QUESTION 1

An e.m.f. of 200V was connected across a resistor and the current flows is 5A. What is the power dissipation in the resistor? Give your answer in **kilowatt.** (2 marks)

QUESTION 2

In the Figure 3, each cell having an e.m.f. 1.45V. Determine the composition value of e.m.f. for that particular cell configuration.

(2 marks)

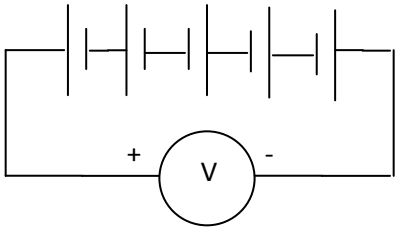


Figure 3

QUESTION 2

Three cells are connected in series. E.m.f and internal resistance for each cell is 1.5V and 0.05Ω. Find :

i. Total e.m.f
ii. Total resistance if load resistance is 25Ω. (3 marks)

QUESTION 4

For Figure B(1), by assuming the internal resistance of each cells is 0.03Ω and connected to load resistance of 15Ω. Find the total resistance.

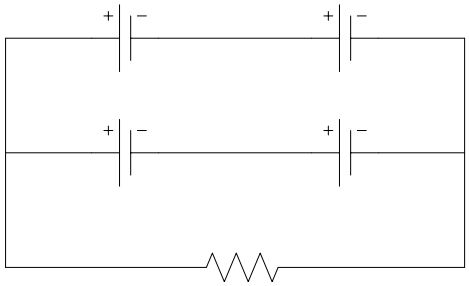


Figure B(1)

(3marks)

QUESTION 5

Determine the resistance of 120m of copper cable having cross sectional area of 40mm^2 if the resistivity of copper is 1.7×10^{-8} Ωm (3 marks)

QUESTION 6

a. State the formula of Ohm's Law (1 marks)
b. Give TWO (2) relationship between current, voltage and resistance. (2 marks)

QUESTION 7

Refer to Figure 4, state the relationship between the voltage drops and load current, when the value of resistance is fixed. (2 marks)

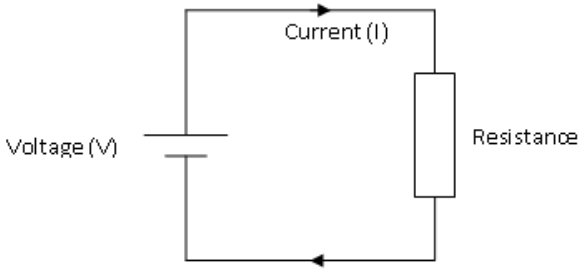


Figure 4

QUESTION 8

Based on Figure 5, calculate the equivalent resistance, R_T between point A and B. (3 marks)

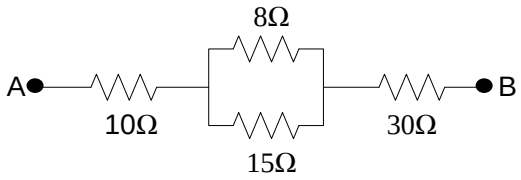
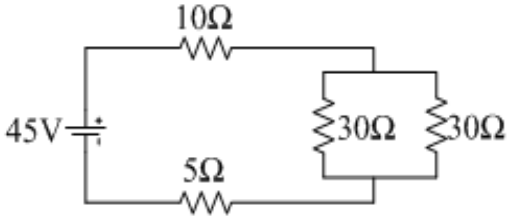


Figure 5

QUESTION 9

Based on the Figure B(2), calculate the total resistance and the total current.

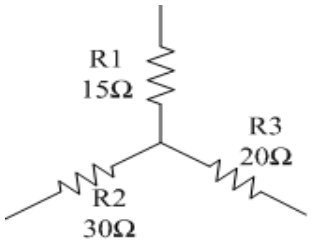


(3 marks)

Figure B(2)

QUESTION 10

Concert the Star Connection in Figure B(3) to the Delta connection and find the resistance value.



(3 marks)

Figure B(3)

QUESTION 11

From the Figure B(4), derive the equation for loop 1 and loop 2 using Kirchhoff's Voltage Law.

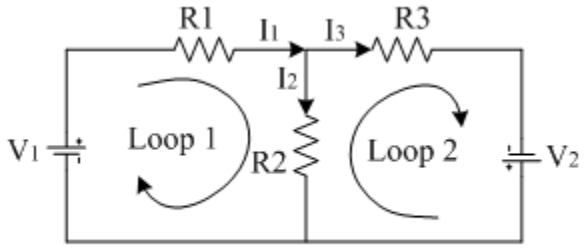


Figure B(4)

(3 marks)

QUESTION 12

Draw the Thevenin equivalent circuit. (2 marks)

QUESTION 13

Base on Figure B(4), calculate the value of R_L if current flow the circuit is 0.15A.

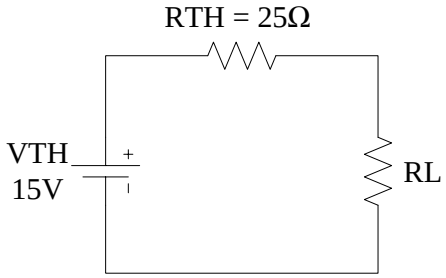


Figure B(4)

(3 marks)

QUESTION 14

Base on Figure B(5), calculate current flow through R = 15Ω by using Norton's Theorem

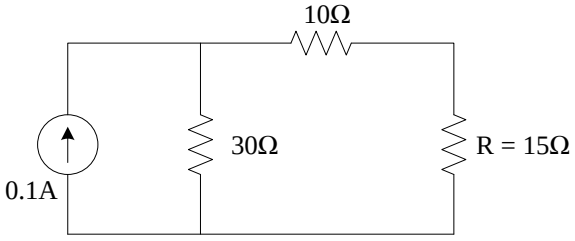


Figure B(5)

