voltan teraruh dalam gegelung yang mempunyai 10 lilitan jika gegelung tersebut bergerak dalam medan magnet. (3 Markah)
- (d) Tentukan Voltan, V melalui kapasitor jika;
- (i) $Q = 45 \text{ } \mu\text{C}$ and $C = 0.01 \text{ } \mu\text{F}$ (1 Markah)
- (ii) $Q = 22 \text{ mC}$ and $C = 1000 \text{ } \mu\text{F}$ (1 Markah)
- (iii) $Q = 188 \text{ nC}$ and $C = 3.76 \text{ } \mu\text{F}$ (1 Markah)
- (e) Kapasitor di dalam sebuah litar telefon mempunyai kapasitan sebanyak $3 \mu\text{F}$ seperti di dalam **Rajah S3(e)**. Kirakan arus elektrik yang mengalir melaluinya jika voltan 15 V pada 800 Hz dialirkan kepadanya. (4 Markah)
- (f) Satu arus ulang alik (AC) 300 Hz 20 mA mengalir dalam litar yang mengandungi kapasitor $25 \text{ } \mu\text{F}$ seperti yang ditunjukkan dalam **Rajah S3(f)**. Apakah kejatuhan voltan merentasi kapasitor? (4 Markah)

- S4 (a) Berdasarkan **Rajah S4(a)**, tiga perintang disambungkan secara selari kepada sumber voltan 12 V. Tentukan arus maksimum dan arus minimum pada setiap resistor jika kod warna pada perintang tersebut adalah;
- (i) $R_1 = \text{MERAH, KUNING, HIJAU, EMAS}$
(ii) $R_2 = \text{PERANG, MERAH, HIJAU, PERAK}$
(iii) $R_3 = \text{MERAH, MERAH, MERAH, PERAK}$ (12 Markah)
- (b) Berdasarkan **Rajah S4(b)**, kirakan;
- (i) Jumlah rintangan perintang, R_T (2 Markah)
(ii) Jumlah arus, I_T (2 Markah)
(iii) Arus cabang, I_1 dan I_2 (4 Markah)
- S5 (a) Berdasarkan **Rajah S5(a)**, reka bentuk beban voltan agihan dengan mencari nilai;
- (i) Perintang, R_1 (3 Markah)
(ii) Perintang, R_2 (3 Markah)
(iii) Perintang, R_3 (3 Markah)
(iv) Kuasa yang dihilangkan pada perintang, R_1 , R_2 dan R_3 (P_{R1} , P_{R2} dan P_{R3}) (6 Markah)
- (b) Berdasarkan **Rajah S5(b)**, kirakan nilai R jika $V_R = 12\text{V}$. (5 Markah)

- S6 (a) Suatu litar resonan mempunyai 25 mH gegelung beroperasi pada frekuensi 700 kHz. Apakah aruhan reaktan pada gegelung tersebut? (2 Markah)
- (b) Kirakan kearuhan pada gegelung untuk memastikan ianya mempunyai reaktan sebanyak 820Ω pada frekuensi 60 kHz? (2 Markah)
- (c) Suatu gegelung penalaan dalam pemancar radio mempunyai kearuhan sebanyak $300 \mu\text{H}$. Pada frekuensi apakah ianya mempunyai aruhan reaktan sebanyak 3768Ω ? (2 Markah)
- (d) Suatu pengubah injak turun mempunyai lilitan primer 50000 dan lilitan sekunder 500. 20000V talian penghantaran disambungkan pada lilitan primer. Jika lilitan sekunder disambungkan pada beban 25Ω , carikan;
- (i) Voltan sekunder. (2 Markah)
 - (ii) Arus sekunder. (2 Markah)
 - (iii) Arus primer. (2 Markah)
 - (iv) Kuasa keluaran. (2 Markah)
- (e) Suatu jenis pengubah kuasa, rujuk **Rajah S6(e)**. Terdapat tiga gelungan sekunder yang berasingan, setiap satunya direka untuk voltan yang berbeza. Bahagian primer pada pengubah disambungkan pada 120V bekalan kuasa dan mempunyai 100 lilitan. Carikan nilai lilitan pada setiap gelungan sekunder. (6 Markah)

