

Midterm Examination #2  
ENEL 280-001, Fall 1994  
1994 November 23



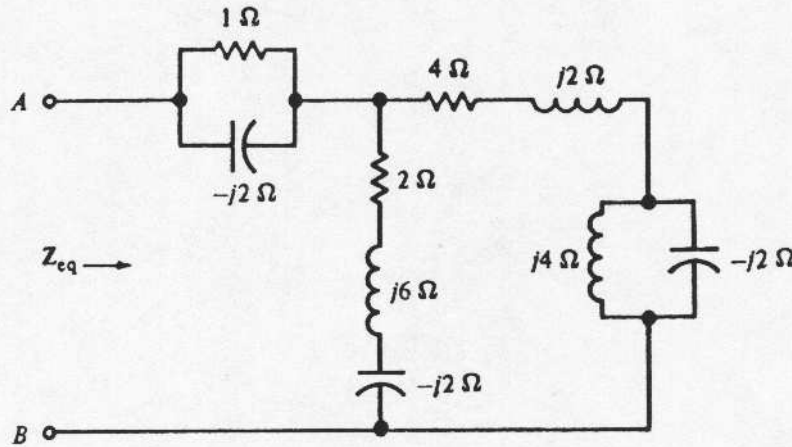
Notes:

1. Text book and notes not allowed. Use of calculator is permitted.
2. Maximum marks for each question are as indicated.
3. Do all the questions. Maximum marks you can get is 40.
4. Laplace transforms of functions are given in the attached table.

Question #1:

Obtain the  $Z_{eq}$  of the following circuit.

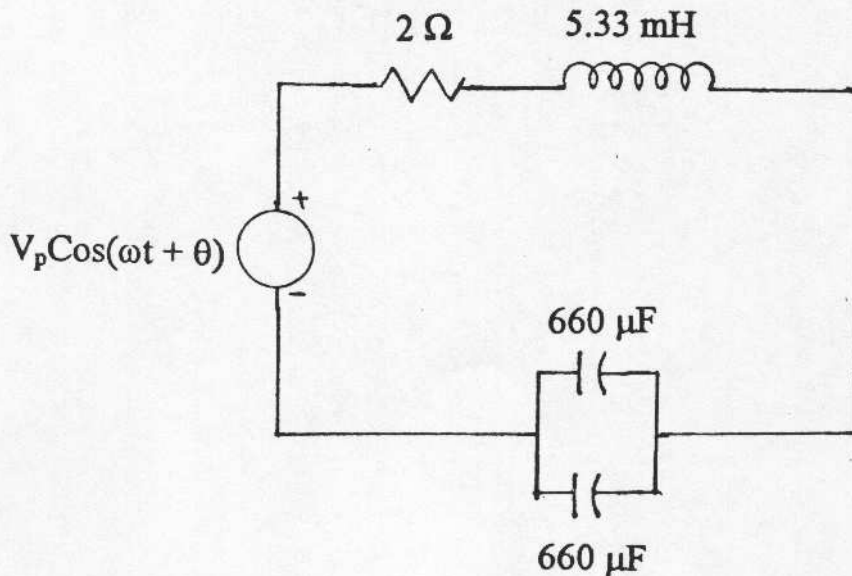
Marks = 10



Question #2

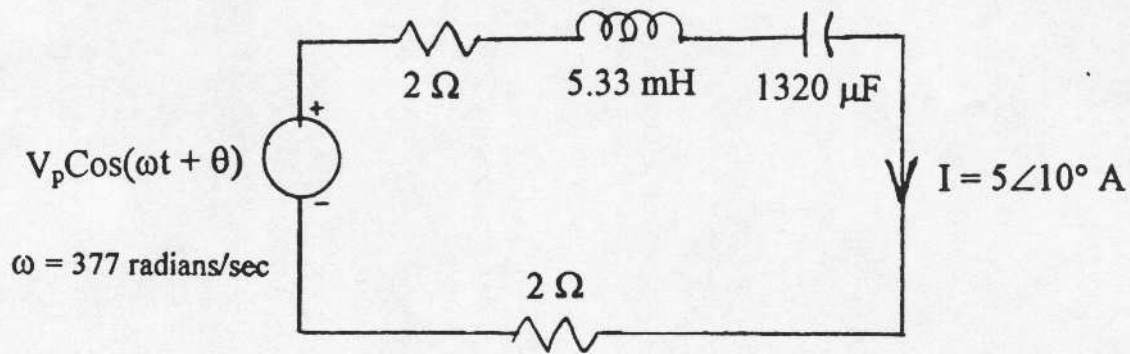
- (a) What shall be the frequency,  $f$  in cycles per second (Hertz), of the voltage applied such that the resulting current in the circuit is in phase with the source voltage (voltage applied)?

Marks = 5



- (b) In the circuit given below, what is the phase angle,  $\theta$ , of the applied voltage?

