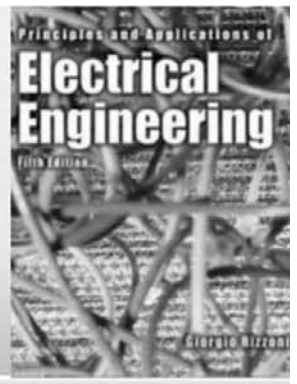
UNIVERSITY OF JORDAN
Faculty of Eng. and Tech.
Electrical Engineering Dept.
Instructor: Ziad R. Al-Khatib



Text Book **Principles and Applications of**

Electrical Engineering

Giorgio Rizzoni

5th Edition

Mc Graw Hill

Chapter 1, 2 & 3
First Exam. Review

First Exam.

أنا أقدر أنكم الأفضل، أما لو كنتُ طالباً بينكم لأنشدت مازحاً:

أخطيب قل لي ما العمل والـيأس قـد غـلب الأمـل
قيـل امتـحـان كـهربـاءٍ فحسبتـه حـان الأجـل
وفزعت من صوت المراقب إن تـنحنح أو سـعل
وأخذ يجول بين صفوفنا ويصول صولات البطل
أخطيب مـهـلاً يا أخـي ما كل مسألة تـحل
فمن الكـهربـاء نـافـع ومن الكهربـاء ما قتـل
قـد كنت أبـلـد طالـب و أنـا و ربـي لـم أزل
فـإذا أتتـك إجـابـتي فيها السـؤال بدون حـل
دعهـا وصحح غيرهـا والصفر ضعه على عجل

First Exam. Review Chapters 1, 2 &3.

- 20 March, 2013, Wednesday. Time 16:00 – 17:00. EE Dept.
- Chapters 1, 2 and 3.
- About ? - ? Questions.
  - ? Short Questions and answers (show your work!).
  - ? Analytical Questions and answers (show your work!).
  - For each part **write** the final answer inside the box with proper unit.
- Closed book and notes!
- Time limit one hour!!! (**plan your time**).
- Suggestions: Study lecture notes, slides, examples in slides and book, check your understanding problems and homework. **Practice!**

أنـــا الطـــالب: ..... . رقمي الجامعي: ..... .

أقسم بالله العظيم أنني سألتزم الصدق والأمانة أثناء أدائي هذا الامتحان وأنني لن أغش أو أحاول الغش، ولن اقدم المساعدة لأي شخص أو أتلقاها بأي وسيلة، طيلة فترة الامتحان. وان اجابتي على كامل الأسئلة ستكون نتاج جهدي الشخصي وحدي. وأنني أتعهد بتحمل كافة المسؤوليات والعقوبات القانونية، المنصوص عليها في أنظمة وتعليمات الجامعة، في حال عدم التزامي بذلك.

وعـــليـــه أوقـــــــع .....

CHAPTER 1: INTRODUCTION TO ELECTRICAL ENGINEERING.

PART ONE - CIRCUITS

CHAPTER 2: FUNDAMENTALS OF ELECTRIC CIRCUITS

النصيحة بعد المصيبة،
كالدواء بعد الموت.

”إِنَّ مِنَ البَيانِ لَسِحراً“

2.2 Charge, Current, and Kirchhoff's Current Law. (p. 28).
2.3 Voltage and Kirchhoff's Voltage Law. (p. 34).
Ground. (p. 35).
2.4 Electric Power and Sign Convention. (p. 39).
2.5 Circuit Elements and Their i-v Characteristics. (p. 42).
2.6 Resistance and Ohm's Law. (p. 43).
Open and Short Circuits. (p. 47).
Series Resistors and the Voltage Divider Rule. (p. 48).
Parallel Resistors and the Current Divider Rule. (p. 51).
Way-Delta (Y-Δ) Transformation (converting). (External notes).
2.7 Practical Voltage and Current Sources. (p. 61).
2.8 Measuring Devices. (p. 62).
The Ohmmeter. (p. 62).
The Ammeter. (p. 62).
The Voltmeter. (p. 63).
The Power meter (Wattmeter). (p. 64).

أنا لا أكتبُ الأشعارَ فالأشعارُ تكتُبُني،
أُريدُ الصَمتَ كَي أحيا،
ولكنّ الذي ألقاهُ يُنطِقُني، مطر

Homework Ch.2 (pp. 65 – 79):
3, 8, 13, 17, 19, 24, 27, 37, 38 41, 45, 47, 60, 67, 69, 72, 75.

CHAPTER 3: RESISTIVE NETWORK ANALYSIS

3.1 Network Analysis. (p. 82).
3.2 The Node Voltage Method. (p. 83).
Node Analysis with Voltage Sources. (p. 90).
3.3 The Mesh Current Method. (p. 93).
Mesh Analysis with Current Sources. (p. 98).
3.4 Node and Mesh Analysis with Controlled Sources. (p. 100).
Remarks on Node Voltage and Mesh Current Methods. (p. 105).
Super Nodal and Super Mesh Circuit Analysis. (External Notes)
3.5 The Principle of Superposition. (p. 105).
3.6 One-Port Networks and Equivalent Circuits. (p. 108).
Thévenin and Norton Equivalent Circuits. (p. 109).
Determination of Norton or Thévenin Equivalent Resistance. (p. 111).
Computing the Thévenin Voltage. (p. 114).
Computing the Norton Current. (p. 118).
Source Transformations. (p. 120).
~~Experimental Determination of Thévenin and Norton Equivalents. (p. 123).~~
3.7 Maximum Power Transfer. (p. 126).
~~3.8 Nonlinear Circuit Elements. (p. 129).~~

First Exam

Homework Ch.3 (pp. 134 – 147):
4, 7, 11, 12, 16, 18, 20, 26, 31, 40, 41, 42, 51, 52, 54, 55, 56, 58, 60, 73, 75.

First Exam. 2nd Term 2012. "إِنَّ مِنَ البَيانِ لَسِحراً"

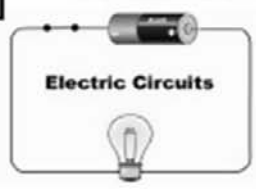
Electrical Engineering Department
Faculty of Engineering & Technology
University of Jordan

الاســم: التَقوى تفوق العِلم شرفاً .....

St. No.: ..... **Ser. No.:** ..... **Sec.:** .....

40

Electrical Circuits (EE203)
First Exam. 2nd Term, 2011-2012
Mar. 7, 2012. ⌛ 5:15 – 6:15