- S7 (a) Nyatakan **Tiga (3)** jenis gelombang bukan sinus dan terangkan kegunaanya dalam aplikasi litar. Lakarkan **Dua (2)** daripada gelombang yang dinyatakan dalam jawapan anda. (8 Markah)
- (b) Nyatakan sudut bagi gelombang sinus voltan arus ulang-alik;
- (i) Apabila ia mencapai nilai positif maksimum. (2 Markah)
 - (ii) Apabila ia mencapai nilai negatif maksimum. (2 Markah)
 - (iii) Apabila ia melintasi paksi sifar. (2 Markah)
- (c) Jika suatu gelombang sinus mempunyai nilai puncak sebanyak 60V, kirakan;
- (i) Nilai puncak ke puncak. (2 Markah)
 - (ii) Nilai voltan purata. (2 Markah)
 - (iii) Nilai min punca kuasa dua, RMS. (2 Markah)

SOALAN DI DALAM BAHASA INGGERIS

- Q1** (a) State **two (2)** difference characteristic of parallel circuit and series circuit. (2 Marks)
- (b) Refer to **Figure Q1**, show all the calculation to find the value for:
- (i) Total resistance R_T (2 Marks)
- (ii) The voltage drop across resistance R_2 (V_{R2}), resistance R_4 (V_{R4}), resistance R_5 (V_{R5}) and resistance R_6 (V_{R6}) (8 Marks)
- (iii) The current flow through resistance R_2 (I_{R2}), resistance R_4 (I_{R4}), resistance R_5 (I_{R5}) and resistance R_6 (I_{R6}) (8 Marks)
- Q2** (a) List **three (3)** factor to determined the amount of voltage induced by flux cutting the turns of coil. (3 Marks)
- (b) A flux Φ of $45 \mu\text{Wb}$ exists in an area of 300000 mm^2 . Calculate the flux density (B) in;
- (i) Gauss.
(ii) Tesla. (4 Marks)
- (c) Calculate the field intensity, H of an electromagnet if the flux density, B equals 0.504 Tesla and the relative permeability (μ_r) of the core is 200 . (5 Marks)
- (d) An iron ring has a mean circumferential length of 50-cm and a cross-sectional area of 1-cm^2 . It is wound uniformly with 700 turns of wire. Measurements made with a search coil around the ring show that the current in the windings is 0.05 A and the flux in the ring is $6 \times 10^{-6} \text{ Wb}$. Find the flux density B , field intensity H , permeability μ , and relative permeability μ_r (8 Marks)

- Q3** (a) State **two (2)** types of capacitor and sketch the diagram of the capacitor structure. (4 Marks)
- (b) The area of one plate of a two-plate mica capacitor is 0.0025 m^2 and the separation between plates is 0.02 m . If the dielectric constant of mica is 7, find the capacitance of the capacitor. (2 Marks)
- (c) The flux of an electromagnet is 6 Wb . The flux increases uniformly to 12 Wb in a period of 2 s . Calculate the voltage induced in a coil that has 10 turns if the coil is stationary in the magnetic field. (3 Marks)
- (d) Determine the voltage, V , across a capacitor if;
- (i) $Q = 45 \text{ } \mu\text{C}$ and $C = 0.01 \text{ } \mu\text{F}$
 - (ii) $Q = 22 \text{ mC}$ and $C = 1000 \text{ } \mu\text{F}$
 - (iii) $Q = 188 \text{ nC}$ and $C = 3.76 \text{ nF}$
- (3 Marks)
- (e) A capacitor in a telephone circuit has a capacitance of $3 \mu\text{F}$ as shown in **Figure Q3(e)**. Calculate the current flows through it if 15 V at 800 Hz is impressed across it. (4 Marks)
- (f) A 300 Hz 20 mA Alternating Current (AC) flows in a circuit containing a $25 \text{ } \mu\text{F}$ capacitor as shown in **Figure Q3(f)**. What is the voltage drop across the capacitor? (4 Marks)

