SECTION A : 75 MARKS
BAHAGIAN A : 75 MARKAH

INSTRUCTION
This section consists of **THREE (3)** structured question. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **TIGA (3)** soalan struktur. Jawab **SEMUA** soalan.*

QUESTION 1
SOALAN 1

CLO1
C3

a) Calculate the total resistance R_T, based on Figure 1 from point A to B.
   Kirakan jumlah rintangan R_T, berdasarkan kepada Rajah 1 dari titik A ke B.
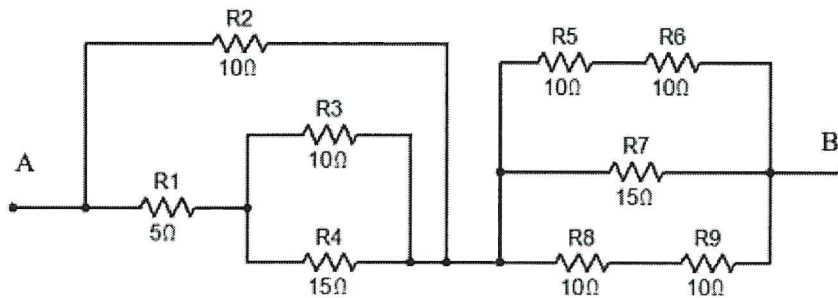

Figure 1(a)/Rajah1(a)

[8 marks]
[*8 markah*]

b) Refer to the circuit Figure 1(b), calculate:
   Rujuk litar di Rajah 1(b), kirakan:

   i. Total resistance R_T
      Jumlah rintangan R_T

   ii. Total current I_T
       Jumlah arus I_T

   iii. Current through R_2
        Arus melalui R_2

   iv. Voltage drops across R_4
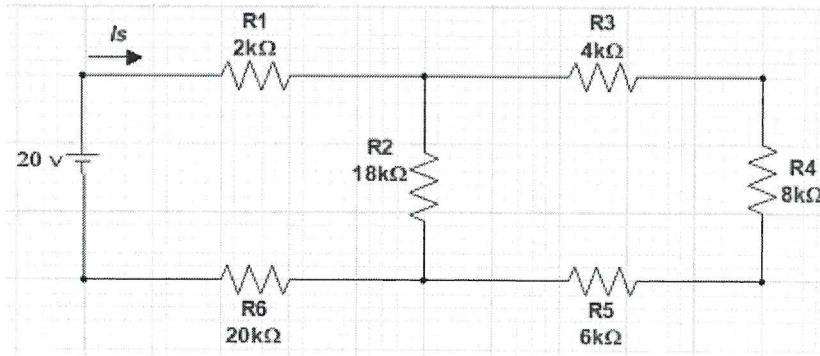   *Voltan susut merentasi R_4*

CLO1
C3

Figure 1(b)/*Rajah 1(b)*

[8 marks]
[*8markah*]

CLO1
C3

c) Based on Figure 1(c), by using Delta – Star Transformation, calculate current flowing through resistance 10Ω .
Berdasarkan Rajah 1(c), menggunakan transformasi delta-bintang kira arus yang melalui perintang 10Ω.
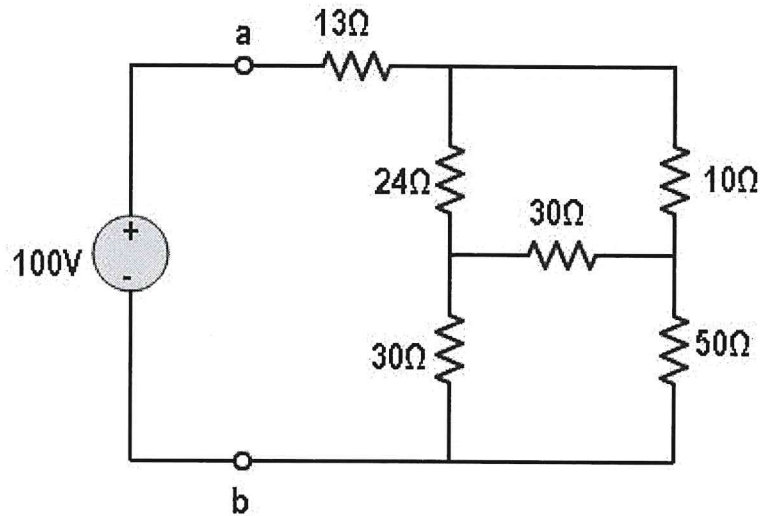