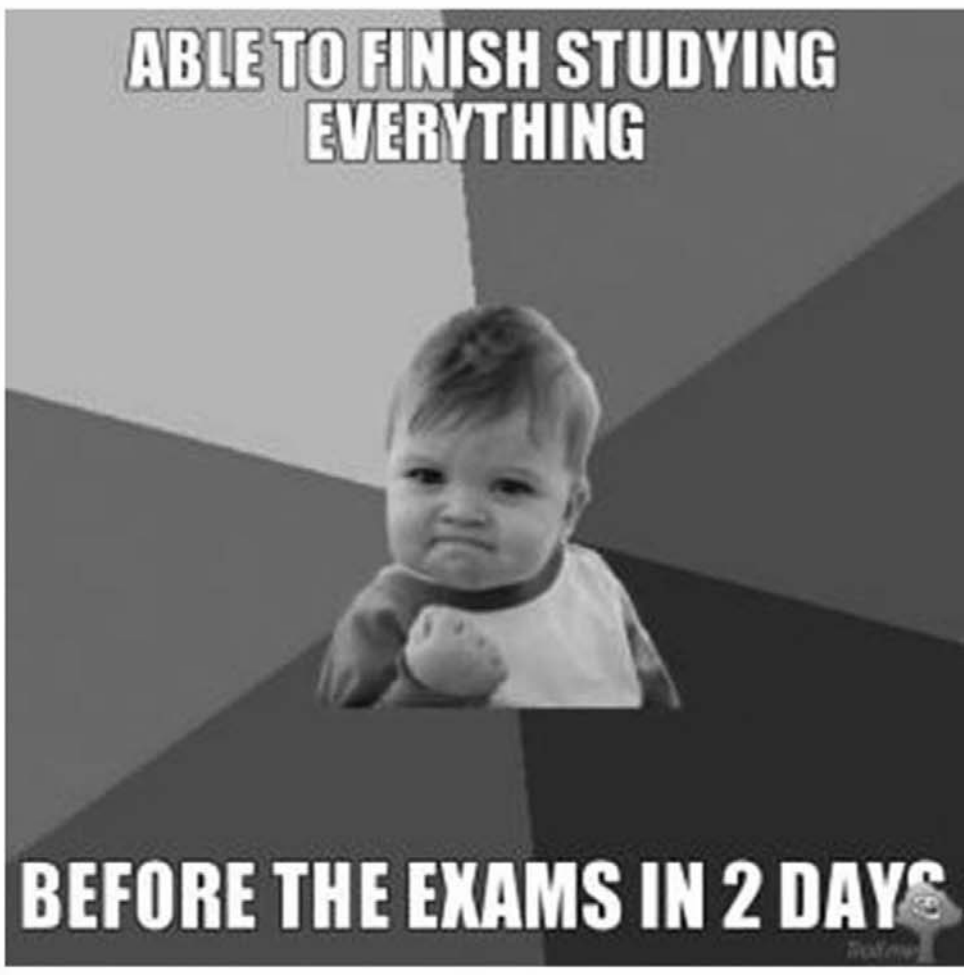
Instructor	Ziad Al-Khatib ☐	Reem Debes ☐

- *Switch **off** your mobile. **No** advanced calculators or mobile phones are allowed.*
- *Hand over your exam sheets with your scratch paper.*
- *Show work and **write** the final answer & units inside the box, to get credit on problems.*
- *Answer all problems directly on the exam. sheet only.*
- *Feel free to use the blank space on the exam sheets for scratch work.*
- ***Please keep*** ☺ & 👂. ***Don't*** 👁, 🗣, **?** & ☹. Take your ⌛ & *enjoy yourself.*

لَو كـانَ لِلعِـلمِ دونَ الـتُقى شَـرَفٌ ... لَكـانَ أشـرَفُ خَـلـقِ اللهِ إبـلـيسُ

نُحِبُّ الحَيَاةَ إذَا مَا اسْتَطَعْنَا إلَيْهَا سَبِيلاً
وَنَسْرِقُ مِنْ دُودَةِ القَزِّ خَيْطاً لِنَبْنِي سَمَاءً لَنَا وَنُسَيِّجَ هَذَا الرَّحِيلاَ
وَنَفْتَحُ بَابَ الحَدِيقَةِ كَيْ يَخْرُجَ اليَاسَمِينُ إلى الطُّرُقَاتِ نَهَاراً جَمِيلاَ درويش

First Exam. 2nd Term 2012.



دائماً يستطيع الاطفال أن يعلموا الكبار ثلاثة أشياء: السـعادة بـلا سـبب، الإنشغال بشئ ما، معرفة كيف يطلبون بكل قوة ما يرغبون فيه. باولو كويلو

First Exam. 2nd Term 2012.

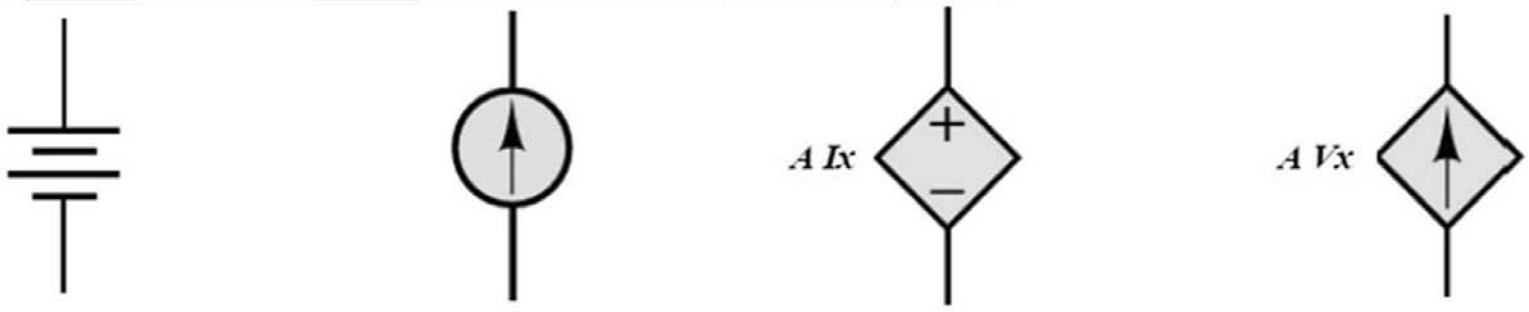
Q1-*(2Pts)* Suppose a **1.2 v** battery supplies **500 mA** for **5** seconds in a flashlight. If you assume that all the electrical energy is converted to light, during this time **Find:**

a- The light **power** has been produced. **b**- The **charge** has been transferred.

a-

b-

Q2-*(2Pts)* **Write** down the **name** for each electrical source symbol.

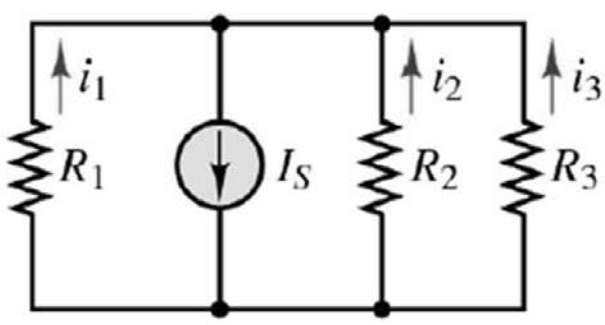


a- ..... **b-** ..... **c-**..... **d-** .....

First Exam. 2nd Term 2012.

Q3-*(4Pts)* In the circuit shown, I_S=**14**A, R_1= **1**Ω, R_2=**0.5**Ω, R_3=**0.25**Ω.