- Q4** (a) Referring to **Figure Q4(a)**, three resistor is connected parallel to the voltage source 12V. Determine the maximum and minimum current at each of the resistor if the color coding for the resistor is;
- (i) $R_1 = \text{RED, YELLOW, GREEN, GOLD}$
 - (ii) $R_2 = \text{BROWN, RED, GREEN, SILVER}$
 - (iii) $R_3 = \text{RED, RED, RED, SILVER}$
- (12 Marks)
- (b) Referring to **Figure Q4(b)**, calculate;
- (i) Total resistance, R_T (2 Marks)
 - (ii) Total current, I_T (2 Marks)
 - (iii) Branch current, I_1 and I_2 (4 Marks)
- Q5** (a) Referring to **Figure Q5(a)**, design the loaded voltage divider by finding the value of;
- (i) Resistor, R_1 (3 Marks)
 - (ii) Resistor, R_2 (3 Marks)
 - (iii) Resistor, R_3 (3 Marks)
 - (v) Power dissipated at resistor, R_1, R_2 and R_3 (P_{R1}, P_{R2} and P_{R3}) (6 Marks)
- (b) Referring to **Figure Q5(b)**, calculate the value R if $V_R = 12 \text{ V}$. (5 Marks)

- Q6 (a) A resonant circuit consists of a 25 mH coil operating at a frequency of 700 kHz. What is the inductive reactance of the coil?
(2 Marks)
- (b) Calculate the inductance of a coil to be in order that it has a reactance of 820Ω at a frequency of 60 kHz?
(2 Marks)
- (c) A tuning coil in a radio transmitter has an inductance of 300 μH . At what frequency will it have an inductive reactance of 3768 Ω ?
(2 marks)
- (d) A step-down transformer with primary turns 50000 and secondary turns 500. The primary is connected to a 20000V transmission line. If the secondary is connected to a 25Ω load, find:
- (i) The secondary voltage. (2 Marks)
 - (ii) The secondary current. (2 Marks)
 - (iii) The primary current. (2 Marks)
 - (iv) The power output. (2 Marks)
- (e) In one type of power transformer, refer **Figure Q6 (e)**. There are three separate secondary windings, each designed for a different voltage output. The primary of the transformer is connected to a 120-V source of supply and has 100 turns. Find the number of turns on each secondary.
(6 Marks)

- Q7** (a) State **three (3)** types of nonsinusoidal wave and explain its use in application circuit. Sketch **two (2)** of the wave stated from your answer.

(8 Marks)

- (b) State the angle for sine wave in alternating voltage;

(i) When reach its maximum positive value.

(2 Marks)

(ii) When reach its maximum negative value.

(2 Marks)

(iii) When its cross the zero axis.

(2 Marks)

- (c) If a sine wave has a peak value of 60V, calculate;

(i) Peak to peak value.

(2 Marks)

(ii) The average value.

(2 Marks)

(iii) The root mean square value, RMS.