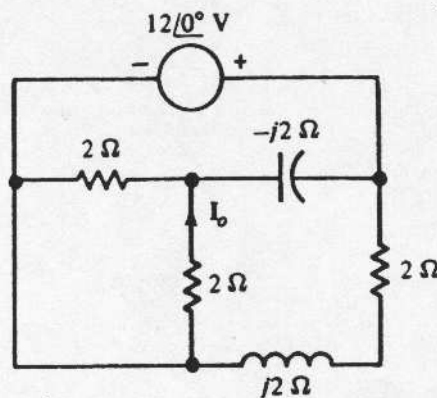
Marks = 5



### Question #3

- (a) Determine the current  $I_0$  in the circuit given below.

Marks = 8



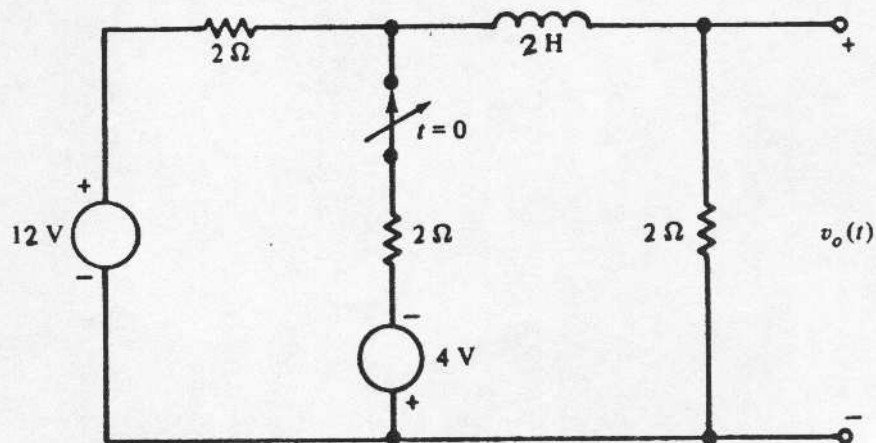
- (b) If the impedance of an inductance is  $5 \Omega$  at  $60$  Hz, what will be its impedance at a frequency of  $180$  Hz?

Marks = 4

### Question #4

Consider the circuit given below. If the switch opens at  $t = 0$ , find the output voltage  $v_o(t)$  for  $t > 0$ .

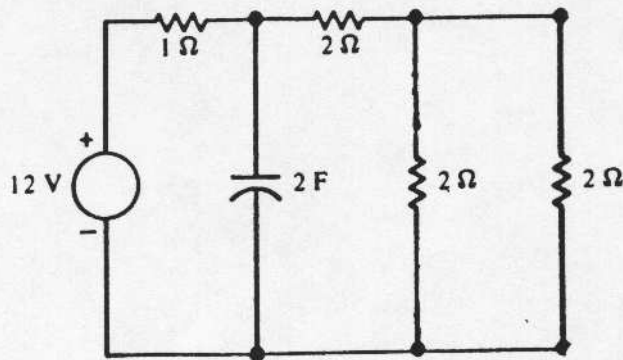
Marks = 12



## Question #5

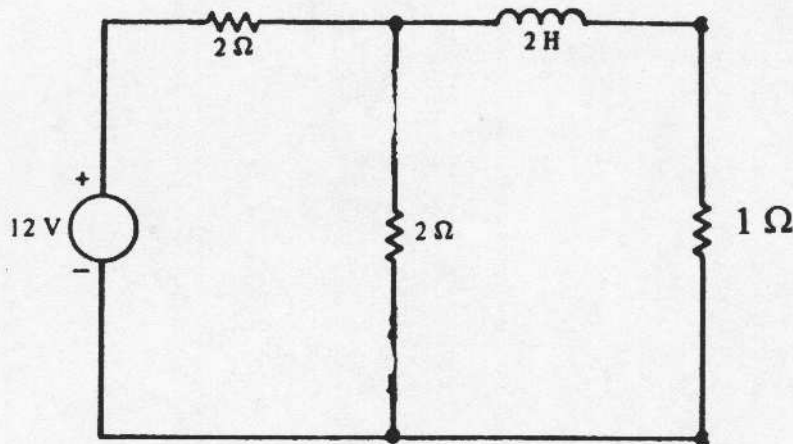
(a) What is the time constant of the following circuit?

Marks = 3



(b) What is the time constant of the following circuit ?

Marks = 3

(c) What is the time constant of a circuit in which the current is found to be  $6-4e^{-2t}$  A?

Marks = 2

## Laplace Transforms

$f(t)$	$F(s)$
$\delta(t)$	1
$u(t)$	$\frac{1}{s}$
$e^{-at}$	$\frac{1}{s+a}$
$t$	$\frac{1}{s^2}$
$\frac{t^n}{n!}$	$\frac{1}{s^{n+1}}$
$te^{-at}$	$\frac{1}{(s+a)^2}$