ENGR-2910-101

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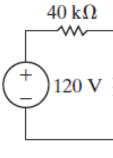
Due: 03/25/2020

**Homework-09**

**Question 1**

A close up of a clock

Description automatically generated

from left side, 1st, we get 120V÷40kΩ=3mA

parallel with 40kΩ and 60kΩ

2nd, combine those two resisters. We get 24kΩ  
A close up of a logo

Description automatically generated3mA×24kΩ=72V, series with 24kΩ, 4kΩ, and 2kΩ.

Add them up, we get 30kΩ.

A picture containing drawing

Description automatically generated72V÷30kΩ=2.4mA, direction ↑, combine this current with 8.4mA.

We get 8.4−2.4=6mA direction ↓.

Combine the two resisters (30kΩ and 90kΩ), we get 22.5kΩ

A picture containing shirt

Description automatically generated-6mA×22.5kΩ=-135V. and its series with 22.5kΩ, 2.5kΩ, and 15kΩ.

Combine resisters we have 40kΩ.

**I=V/R=−135V÷40kΩ = −3.375mA.**

(2) the voltage through 90kΩ is equal the voltage through 2.5kΩ+15kΩ

That will be **-3.375mA×(2.5k+15k) Ω=-59.0625V.**

The current though 90kΩ will be **59.0625V÷90kΩ=0.65625mA. direction ↑**

the current though 4kΩ will be **8.4mA-o.65625mA-3.375mA=4.36875mA, direction⟶**

the voltage drop though 60kΩ will be **4.36875mA× (4+2) kΩ-59.0625V=-32.85V**

the current flowing though left will be **[120V-(-32.85V)] ÷40kΩ=3.82125mA direction ↑**

**Question 2**A screenshot of a cell phone

Description automatically generated

Mesh b: 150(ib-ia) +10ib+40(ib- ic) =0

Mesh c: -300+40(ic-ib) +8ic =0

Mesh a: ia=-3A

So, we get ia=-3A, ib=-1.2A, ic=5.25A.

**Vab=-1.2A×10+5.25×8=30V**

**A close up of text on a white background

Description automatically generated**

Mesh a: 450+10(ia-ic) +40(ia-ib) +150ia=0

Mesh b: -300+40(ib-ia) +8(ib-ic) =0

Mesh c: 10(ic-ia) +8(ic-ib) =0

So, we get ia=-1A, ib=5.75A, ic=2A.

**I=ic=2A. R=30/2=15𝛀**

**A close up of text on a white background

Description automatically generated**

**Question 3**

**A picture containing object, clock

Description automatically generated**

Node c:

Node d:

We get i=80mA, and **V=112V.**

A close up of text on a white background

Description automatically generated

Mesh a: -280+2ia+2(ia-ic) =0

Mesh b: 0.2ia=ib, V+2(ib-ic) =0

Mesh c: 2(ic-ia) +2(ic-ib) +5.6(ic-id) =0

Mesh d: 5.6(id-ic) =0

So, we get **Ia=100mA, Ib=20mA, Ic=60mA, Id=60mA, i=id=60mA**

**R=112V/60mA=28/15k𝛀**

A close up of text on a white background

Description automatically generated

This picture is Norton equivalent.

**Question 4**

**A close up of a map

Description automatically generated**

V4=Vt-V1=Vt-150iΔ

V3=Vt-250iΔ

V2=250iΔ-V4=250iΔ-Vt+150iΔ

Node a: iΔ+

Node c:

From a, we get 200iΔ+250iΔ-Vt+150iΔ-2Vt+300iΔ=0

-3Vt+900iΔ=0, ⟹**Vt=300i∆**

From c: -50i∆+50iT-Vt+250i∆=0

Plug Vt=300i∆ in, we have 50iT-100i∆=0, ⟹**iT=2iΔ**

**R=Vt/iT=300i/2i=150Ω**

**A picture containing meter, drawing

Description automatically generated**

**Question 5**

**A close up of a map

Description automatically generated**

R=

**A picture containing text, map, drawing

Description automatically generated**

R=

**A close up of text on a white background

Description automatically generated**

Node a:

Node b:

Node c:

A: 4V1+V0=90

B: 12V1-V0-4V=0

C: -4V1-V0+4V=180