Find **a**- The **current** I_2. **b**- The dissipated **power** in R_2.



a-

b-

1/4

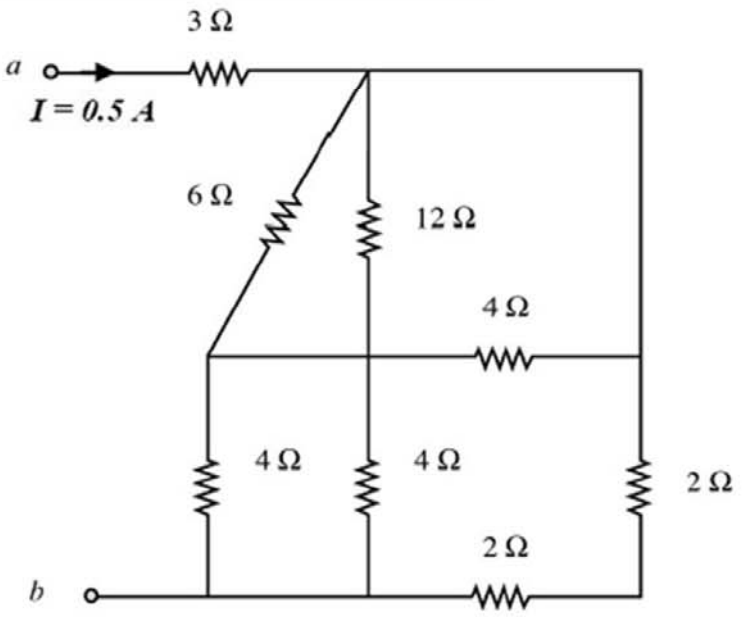
إذا رَأيْتَ نُيُوبَ اللّيْثِ بارزَةً فلا تَظُنّنّ أنّ اللّيْثَ يَبْتَسِمُ.

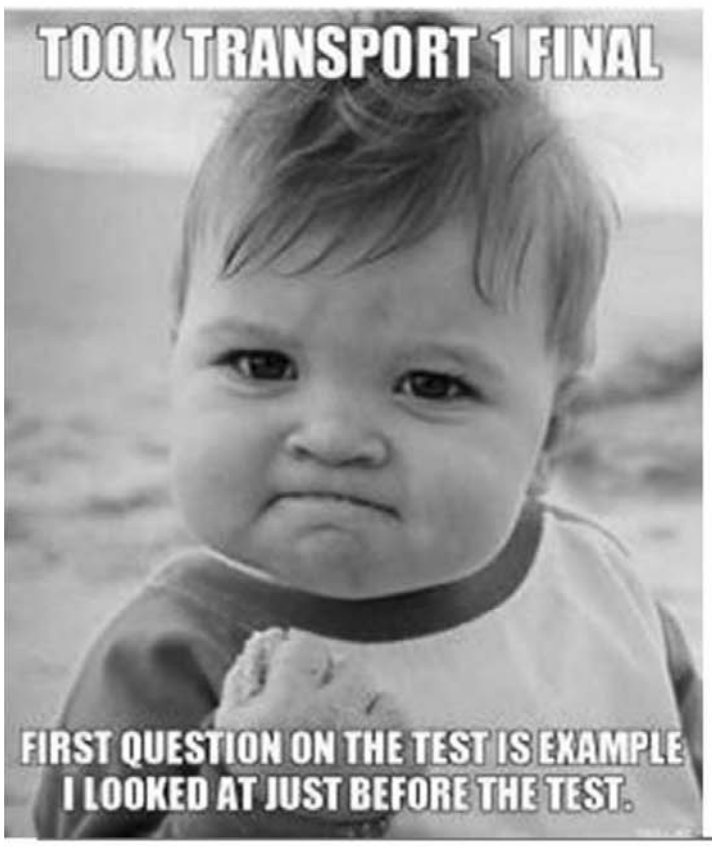
If you can see the lion's teeth,
do not think that the lion is smiling.

First Exam. 2nd Term 2012.

Q4-*(5Pts)* In the circuit shown **Find**: **a**- The **equivalent** resistance (R_{eq}) between a & b. **b**- The voltage ***Vab***

.





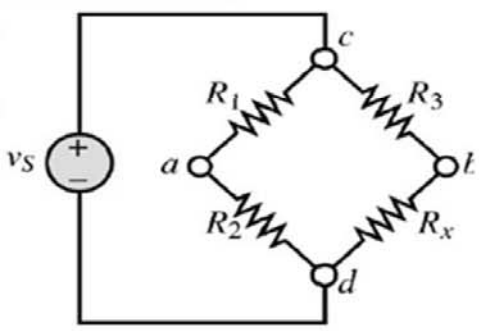
a-

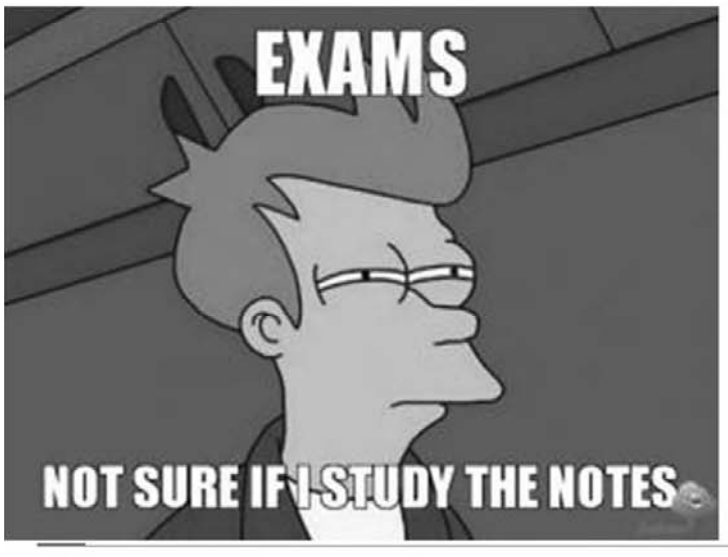
b-

First Exam. 2nd Term 2012.

Q5-*(5Pts)* In the Wheatstone bridge, Where: Vs =**12**V, R_1 = **10** kΩ, R_2 = **15** kΩ, R_3 = **0.1**MΩ. *By using a voltage division rule and KVL only.*

Find: **a**- The value of R_x if V_{ab} = **1.5**V. **b**- The value of V_{ab} if R_x = 100kΩ.





a-

b-

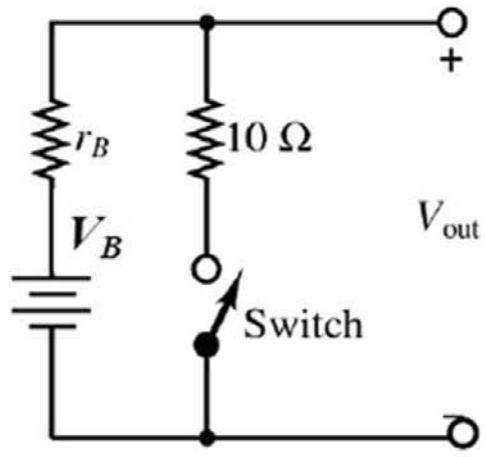
2/4

First Exam. 2nd Term 2012.