Figure 1(c)/Rajah 1 (c)

[9 marks]
[*9 markah*]

QUESTION 2
SOALAN 2

CLO1
C3

a) By referring to the Figure 2(a) below, calculate:
    Merujuk Rajah 2(a) di bawah, kirakan:

   i) Equivalent resistance of the circuit, R_{Total}
      Rintangan setara litar, R_{Total}

   ii) Current from supply, Is
       Arus dari bekalan, Is

   iii) Current through resistor R3=150Ω
        Arus melalui R3=150Ω

   iv) Voltage drop across resistor R5=220Ω,
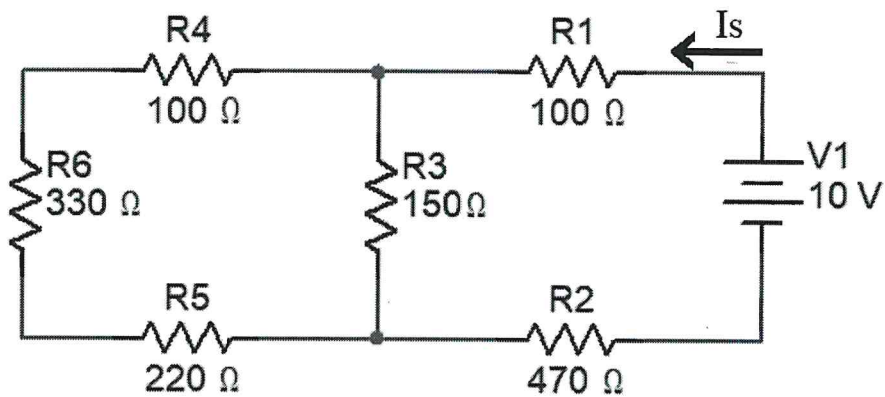   *Voltan susut merentasi R5=220 Ω*

Figure 2(a) / *Rajah 2(a)*

[8 marks]
[*8 markah*]

4

CLO1
C3

b) Calculate the total capacitance C_{XY} of the network in Figure 2(b).
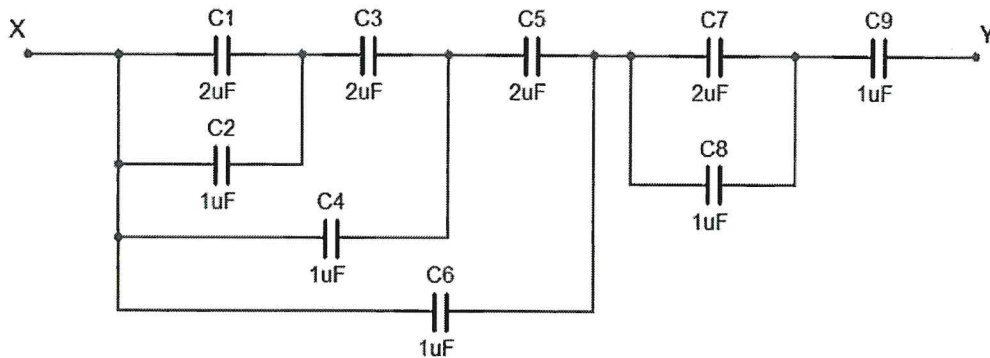   *Kira jumlah kemuatan C_{XY} bagi rangkaian dalam Rajah 2(b).*

Figure 2(b) / *Rajah 2(b)*

[8marks]
[*8 markah*]

