Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 2nd Semester Examination – Jan. /Feb. 2016
SCT 362-2 Principles of Electricity

Uva Wellassa University

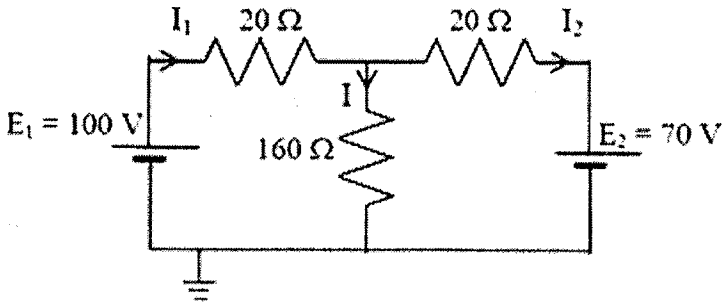
Instructions to candidates
Duration: 02 hours
Number of questions: 03 Essay
Mark allocation: 200 marks
Answer all questions.

1.

a. State Ohm's law and Kirchoff's laws.

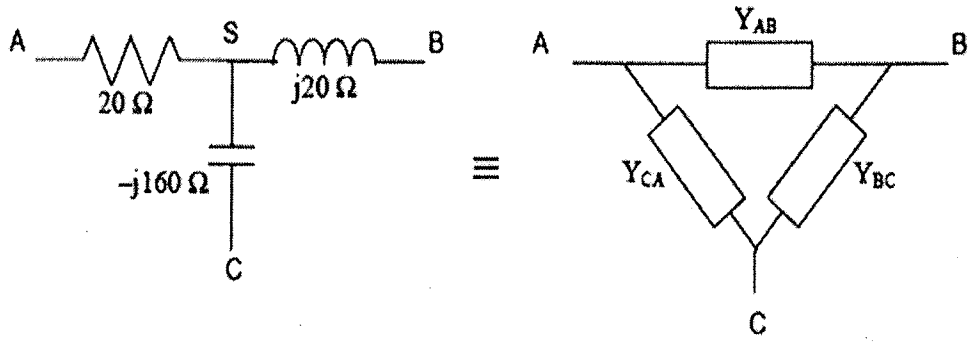
(15 marks)

b. Find the current (I) through 160Ω resistor.



(20 marks)

c. Determine the **Delta** equivalent of the **Star** connected network shown below.



(20 marks)

d. Briefly explain
   i. Reciprocality theorem
   ii. Norton's theorem
   iii. Passive network
   iv. Active network

(20 marks)

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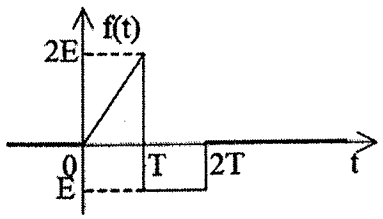
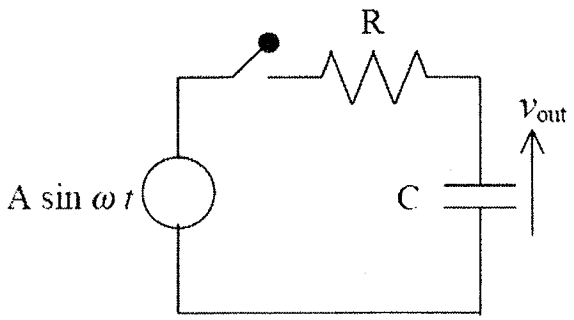
2.

a. Find the Laplace transformation of the following waveforms.



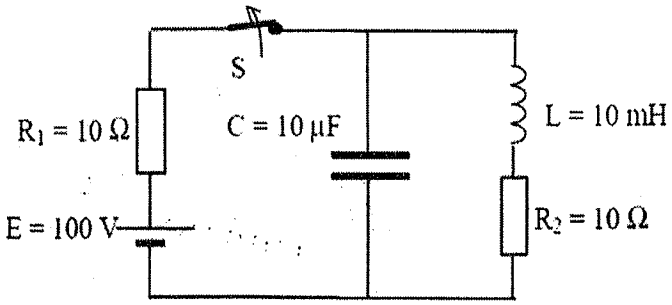
(25 marks)

b. Determine the transient voltage V_{out} across the capacitor **C** when the switch is closed at time t=0. Capacitor C is initially uncharged.



(25 marks)

c. Figure shows a circuit which has reached steady state with switch **S** closed. If the switch **S** is opened at time t=0, obtain an expression for the ensuing current through the inductor, **L**.



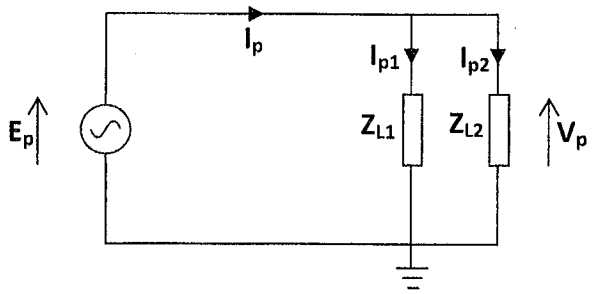
(25 marks)

3.

a. A three phase 400V, 50Hz, balanced supply feeds a balanced load consisting of three equal single phase loads of (40 + j30)Ω connected in Star.
Determine ,

(i) the supply current,
(ii) supply power factor,
(iii) active and reactive power supplied
(iv) and the value of the capacitance that must be connected in Delta to improve the overall power factor to 0.95 lag.

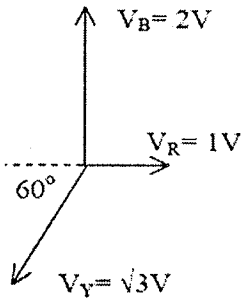
Note: Obtain the result using any one phase in the three phase system.



(35 marks)

a. Find the symmetrical components of the unbalanced system of the following voltages.

$1\angle 0^0$ V, $\sqrt{3}\angle -120^0$ V and $2\angle 90^0$ V.



(15 marks)