Q6-*(5Pts)* **Find** the internal resistance r_B of a NiMH rechargeable battery for the following measurements:

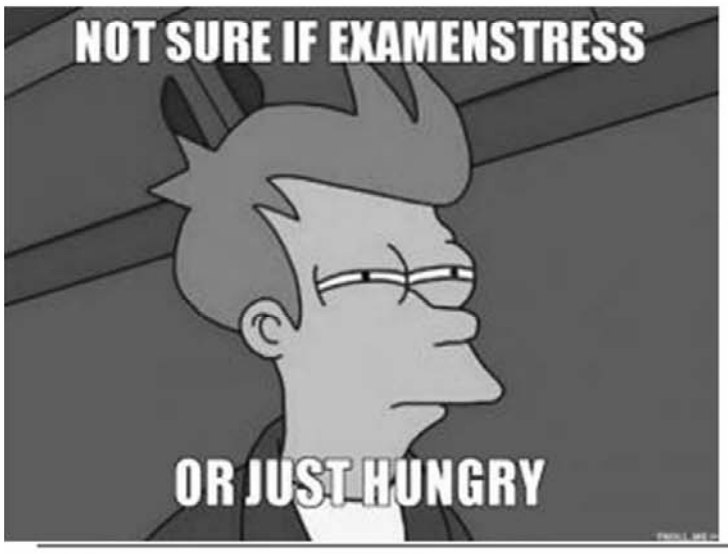
a- ***V*out**, is **1.25** V with the switch **open** and **1.2** V with the switch **closed**.

b- ***V*out** is **1.2** V with the switch **open** and **0.25** V with the switch **closed**.



a-

b-

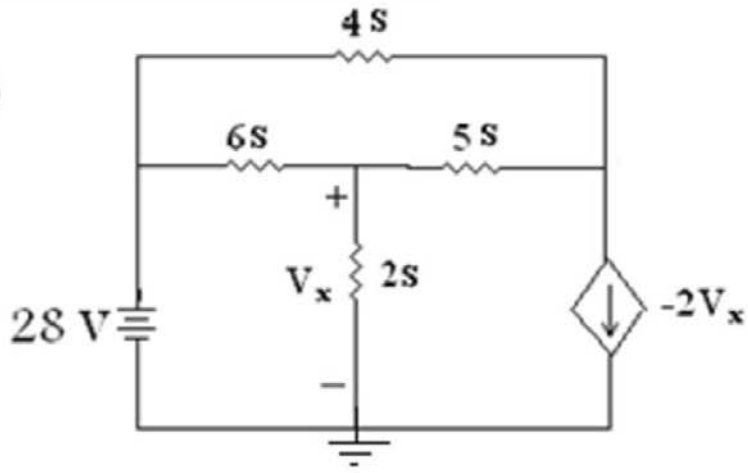


ومن لم يعانقْه شوْقُ الحياة تبخَّرَ في جوِّها واندثرْ
إذا ما طمحتُ إلى غايةٍ ركبتُ المُنى، ونسِيت الحذرْ
ومن يتهيب صعود الجبال يعش أبَدَ الدهر بين الحفرْ
أُبارك في الناس أهلَ الطموح ومن يستلذُّ ركوبَ الخطرْ
وألْعنُ من لا يماشي الزمانَ ويقنع بالعيْش عيش الحجَرْ
هو الكونُ حيٌّ، يحبُّ الحياة ويحتقر المَيْتَ, مهما كبُرْ
فلا الأفق يحضن ميْتَ الطيور ولا النحلُ يلثم ميْتَ الزهرْ

أبو القاسم الشابي

First Exam. 2nd Term 2012.

Q7-*(6Pts)* Use **Nodal Analysis** to find the **absorbed power** by the dependent source. (Note: **S = 1/Ω**, Conductance=1/Resistance)

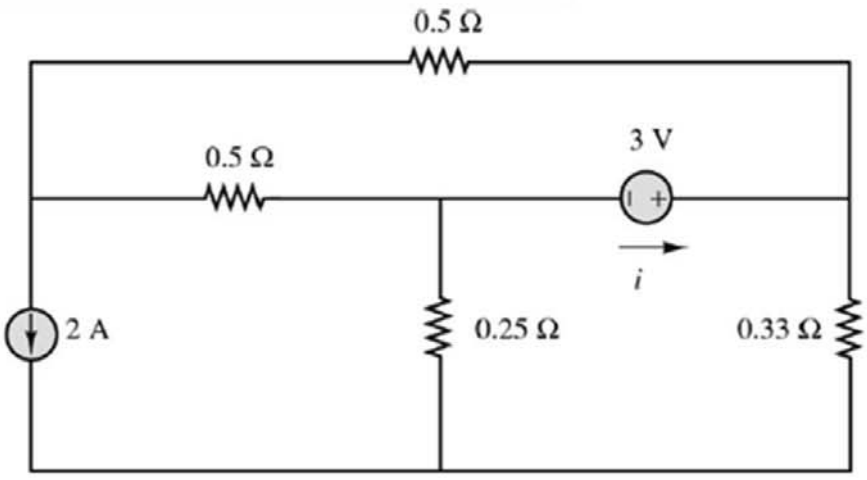


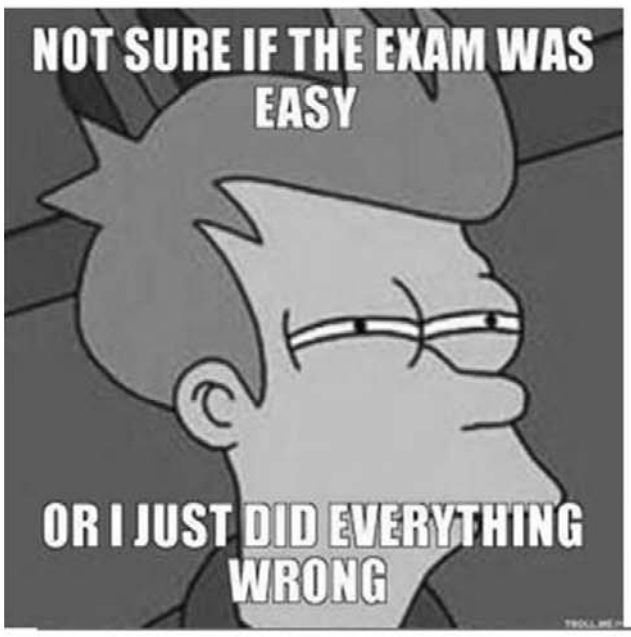
***P* =**

3/4

First Exam. 2nd Term 2012.

Q8-*(6Pts)* In the circuit shown use the **Mesh Analysis** to **find** the **delivered power** of the voltage source.

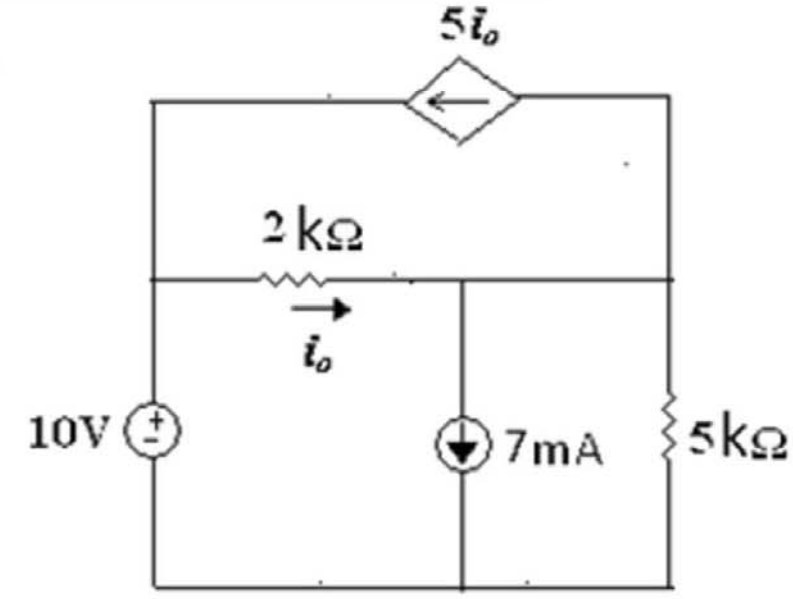




P =

First Exam. 2nd Term 2012.

