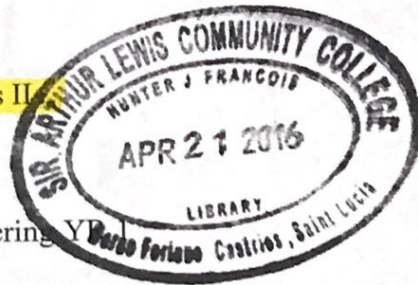


DTEMS PAST PAPER  
TECHNICAL

SIR ARTHUR LEWIS COMMUNITY COLLEGE  
DIVISION OF TECHNICAL EDUCATION AND MANAGEMENT STUDIES

EXAMINATION SESSION : May 2015 Final Examination  
TUTOR : Lindsley Philbert  
PROGRAMME CODE : 3EE ESC-AD  
COURSE TITLE : Electrical Principles II  
COURSE CODE : ELT 111  
CLASSES : Electronics Engineering YD  
DATE : Wednesday 13<sup>th</sup> May, 2015  
COMMENCEMENT TIME : 9:00 am  
DURATION : 2 ½ Hours  
INVIGILATORS : T. Warner, P. Beausoleil, L. Ollivierre  
ROOM : CEHI-1R-02



#E92

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**INSTRUCTIONS**

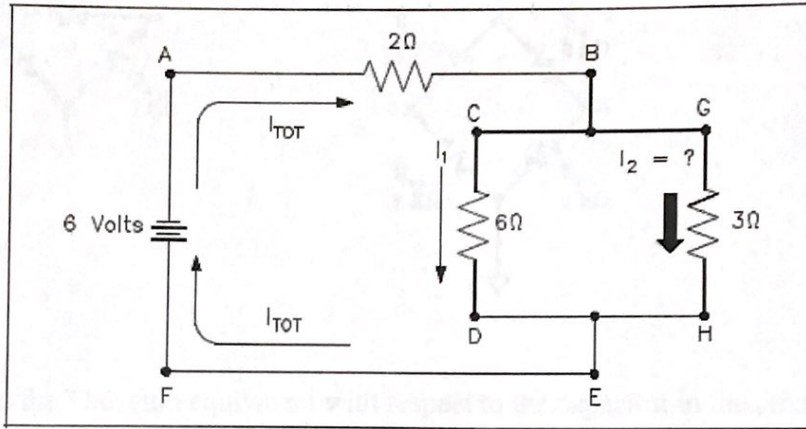
Answer all Questions

All working must be shown

Questions should be properly labeled.

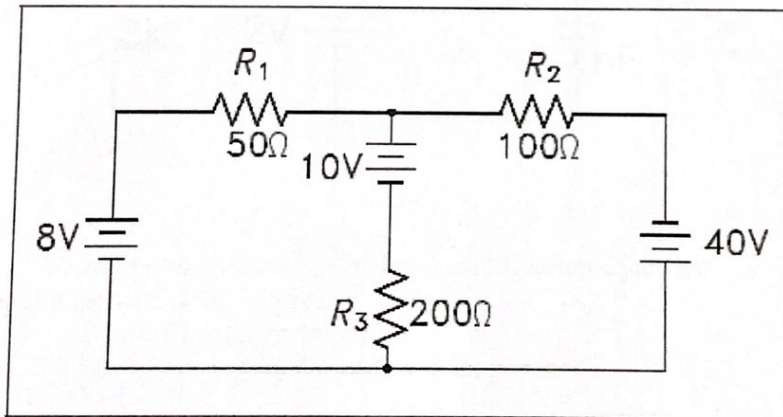
1. Use Kirchhoff's laws to derive the equation for the current and the voltage.  
 (for the voltage work with two loops ABCDEFA and ABGHEFA) (4mks)

Calculate the voltage drops across each resistor and the total current in the circuit.