CLO1
C3

c) Refer to Figure 2(c), a capacitor 100μF is charged to a voltage of 20V and has a resistance of 470 ohm. Calculate:
   Merujuk kepada Rajah 2(c), satu kapasitor 100μF dicas pada voltan 20V dan mempunyai rintangan 470 ohm. Kirakan:

   i. Instantaneous value of current i_C when t = 47ms
      Nilai arus seketika, i_C apabila t = 47 ms

   ii. Time taken to make the instantaneous value of charging voltage equals to 10V
       Masa yang diambil untuk menjadikan nilai voltan pengecasan bersamaan dengan 10V
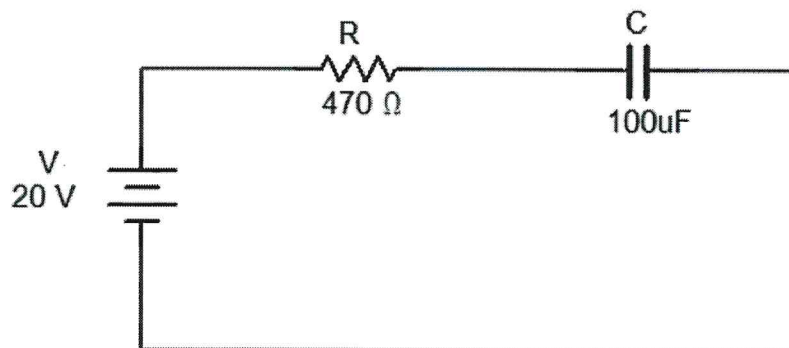

Figure 2(c) / Rajah 2(c)

[9 marks]
[*9 markah*]

QUESTION 3
SOALAN 3

CLO1
C3

(a) Calculate the total inductance of the inductive circuit in Figure 3(a)

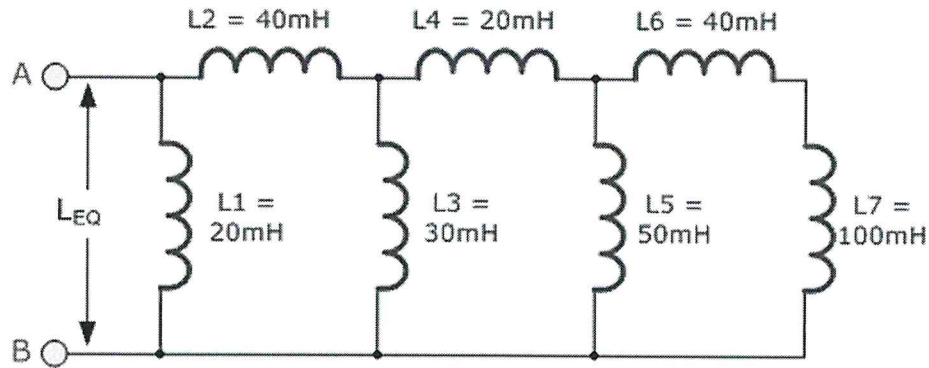*Kirakan jumlah kearuhan bagi litar inductor pada Rajah 3(a).*

Figure 3(a)/*Rajah 3(a)*

[8marks]
[8 *markah*]

(b) A coil which has an inductance of 40mH and a resistance of 2Ω is connected to form a LR series circuit in Figure 3 (b). If they are connected to a 20V DC power supply, calculate:

CLO1
C3

Satu gegelung mempunyai kearuhan sebanyak 40mH dan rintangan 2Ω disambung pada litar siri LR pada Rajah 3(b). Jika litar ini disambung pada bekalan kuasa DC 20V, kirakan :

i. Time constant, τ.
   Masa tetap, τ.