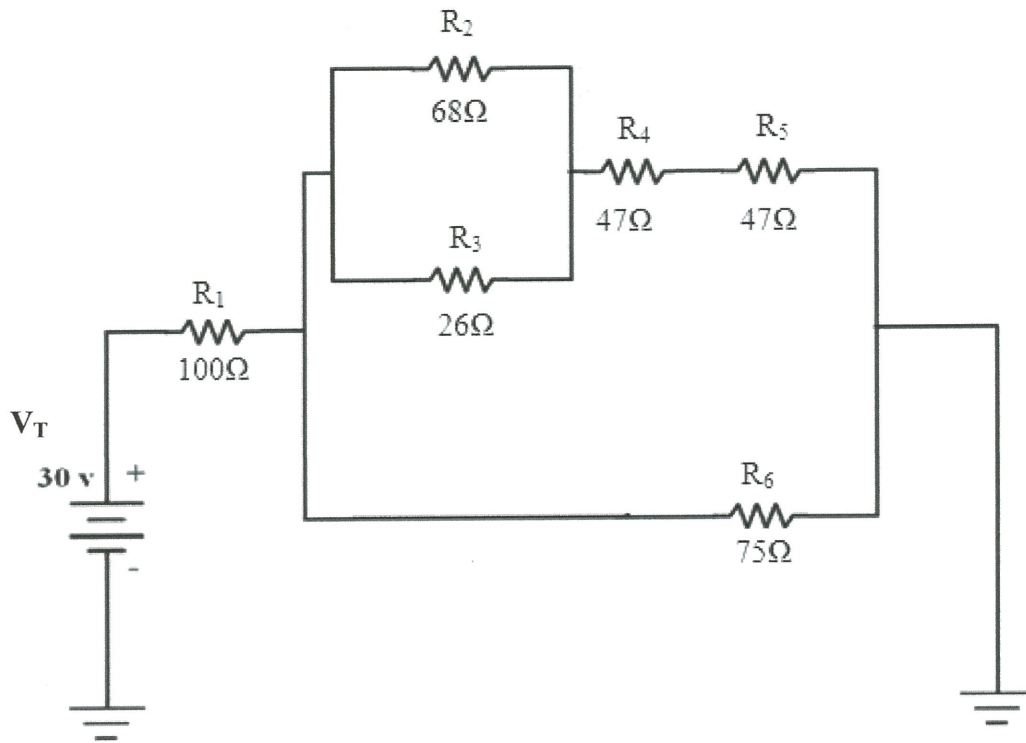
(2 Marks)