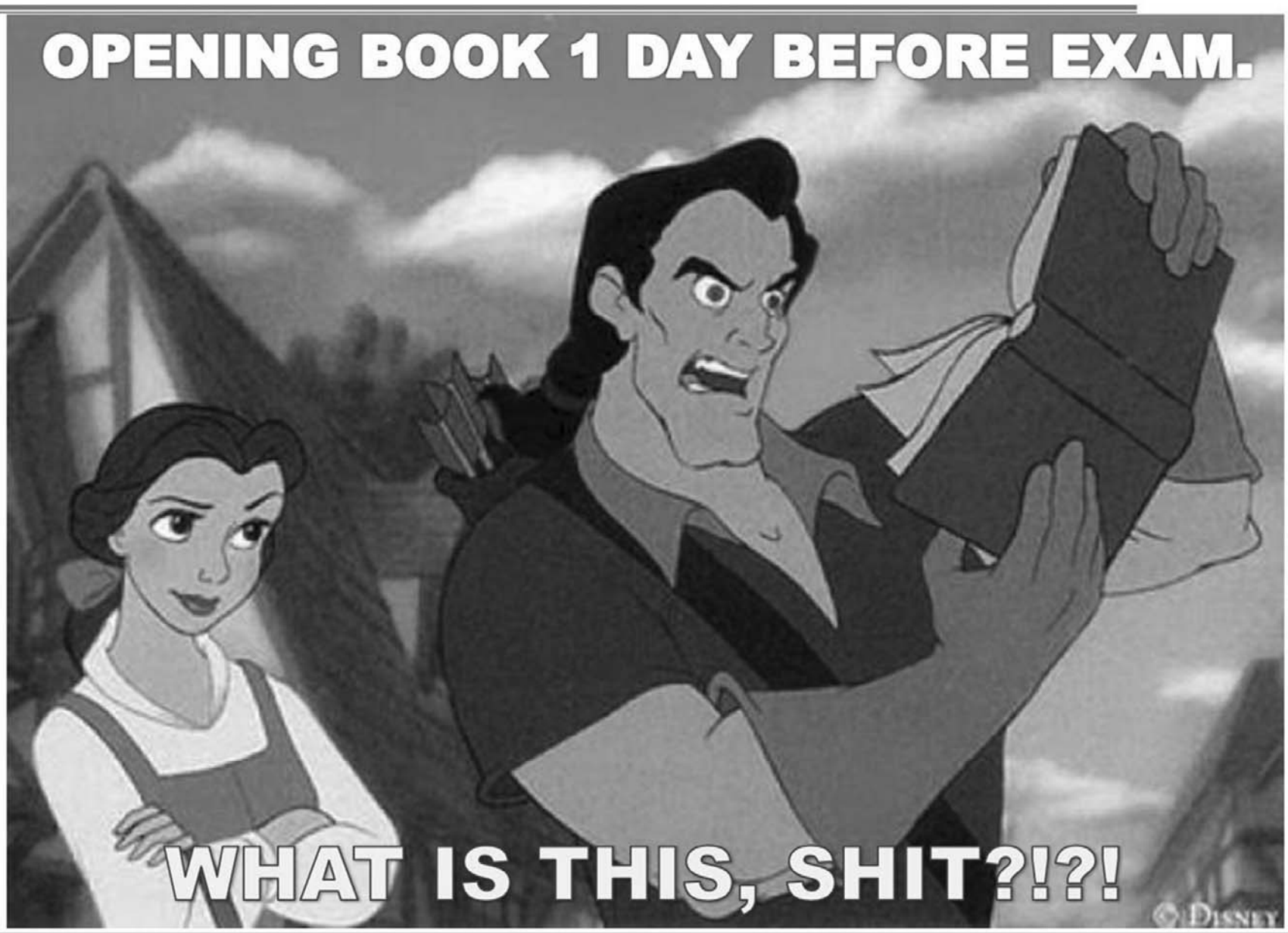
Q9-*(5Pts)* **Find** the **current** i_o in the circuit shown with an **appropriate** method (***Mesh*** *or* ***Nodal*** *analysis*).



i_0 =

Good Luck Don't cry ☹, Just try ☺ ... 4/4

First Exam. 1st Term 2013.



First Exam. 1st Term 2013.

Electrical Engineering Department
Faculty of Engineering & Technology
University of Jordan

الاســم: ……..……..

St. No.: …… **Seat No.**: ….. **Sec.**: …..

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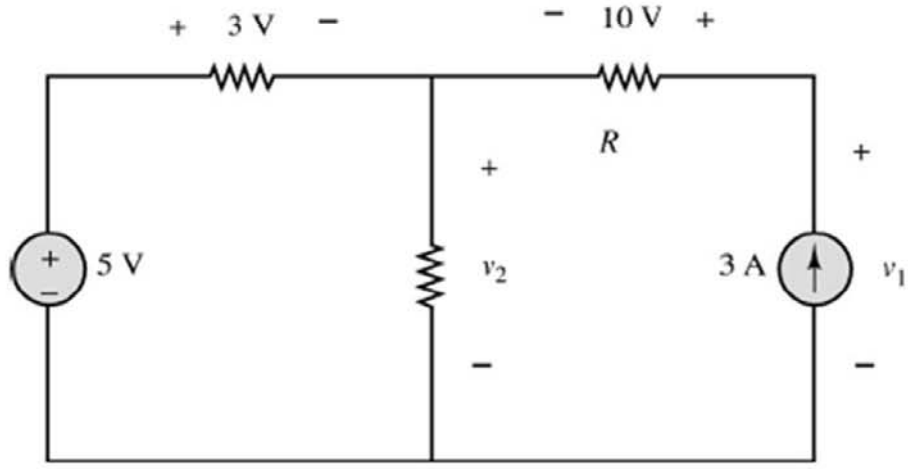
Electrical Engineering (EE203)
First Exam. 1st Term, 2012-2013
Oct. 17, 2012. ⌛ 5:15 – 6:15

Electrical Engineering

Instructor	Ziad Al-Khatib ☐	Reem Debes ☐

Q1-*(5Pts)* In the circuit shown, **Determine:**

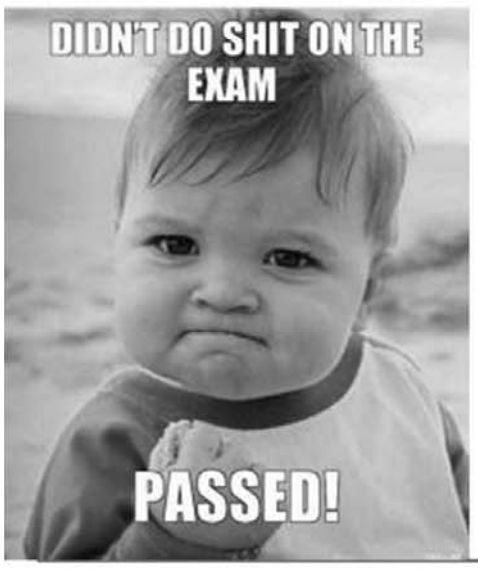
a) The **actual power** absorbed by **R.**
b) The **power** delivered by the **current source**.
c) If the power **rating** of the resistor **R** is **10W**. What happens to the resistor **R**?