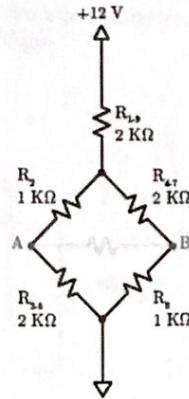
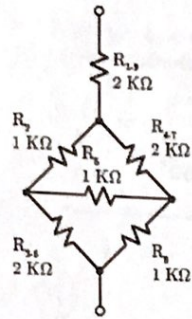


(12mks)

2. For the circuit below:  
 i. determine the three loop equations and (3mks)  
 ii. the current in each element (assume an anticlockwise direction) (12mks)

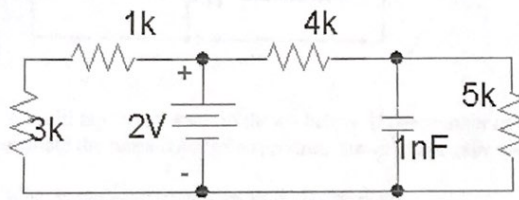


3. Apply the **Superposition** method to the circuit above in question 2 and determine all currents and voltages. (20mks)
4. Thevenize the bridge circuit below. AB represents the load resistor. Find  $V_{th}$  and  $R_{th}$  and hence the current through the load (20mks)



5. Find the Thévenin equivalent with respect to the capacitor in the circuit shown. Then replace the capacitor with a resistor chosen for maximum power transfer.

- i. What is the value of the resistor?
- ii. What is the power absorbed by this resistor?



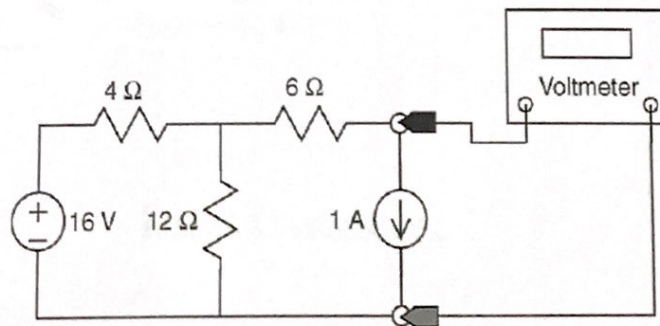
(20mks)

6. Use Norton to Thevenin or Thevenin to Norton equivalent circuits and determine the voltage seen at the voltmeter.

(Current to voltage sources)

(Use circuit reduction to arrive at the answer)

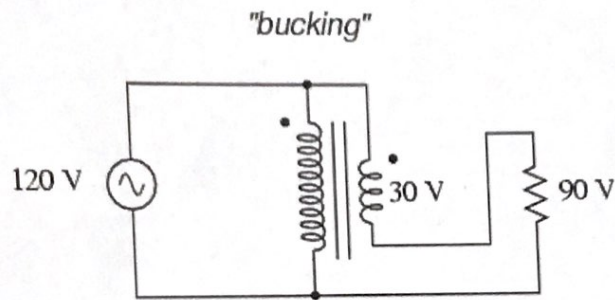
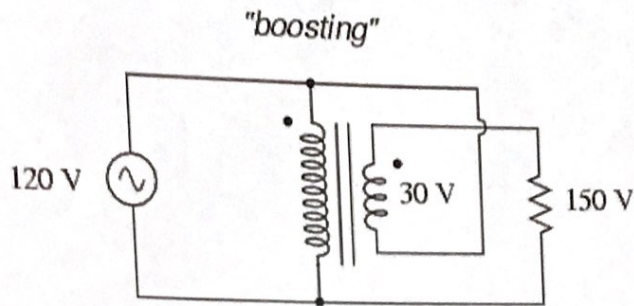
(8mks)



8. a. With the aid of the Hysteresis graph describe the concept of hysteresis loss in a transformer. (6mks)

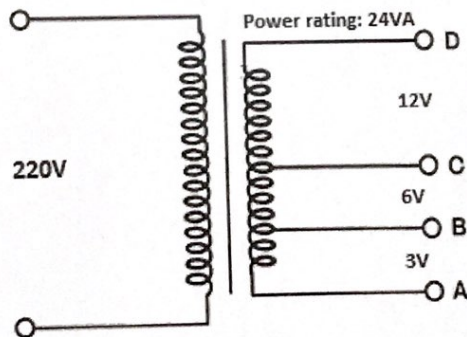
b. Discuss three other losses in a transformer and how they can be reduced. (6mks)

9. a. The circuits below shows two transformer configurations. Explain how each works. (pay attention to the output voltages) (10mks)



b. A multi tap transformer is shown below. If the number of turns in the primary is 2400, calculate the turns required to produce the voltages indicated at A, B, C and D.

c. What is the maximum current in the primary?



(10mks)

**End of Examination!**