ii. Maximum current of inductance.
    Arus aruhan maksima

iii. Time for current rising to maximum.
     Masa untuk arus mencapai maksima

iv. Instantaneous rise current in inductor after the switch is closed for 20ms.
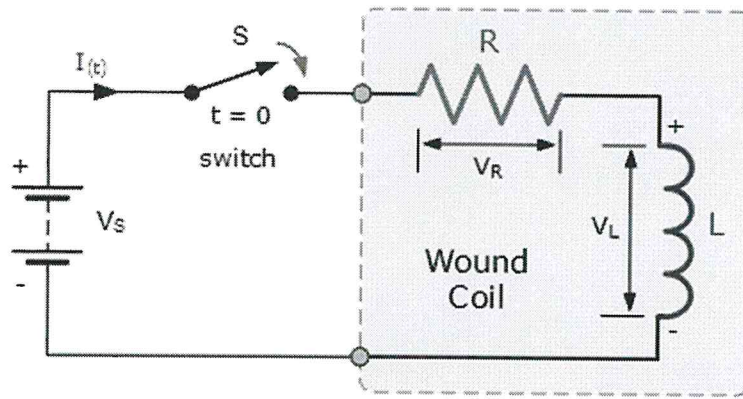   *Masa untuk arus seketika dalam peraruh menaik ketika suis ditutup selama 20ms.*

Figure 3(b)/*Rajah 3(b)*

[8 marks]

[8 *markah*]

(c) A coil is uniformly wound on a toroidal core. Given the value of $\phi = 0.5\mu Wb$, N=600 turns, cross sectional area, A=1 cm² and current, I=2A. Calculate magnetomotive force (m.m.f), winding flux density, the reluctance of the magnetic flux path and magnetic field strength when length, l = 0.3 m.

Sebuah gegelung dibalut dengan teras toroid. Diberi nilai ϕ = 0.5μWb, N= 600 lilitan, luas permukaan rentas, A=1 cm² dan arus, I=2A. Kirakan daya gerak magnet, ketumpatan fluks lilitan, keengganan bagi laluan fluks magnet dan kekuatan medan magnet apabila panjang, l = 0.3 m.

[9 marks]

[9 *markah*]

CLO1

C3

SECTION B : 25 MARKS
BAHAGIAN B : 25 MARKS

INSTRUCTION:

This section consists of **ONE (1)** essay question. Answer **ALL** question.

ARAHAN:

Bahagian ini mengandungi SATU (1) soalan esei. Jawab SEMUA soalan.

CLO1
C3

QUESTION 1
SOALAN 1

Based on Figure B1, calculate the value of current flow I_L through 70kΩ resistor using Thevenin and convert to Norton equivalent circuit.

Berdasarkan Rajah B1, kirakan nilai arus I_L yang melalui perintang 70kΩ menggunakan Theorem Thevenin dan tukarkan kepada litar setara Norton.
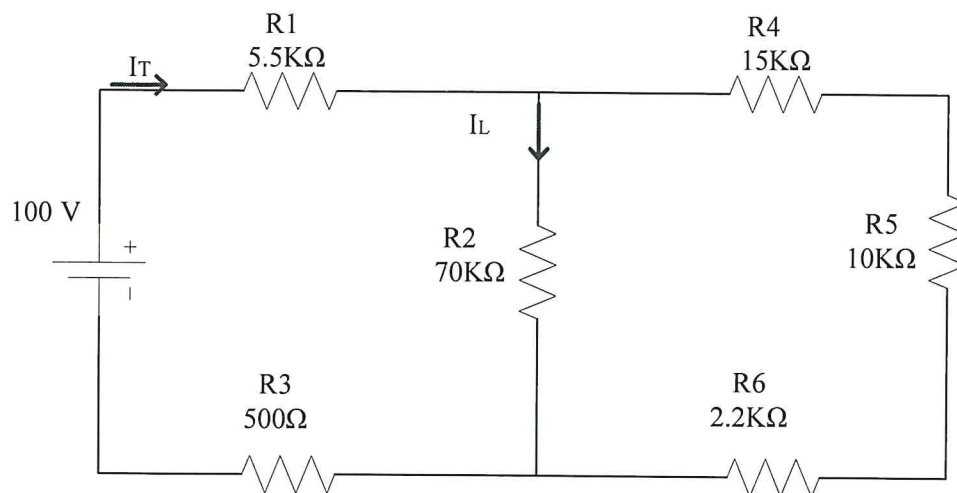

Figure B1/*Rajah B1*

[25 marks]
[*25 markah*]

SOALAN TAMAT