(3 marks)

QUESTION 15

Determine Norton's equivalent resistance, R_N for the circuit in Figure 6. (3 marks)

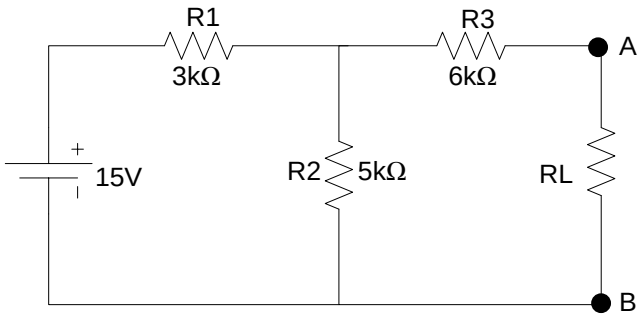


Figure 6

QUESTION 16

One capacitor 15pF was connected in series with resistor 0.2MΩ and d.c voltage 220V. Determine the:

a) Time constant
b) Early current charge. (2 marks)

QUESTION 17

A dimension of two square plate capacitor is 3cm. Calculate electric flux density if capacitor charge is 60C. (3 marks)

QUESTION 18

A ceramic capacitor has an effective plate area of $2cm^2$ separated by 0.1mm of ceramic of relative permittivity 150. Calculate the capacitance of the capacitor. (assume $\varepsilon_0 = 8.85 \times 10^{-12}$)

(3 marks)

QUESTION 19

One capacitor 0.5μF connected in series with 680kΩ and dc voltage 180V. Determine:

i. Time constant
ii. Initial current charge

(3 marks)

QUESTION 20

Based on Figure 7, determine the composition value of capacitor (C_T) in that particular arrangement. (3 marks)

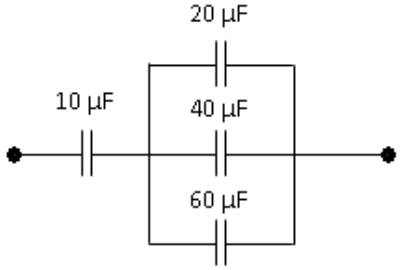


Figure 7

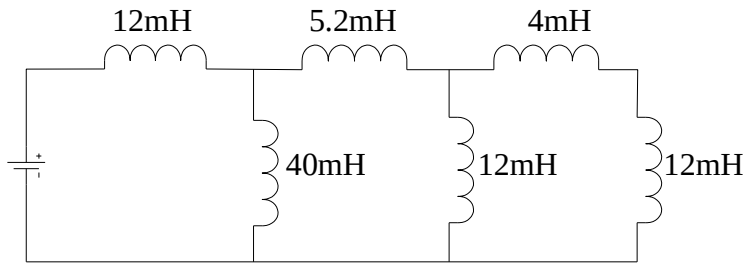
QUESTION 21
State the definition of inductance and give it's unit.

(2 marks)

QUESTION 22
A 30mH inductor is connected in series with 10Ω resistor. The circuit is supplied with 10V. Determine the energy stored in the inductor. (3 marks)

QUESTION 22
A coil is wound with 800 turns. When a current of 5A flows, 0.02 mWb flux is produced. Calculate the inductance of the coil. (3 marks)

QUESTION 23
Find the equivalent inductance for Figure B(5).



(3 marks)

Figure B(5)

QUESTION 24
List **THREE (3)** factors that influence the value of inductance. (3 marks)

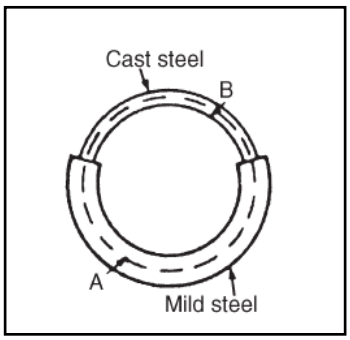
QUESTION 26
An inductor 0.5H is connected in series with a resistor 15Ω and DC voltage 60V. Determine:

a. Time constant of the circuit
b. Maximum current

(3 marks)

QUESTION 27
Figure 8 shows a ring formed using two different materials, cast steel and mild steel. By referring the information in Table 1, find the total m.m.f. of the ring.

(3 marks)



Dimensions:

Material	H(A/m)	l (m)
Mild steel	1200	400 x 10-3
Cast Steel	4500	300 x 10-3

Table 1

Figure 8

QUESTION 28

Sketch the magnetic field pattern associated with a solenoid connected to a battery and wound on an iron bar. Show the direction of the field. (3 marks)

QUESTION 29

Explain three rules used to determine the magnetic field direction.

(3 marks)

QUESTION 30

A closed magnetic circuit of copper contains a 25mm long path of cross-sectional area $10mm^2$ and 12mm path of cross-sectional area $8mm^2$. Determine the total reluctance of the circuit by assuming μr is 750 and is μo is $4\pi \times 10^{-7}$.

(3 marks)

QUESTION 31

Draw and label the Right Hand Rule to show the directional and magnetic flux direction.

(3 marks)

QUESTION 32

A closed magnetic circuit of cast steel contains a 5cm long path of cross-sectional area $1cm^2$ and 1cm path of cross-sectional area $0.5cm^2$. Determine the total reluctance of the circuit by assuming μ_r is 850 and μ_o is $4\pi \times 10^{-7}$

(3 marks)

QUESTION 33

State the method to determine the magnetic field direction. (3 marks)

QUESTION 34

List THREE(3) characteristics of magnetic force line (Flux). (3 marks)