a-

b-

c-

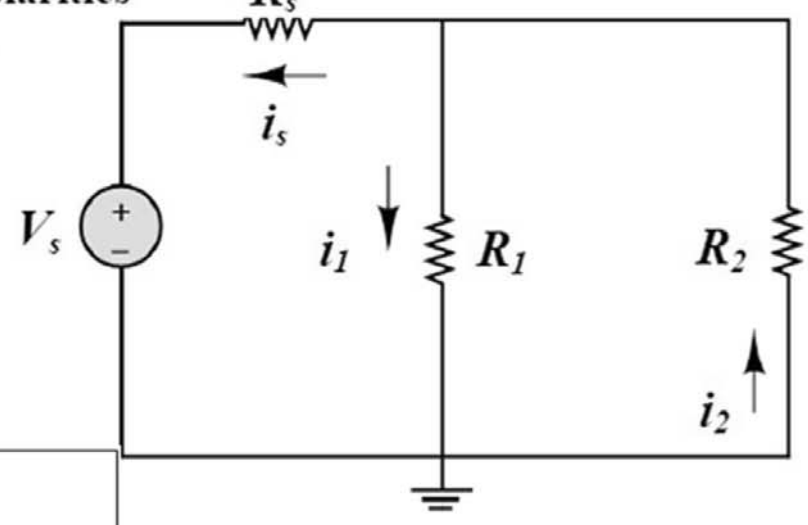


First Exam. 1st Term 2013.

Q2-*(2Pts)* **Sketch** the following: a) Ideal current source symbol. c) Practical current source circuit.
b) Current controlled voltage source symbol. d) Practical voltage source circuit.

a-	*b-*	*c-*	*d-*

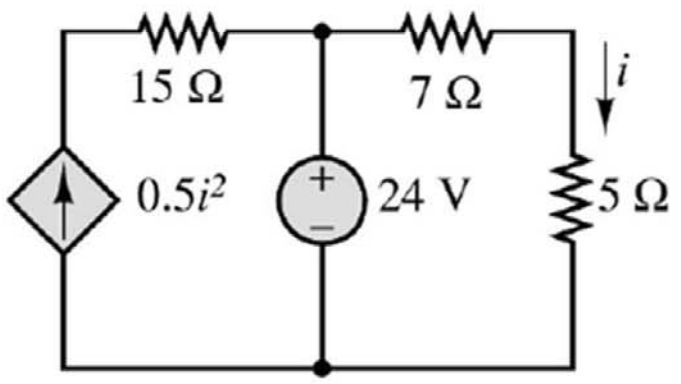
Q3-*(6Pts)* In the circuit shown, the **directions** of current and **polarities** of voltage have already been defined, where $i_2 = -0.5$A, R_2=30Ω. **Find**: The values of V_s and i_s.
a) R_s=30Ω, R_1=20Ω. b) R_s=30Ω, R_1 **Open ckt**.
c) R_s **Short ckt**., R_1=20Ω.



a)	*b)*	*c)*
V_s= i_s=	V_s= i_s=	V_s= i_s=

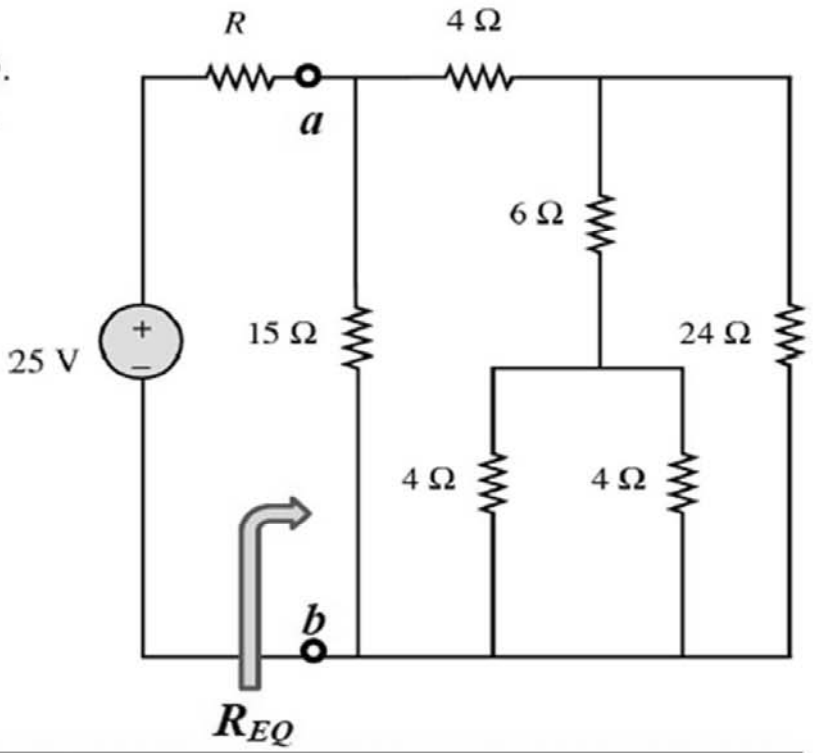
First Exam. 1st Term 2013.

Q4-*(5Pts)* In the circuit shown, **find** the **power** delivered by the **dependent** source.



P =

Q5-*(6Pts)* In the circuit shown, **find:**
a) The equivalent resistance R_{EQ} seen to the **right** of *ab*.
b) **R** if the **power** absorbed by the **15Ω** resistor is **15**W.

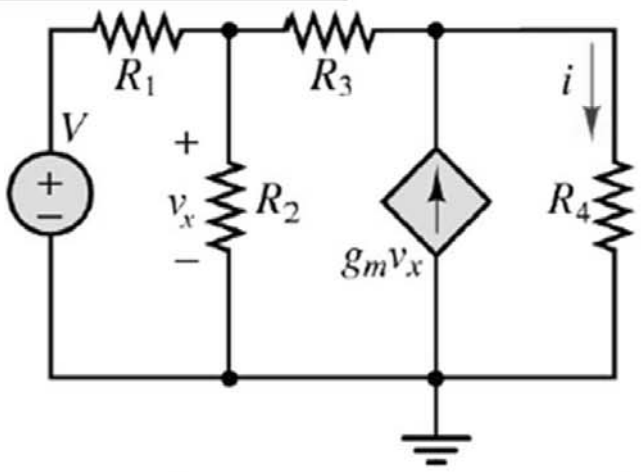


a-
b-

First Exam. 1st Term 2013.

Q6-*(6Pts)* In the circuit shown, $V = 5.6\text{V}$, $R_1 = 50\Omega$, $R_2 = 1.2\text{k}\Omega$, $R_3 = 330\Omega$, $R_4 = 440\Omega$, $g_m = 0.2\text{S}$.

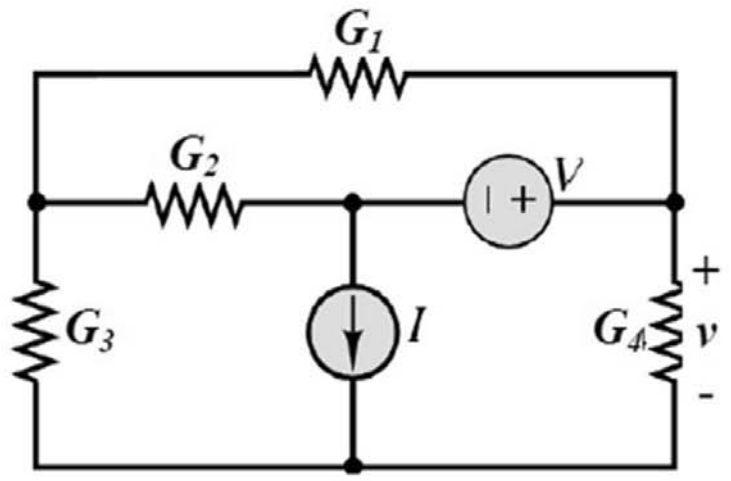
Use the **appropriate** method to **find** i.



