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U-6161

Second Year B. E. (Sem. III) (Computer) Examination

June / July – 2012

Electrical Circuit Theory : Paper - II

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **S. Y. B. E. (Sem. 3) (Computer)**

Name of the Subject :

☛ **Electrical Circuit Theory : Paper - 2**

☛Subject Code No. : **6 1 6 1** ☛Section No. (1, 2,.....) : **NIL**

Seat No. :

Student's Signature

(2) Attempt all questions.

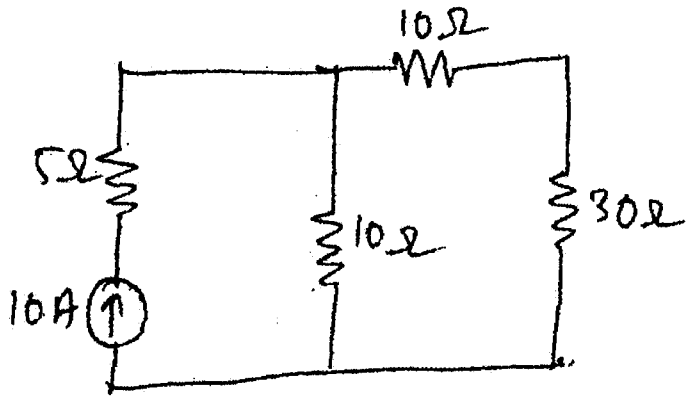
(3) Figure to the right indicate full marks.

(4) Assume suitable data wherever required.

(5) Scientific calculator up to Casio-super fx 100 D, 100 W, 100 MS series and equivalent are permitted.

1 (a) Do as directed : **10**

(1) The current through $30\,\Omega$ branch in the given circuit is _____ . **2**



(2) KCL is a consequence of law of _____ and conservation of _____ . **2**

(a) energy

(b) charge

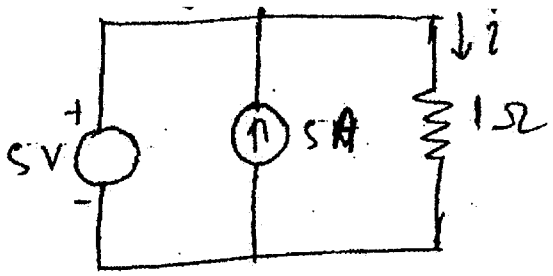
(c) flux

(d) all the above

(3) A network N with short circuit impedence matrix **2**

$\begin{bmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{bmatrix}$ is followed by and ideal transformer with 1 : a ratio, find the overall admittence matrix.

(4) The value of the current I flowing in the 1Ω resistor in the circuit, shown in the fig is _____ . A. **1**



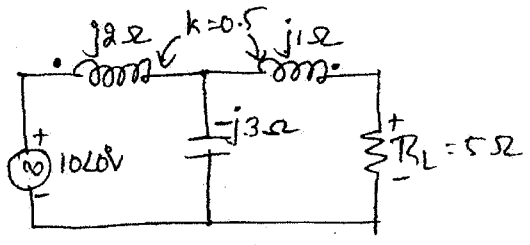
(5) The current through the current coil of a wattmeter is given by, $i = (1 + 2\sin wt)$ A and voltage accross the pressure coil is $V = (2 + 3\sin 3at)v$. What is wattmeter reading _____ ? **2**

(6) What is node ?

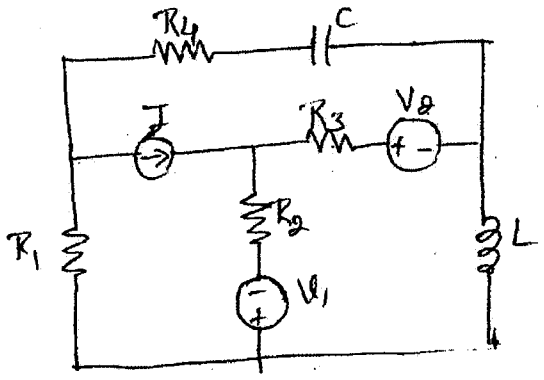
(b) Explain Kirchoff's voltage and Kirchoff's current law in brief. **4**

(c) For the mutually coupled coils circuit prove the $M = k\sqrt{L_1 L_2}$. **6**

