KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Level : B.E.
Year : I
Time : 2 hrs. 30 mins.

15 APR 2025

Course : ENGG 112
Semester : II
F. M. : 40

SECTION "B"
[4 Q × 10 = 40 marks]

Attempt ***ANY FOUR*** Questions. Assume suitable data, if necessary. Symbol has their usual meaning.

1.

a. For the circuit shown in **Figure 1**, find the equivalent resistance. Assume all the resistor have resistance of **10Ω**. [5]

b. Determine the current through the source resistor $R_S$ of the network of **Figure 2** using **Nodal Analysis.** [5]

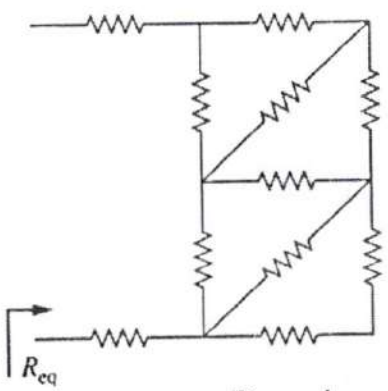


**Figure 1**

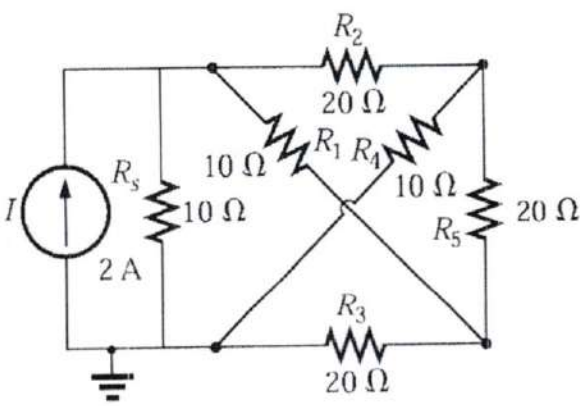


**Figure 2**

2.

a. Calculate the indicated currents and voltages shown in **Figure 3**. [5]

i. $I_S$
ii. $V_7$
iii. $I_5$

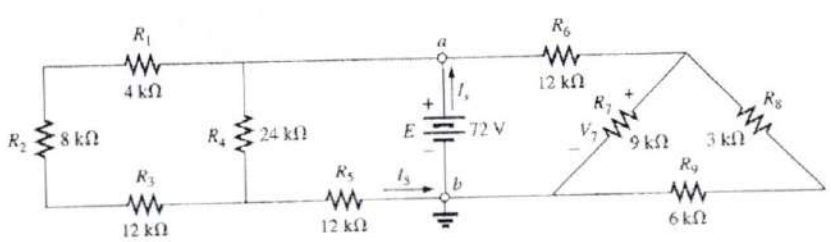


**Figure 3**

**P.T.O.**

b. For the network shown in **Figure 4** determine the **Thevenin equivalent** circuit for the network external to the load resistance $R_L$. [5]

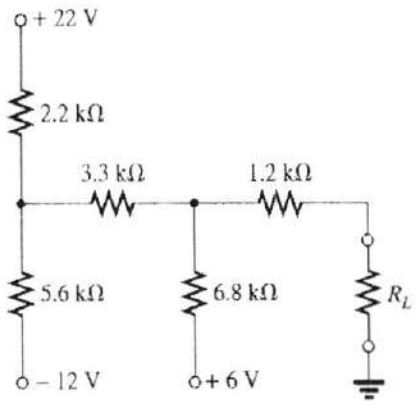


Figure 4

3.

a. Find the **average and RMS** value of the periodic waveform in **Figure-5**. [5]