$i =$

Q7-*(7Pts)* In the circuit shown, $V = 50\text{V}$, $I = 0.2\text{A}$, $G_1 = 0.01\text{S}$, $G_2 = 0.2\text{S}$, $G_3 = 50\text{mS}$, $G_4 = 0.02\text{S}$.

Use **nodal** voltage analysis to **find** v.

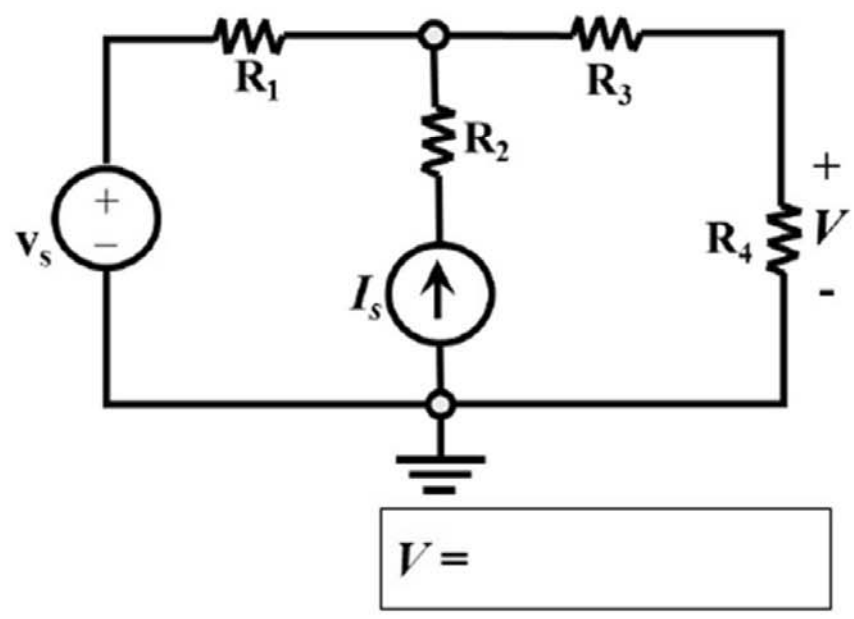


$v =$

First Exam. 1st Term 2013.

Q8-*(7Pts)* In the circuit shown. $v_s = 10\text{V}$, $I_s = 3\text{A}$, $R_1 = 3\Omega$, $R_2 = 1\Omega$, $R_3 = 5\Omega$, $R_4 = 2\Omega$.

Use **mesh** current analysis to **find** V.



$V =$

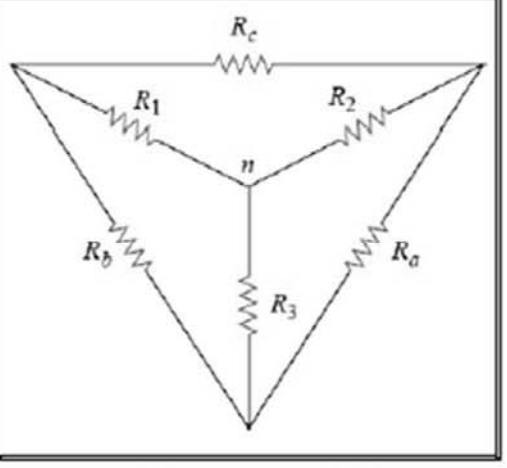
Good Luck

Don't cry ☹, Just try ☺ ...

4/4

First Exam. 2nd Term 2013.

Q1-*(6Pts)* **a**- In the table below, **Fill** in the blank (empty) cells; with proper mathematical **relationship.**

Function/Law	Relation	Function/Law	Relation
$i\,(q)$	$i =$	*Voltage division* $V_n(V_S, R_n, R_{EQ})$	$V_n =$
KCL		*Current division* $I_n(I_S, R_n, R_{EQ})$	$I_n =$
KVL		*Wye – Delta* ⇘	$R_b =$
R_{EO} *of Parallel Connection*	$R_{EQ} =$	*Delta – Wye* ⇘	$R_3 =$
Ohm's law	$V =$	⇧ ⇧ *Wye – Delta & Delta – Wye Transformation*	
Power (V)	$P =$		
Power (I)	$P =$		
Energy	$W =$		

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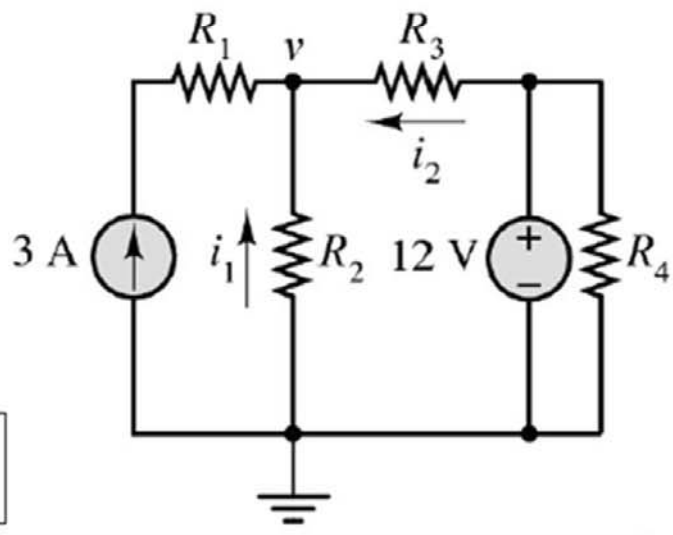
Q1-*(2Pts)* **b**- **Sketch** the following: **a)** Ohmmeter symbol. **b)** Current controlled current source symbol. **c)** Wattmeter (power meter) symbol. **d)** Practical current source circuit.

a-	*b-*	*c-*	*d-*

Q2-*(8Pts)* In the circuit shown, the **direction** of currents have already been defined, where: $R_1 = 24\ \Omega$, $R_2 = 10\ \Omega$, $R_3 = 5\ \Omega$, $R_4 = 6\ \Omega$. Use **KCL** , **KVL** and/or **Ohm's** law to **find** the:

a- Currents i_1 & i_2. **b**- Power supplied by each source.

c- Total power supplied, if the resistor R_2 is **short circuited**.



