

## Homework 8

Due time: 11 p.m. **31st. Dec, 2024**

Turn in your hard-copy hand-writing homework at the entrance of  
Room 3-324 SIST #3 Building.

Rules:

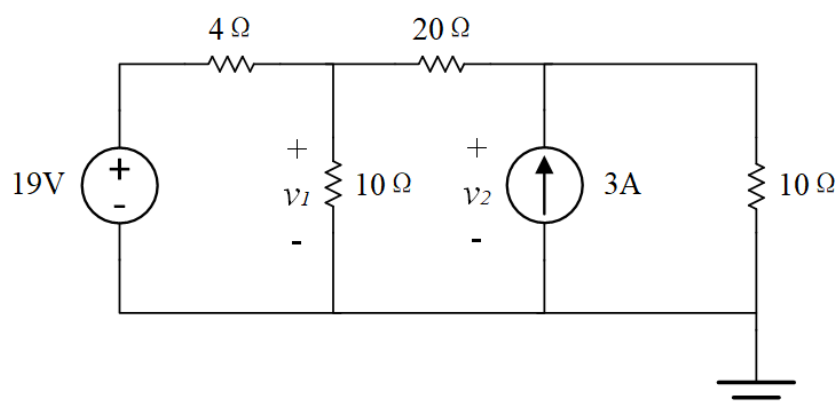
- Work on your own. Discussion is permissible, but extremely similar submissions will be judged as plagiarism.
- Please show all intermediate steps: a correct solution without an explanation will get zero credit.
- Please submit on time. No late submission will be accepted.
- Please prepare your submission in **English only**. No Chinese submission will be accepted.
- All final answers must be rounded to **two decimal places**, and include the **appropriate units**.

1. Find the inverse Laplace Transforms of the following expressions.

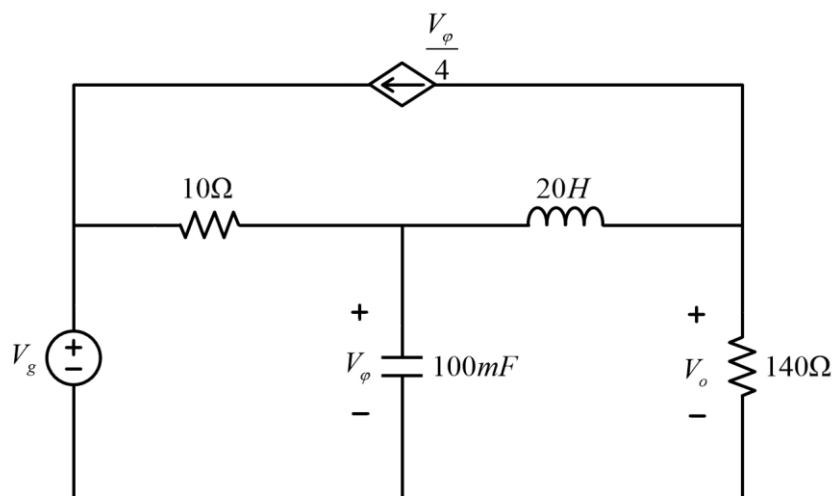
(a)  $F(s) = \frac{6(s+10)}{(s+5)(s+8)}$

(b)  $F(s) = \frac{280}{s^2+14s+245}$

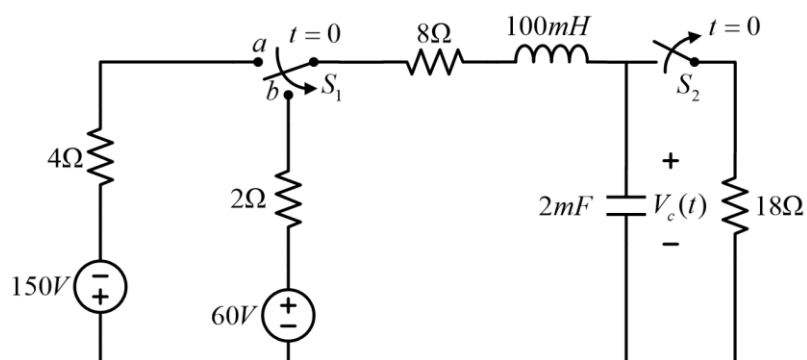
2. Suppose the voltage and current source are both turned on at  $t = 0$ , please use the Laplace Transform method to find  $v_1(t)$  and  $v_2(t)$  for  $t > 0$ .



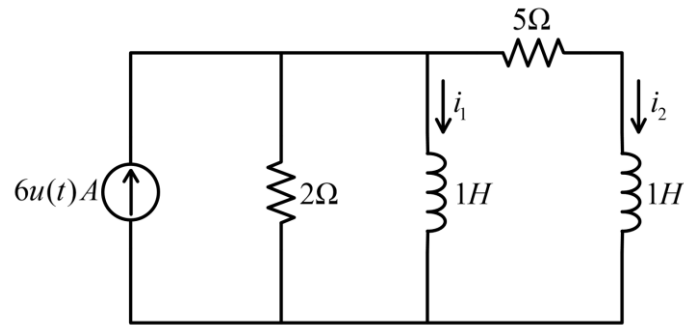
3. The initial energy in the circuit is zero and the ideal voltage source is  $600u(t)V$ .
- (a) Use **mesh or nodal method** to find  $V_o(s)$  in s-domain.
- (b) Use the initial and final value theories to find  $v_o(0)$  and  $v_o(\infty)$  in time domain.



4. The switch  $S_1$  has been in position  $a$  and the switch  $S_2$  has been closed for a long time. At  $t = 0$ s, switch  $S_1$  is moved instantaneously to position  $b$ , and switch  $S_2$  is opened at the same time. Find  $v_c(t)$  for  $t > 0$  **with Laplace method**.



5. If  $i_1(t = 0) = i_2(t = 0) = 1\text{A}$ , please use the Laplace Transform method to find  $i_1(t)$  and  $i_2(t)$  for  $t > 0$ .



6. The initial energy in the circuit is zero. Please use the **Laplace method** to find  $V_o(t)$  for  $t > 0$  if  $V_g = 75 \cos(5000t) \cdot u(t) V$ .