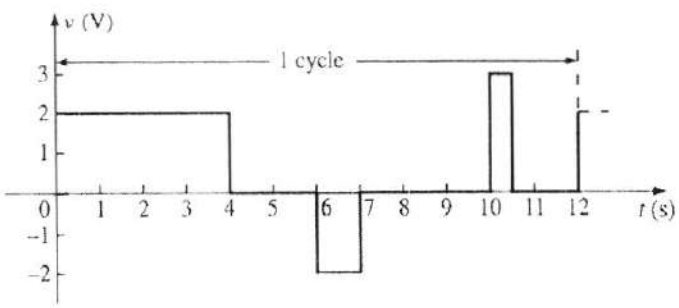


**Figure 5**

b. Using the **Mesh analysis** to determine the current through the resistor $R_1$ for the network of **Figure 6.** [5]

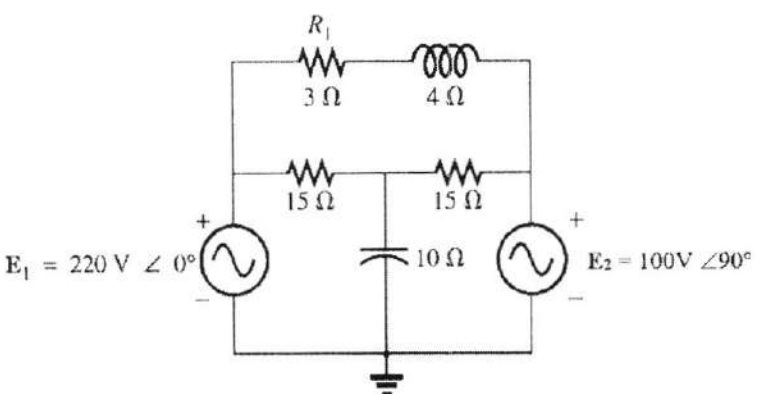


**Figure -6**

4.

a. An impedance of (4-j10)Ω is connected in parallel with an impedance (6+j8). The circuit is fed from a 230V, 50Hz supply. Find the current through each branch, total circuit current, total impedance, Power factor(p.f.), active power, reactive power and apparent power. Also draw the phasor diagram for voltages and currents in the circuit. [5]

b. Explain construction and working principle of DC generator. [5]

5.

a. For the iron-core transformer (k = 1) of **Figure-7** [5]

i. find the magnitude of the induced voltage $E_s$.

ii. find the maximum flux $\phi_m$.

iii. if the maximum flux passing through the core is 12.5 mWb, find the frequency of the input voltage.

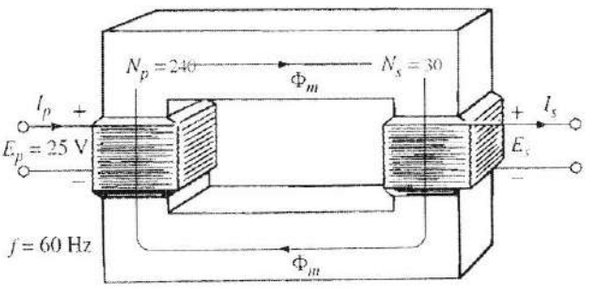


**Figure 7**

b. For the Δ-Y system as shown connected load in **Figure 8**. [5]

i. Find the total average power.

ii. Find the total reactive power.

iii. Find the total Apparent Power.

iv. Fin the power factor of the load.

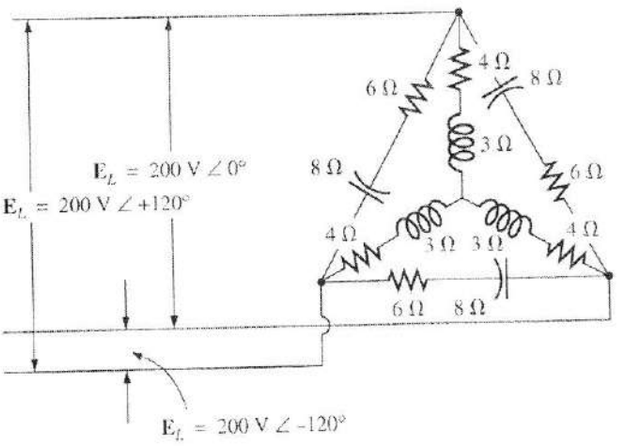


**Figure 8**