a)	*b)*	*c)*
$i_1 =$ $i_2 =$	$P_I =$ $P_V =$	$P_T =$

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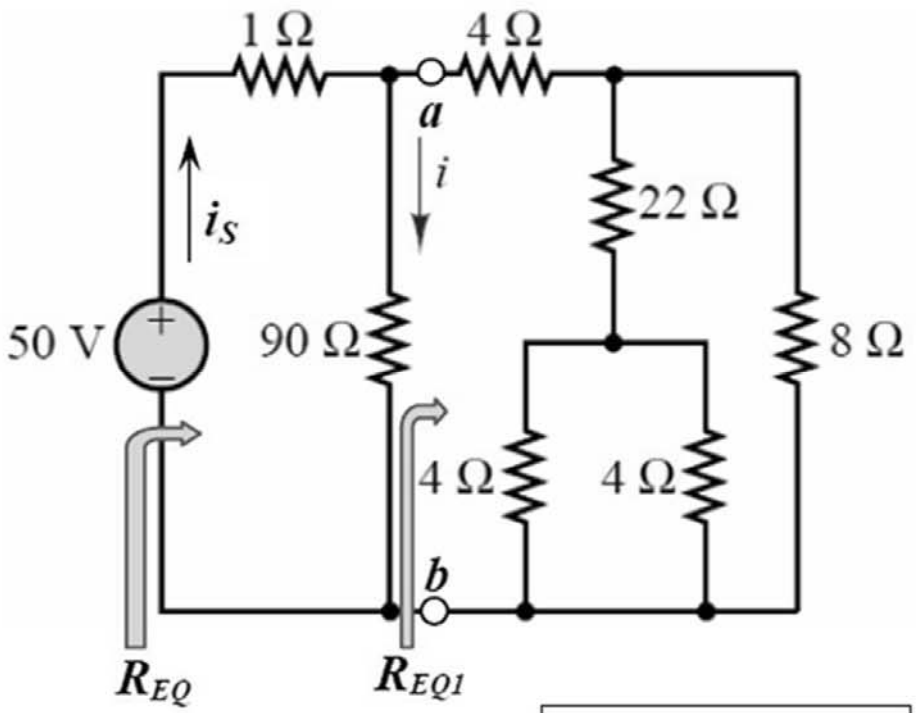
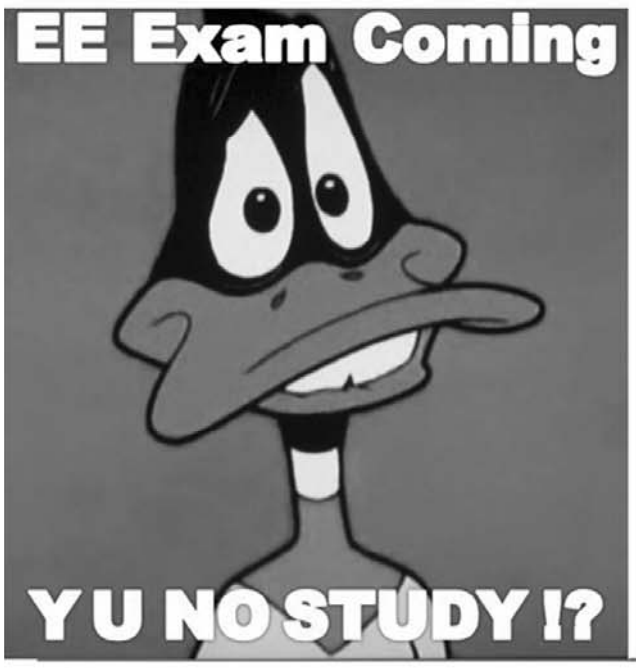
Q3-*(6Pts)* In the circuit shown, **find** the:

- **a**- Equivalent resistance: R_{EQ1} seen at the points **ab**, and R_{EQ} seen by the source.
- **b**- Source current i_S.
- **c**- Current i, by using **current division** technique; depends on the source current i_S.





a) R_{EQ1} =
R_{EQ} =

b) i_S =

c) i =

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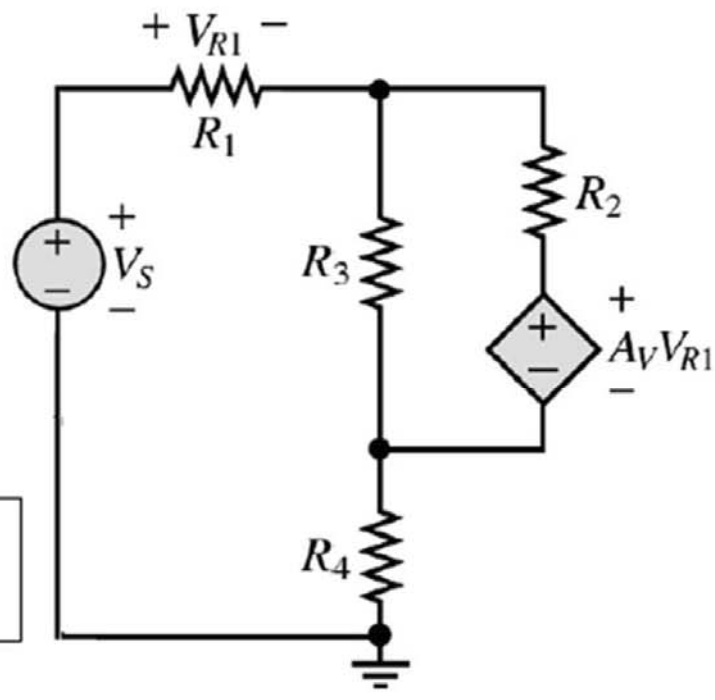
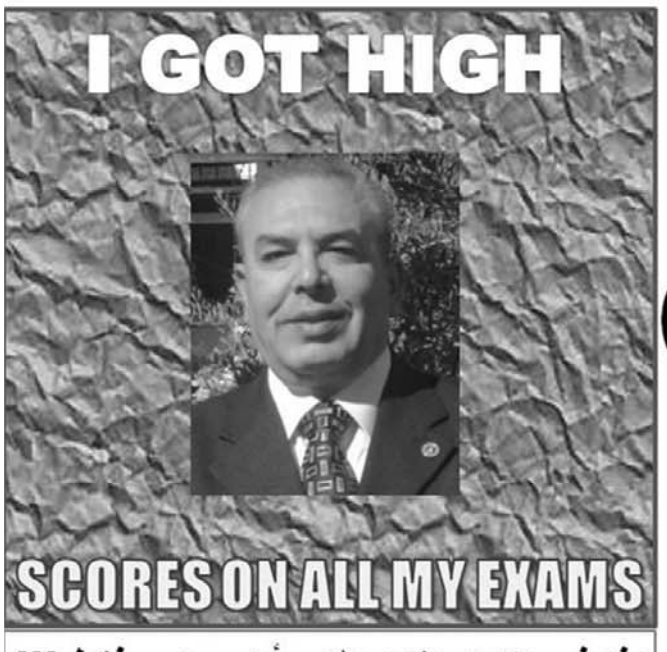
Q6-*(7Pts)* In the circuit shown, perform **mesh** current analysis to **determine** the **voltage** across R_4. Let V_S=**5**V; A_V=**50**; R_1=**2.2** kΩ; R_2=**1.8** kΩ; R_3=**6.8** kΩ; R_4=**220** Ω.



V_{R4} =



هذا في الامتحانات التي أضعها .. فقط !!!

الْمُؤْمِنُ الْقويُّ خَيْرٌ وَأَحَبُّ إِلَى اللَّهِ مِنْ الْمُؤْمِنِ الضَّعِيفِ وَفِي كُلٍّ خَيْرٌ احْرِصْ عَلَى مَا يَنْفَعُكَ وَاسْتَعِنْ بِاللَّهِ وَلا تَعْجَزْ.

طلبتي الأعزاء، يا علماءَ الأمة وبناة المستقبل الأفضل بإذن الله. إنني موقن بقدرتكم العلمية، أرجو منكم الدراسة والتركيز جيداً، سأفرح بنتائجكم الرائعة، لأنكم رائعون. ان الإمتحان فرصة لتقولوا أننا استفدنا مما قدمت لنا من خلال العلامات المتميزة. أتمنى أن تتم فرحتي برؤية نجاحكم الباهر، لأنه بحق سيكون نجاح يثلج صدري. مع خالص دعائي لكم بالتوفيق والنجاح.