-END OF QUESTION-

PEPERIKSAAN AKHIR
FINAL EXAMINATION

SEMESTER / SESI : SEM 1 / 2013/2014
SEMESTER / SESSION
KURSUS : ASAS ELEKTRIK DAN
COURSE ELEKTRONIK

PROGRAM: 2 DAM / 3 DAM
PROGRAMME
KOD KURSUS: DAM32103
COURSE CODE

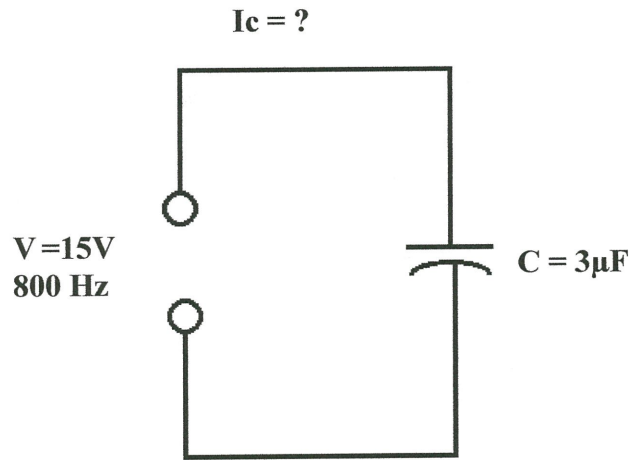


RAJAH S1 / FIGURE Q1

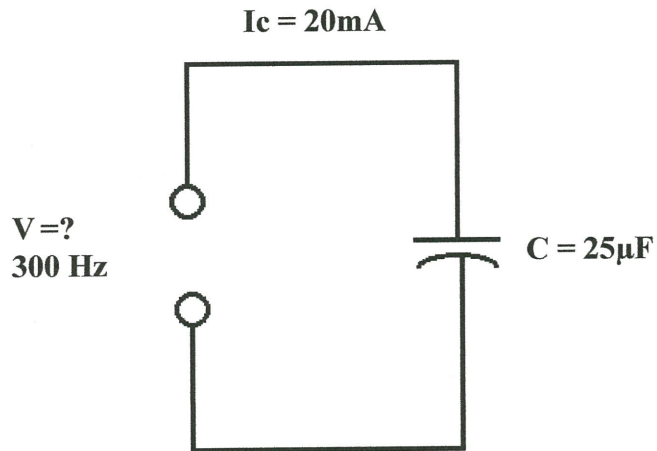
PEPERIKSAAAN AKHIR
FINAL EXAMINATION

SEMESTER / SESI : SEM 1 / 2013/2014
SEMESTER / SESSION
KURSUS : ASAS ELEKTRIK DAN
COURSE ELEKTRONIK

PROGRAM: 2 DAM / 3 DAM
PROGRAMME
KOD KURSUS: DAM32103
COURSE CODE



RAJAH S3(e) / FIGURE Q3(e)

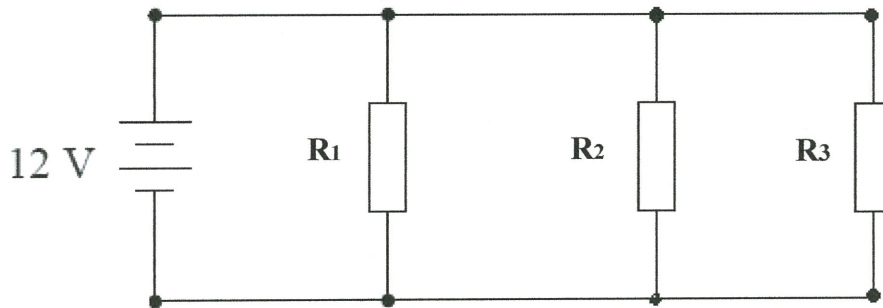


RAJAH S3(f) / FIGURE Q3(f)

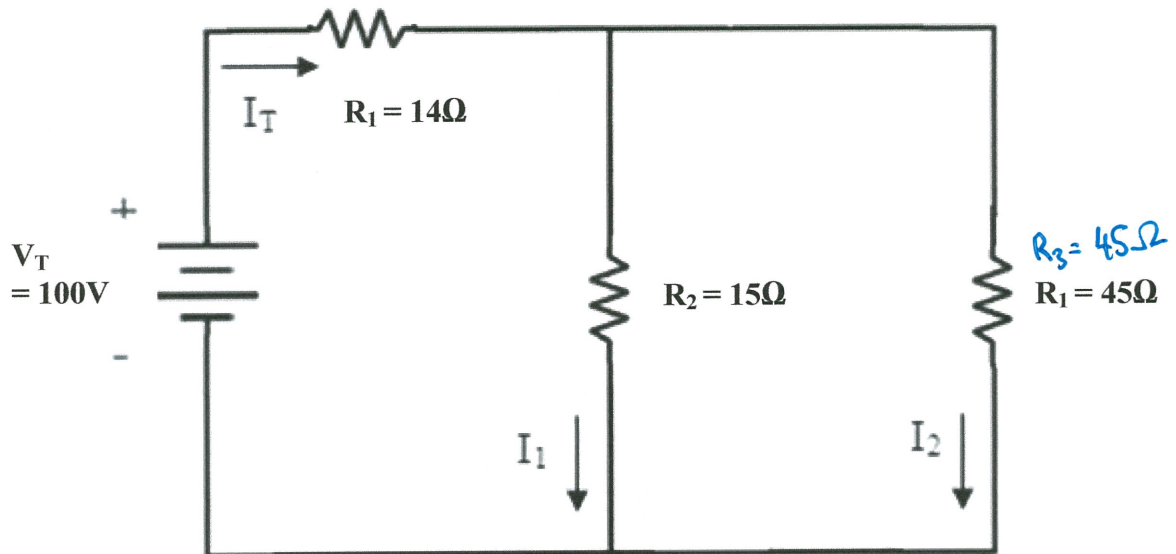
PEPERIKSAAAN AKHIR
FINAL EXAMINATION

SEMESTER / SESI : SEM 1 / 2013/2014
SEMESTER / SESSION
KURSUS : ASAS ELEKTRIK DAN
COURSE ELEKTRONIK

PROGRAM: 2 DAM / 3 DAM
PROGRAMME
KOD KURSUS: DAM32103
COURSE CODE



RAJAH S4(a) / FIGURE Q4(a)