2 (a) Find the drop accross R_L. **7**

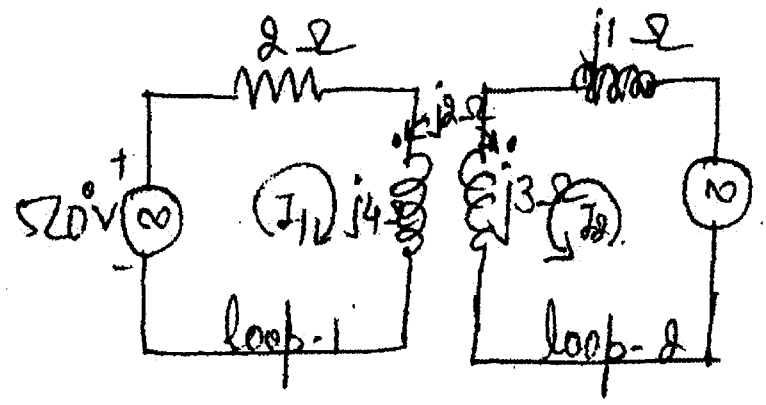


(b) Obtain the dual of the network. **5**

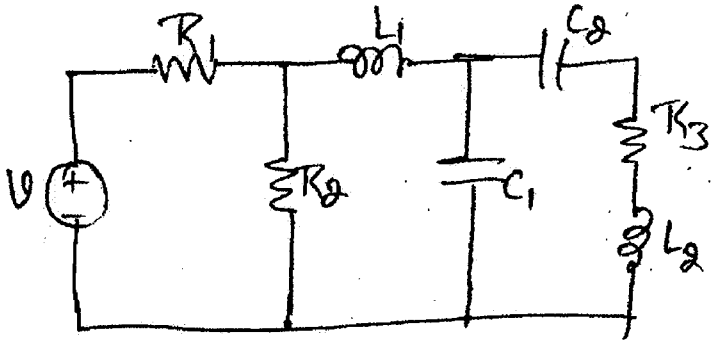


OR

2 (a) Find V_2 in the circuit, such that current in the loop-1 is zero. **7**



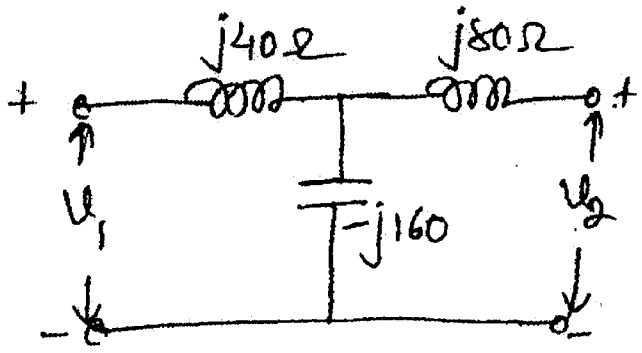
(b) Obtain the dual of the network. **5**



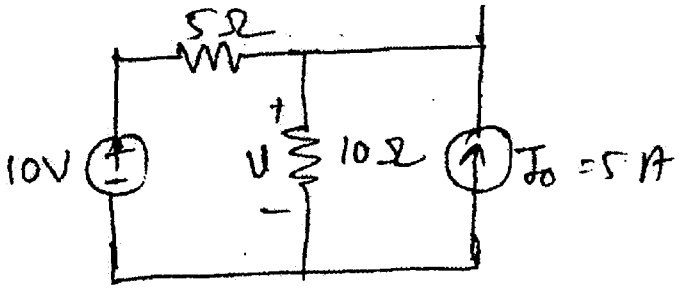
3 Attempt any **three** : 18

(1) Obtain y-parameters in terms of z-parameters.

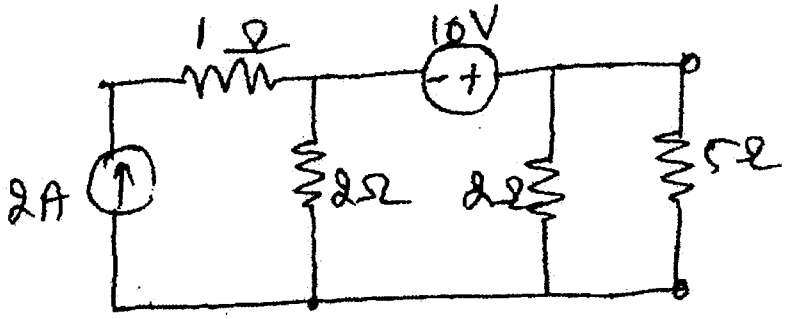
(2) Find the open circuit parameter of given circuit.



(3) Find v by superposition Theorem.