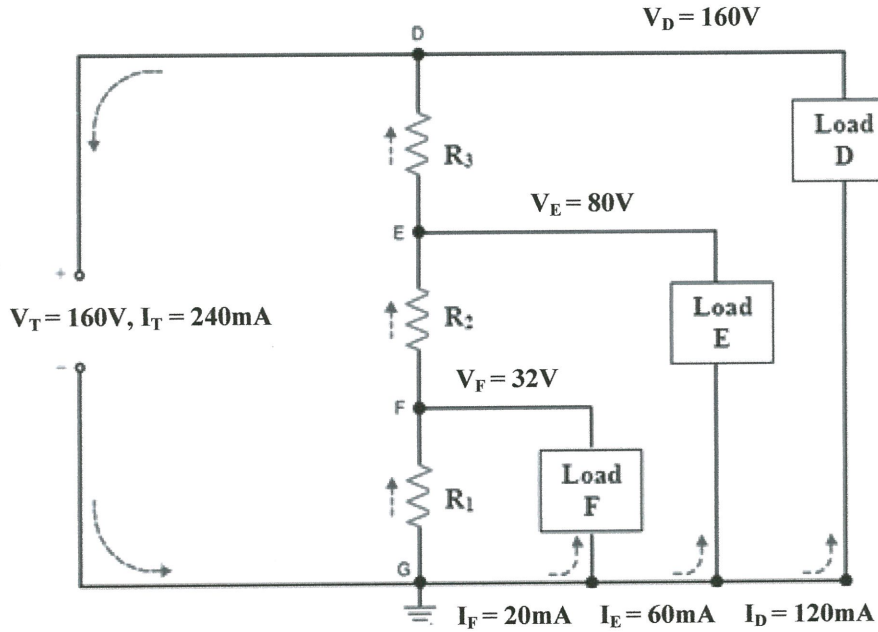


RAJAH S4(b) / FIGURE Q4(b)