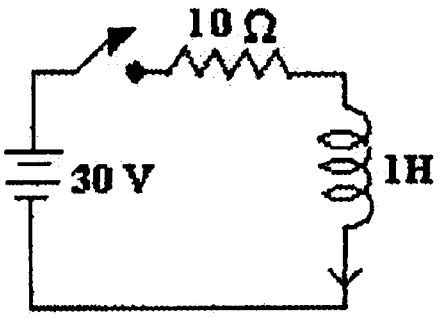
(4) What is the current in 5 Ω, resistor of the given ckt, Use Norton's theorem.



(5) Write down the statement of Thevenin's theorem and maximum power transfer and explain it.

4 (a) Do as directed :

(1) For the circuit shown below current through the circuit at $t = \infty$ is _____ . **1**



(2) Write equation for voltage across capacitor in a series RC circuit. **1**

(3) Time constant for series RL circuit is _____ and for a series RC circuit is _____ . **2**

(4) Define unit ramp function and obtain its laplace transform. **2**

(5) $F(s) = S + 2/S(S+1)$, the initial value of the function is _____ and the final value of the function is _____ . **4**

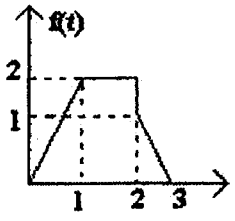
(b) Match the following functions with their Laplace transformations : **5**

	Function	*Laplace Transform*
(1)	$u(t)$	$1/s^2$
(2)	ramp	1
(3)	e^{-at}	$s/(s^2+\omega^2)$
(4)	$\cos \omega t$	$1/(s+a)$
(5)	impulse	$1/s$

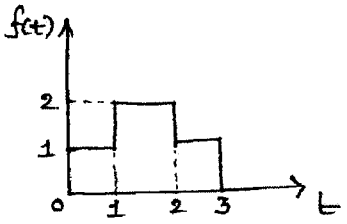
(c) State and prove final value theorem. **5**

5 (a) Obtain Laplace transform of the following waveforms : **5**

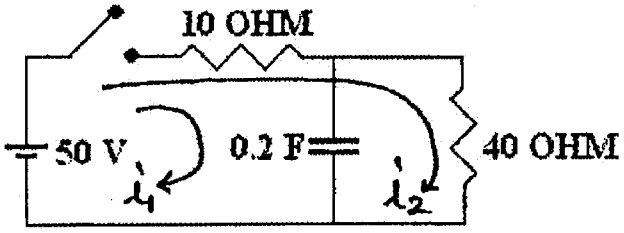
(1)



(2)



(b) In two N/W shown; there is no initial charge on the capacitor. Find the loop currents i_1 and i_2 which result when the switch is closed at $t = 0$, **10**



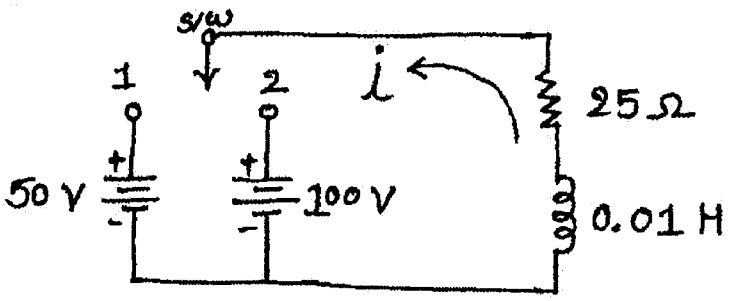
OR

5 (a) Obtain inverse Laplace transformation for the following function. **5**

(1) $F(s) = \left(2x^2 + 6s + 5\right)(s+1)^2(s+2)$

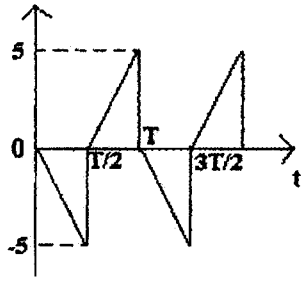
(2) $F(s) = 2s + 5 / \left(s^2 + 5s + 6\right)$

(b) In the RL circuit shown, the s/w is in position 1 for long time to establish steady state conditions and at $t = 0$ it is switched to position 2, find resulting current. The direction of current is shown in fig. **10**



6 (a) Evaluate the Fourier coefficient for the Fourier series. **5**

(b) Find trigonometric Fourier series for the periodic wave shown in fig. below. **10**



OR

(b) Find exponetial of Fourier series for the periodic shown in fig. below. **10**