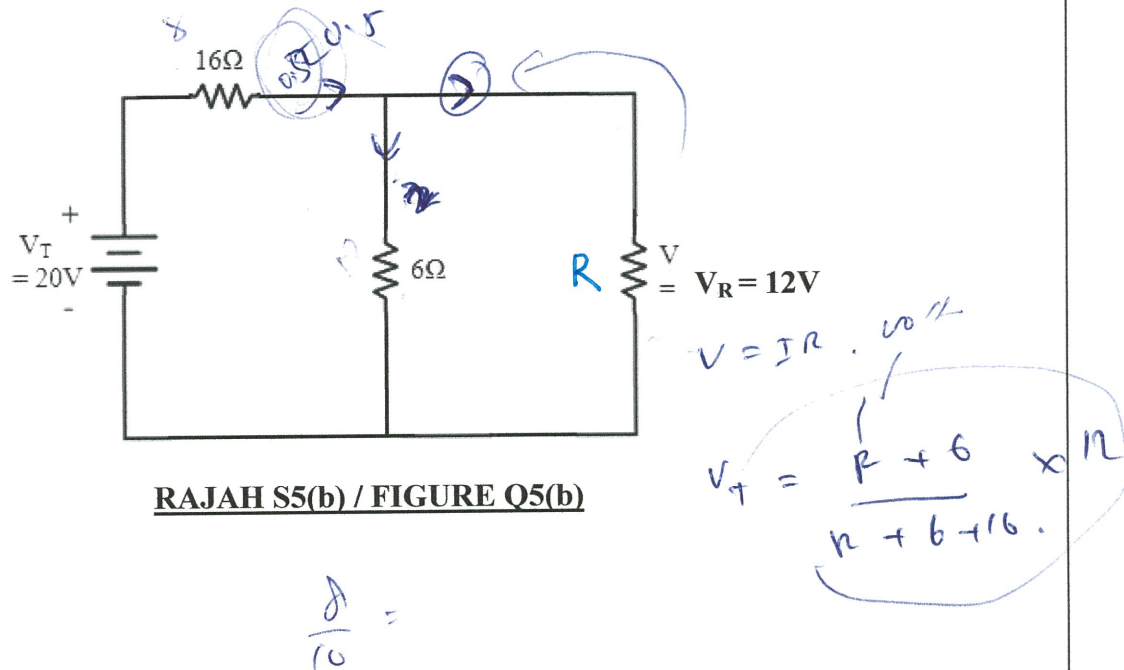
PEPERIKSAAAN AKHIR
FINAL EXAMINATION

SEMESTER / SESI : SEM 1 / 2013/2014
SEMESTER / SESSION
KURSUS : ASAS ELEKTRIK DAN
COURSE ELEKTRONIK

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RAJAH S5(a) / FIGURE Q5(a)



RAJAH S5(b) / FIGURE Q5(b)

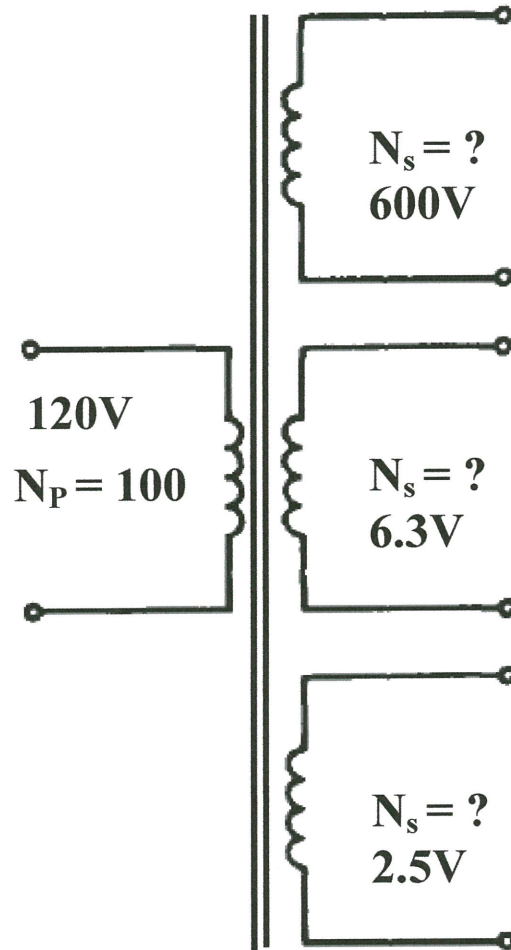
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FINAL EXAMINATION

SEMESTER / SESI : SEM 1 / 2013/2014
SEMESTER / SESSION

KURSUS : ASAS ELEKTRIK DAN
COURSE ELEKTRONIK

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RAJAH S6(e) / FIGURE Q6(e)

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FINAL EXAMINATION













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COURSE ELEKTRONIK

PROGRAM: 2 DAM / 3 DAM
PROGRAMME

KOD KURSUS: DAM32103
COURSE CODE

References :

Band Color	Digit	Multiplier	Tolerance
Black	 0	1	---
Brown	 1	10	±1%
Red	 2	100	±2%
Orange	 3	1,000	±3%
Yellow	 4	10,000	±4%
Green	 5	100,000	---
Blue	 6	1,000,000	---
Violet	 7	10,000,000	---
Gray	 8	100,000,000	---
White	 9	---	---
Gold	 ---	0.1	±5%
Silver	 ---	0.01	±10%
None	---	---	±20%