



- [1] For the circuit shown in Fig.1 , find the value of the current  $i(t)$  after 0.4m sec. and 1.0m sec. respectively.
- [2] For the two circuits shown in Fig.2a,b , derive an expression for the current through the resistance and the voltage across it as a function of time .
- [3] Derive the expression of the output voltage of the network shown in Fig.3 ,  $v(t)$  . What would be its value at  $t = 0$  and as  $t$  tends to  $\infty$  .
- [4] For the network shown in Fig.4 , find  $v_o(t)$  for  $t > 0$  using loop analysis . Verify your answer using the superposition theorem .
- [5] Find  $v_o(t)$  ,  $t > 0$  , for the network shown in Fig.5 using node analysis .
- [6] Derive an expression for the current  $i_o(t)$  ,  $t > 0$  , in the network shown in Fig.6 . What would be the value of this current as  $t$  tends to  $\infty$  .
- [7] In the network shown in Fig.7 , use Thevenin's Theorem to derive an expression for  $v_o(t)$  ,  $t > 0$  .
- [8] In the circuit shown in Fig.8 find the branch currents  $i_1(t)$  ,  $i_2(t)$  ,  $i_3(t)$  ,  $t > 0$  . Apply the initial and final value theorems to the S-domain expressions .
- [9] Using the Laplace Transform Technique , find an expression for the current  $i(t)$  shown in Fig.9 ,  $t > 0$  , hence calculate its initial and final values .
- [10] For the circuit shown in Fig.10 , calculate the branch currents which will result when the switch is closed at  $t=0$  .
- [11] When the switch in the circuit shown in Fig.11 is closed , the condenser was charged such that  $v_c(0) = 20 V$  and the current in the coil was  $i_L(0) = 2 A$  . Derive expressions for the instantaneous currents  $i_1(t)$  ,  $i_2(t)$  and  $i_3(t)$  for  $t > 0$  .
- [12] In the circuit shown in Fig.12 , the capacitor is initially charged such that  $v_c(0)=50V$ . Calculate  $v_c(t)$  ,  $t > 0$  . Using current sources only , derive an expression for the Capacitor current in the time domain  $i_c(t)$  ,  $t > 1$  msec. Calculate also  $i_c(\infty)$  and verify your result using the final value theorem .

[13] The circuit shown in Fig. 13 is fed from a source  $v(t)$  given by :

$$v(t) = 100 e^{-100t} \text{ V}$$

Calculate  $i(t)$ ,  $t > 0$ .

[14] For the circuit shown in Fig. 14, calculate the potentials at nodes 1, 2  $v_1(t)$  and  $v_2(t)$ . Using the initial and final value theorems, calculate  $v_1(0)$ ,  $v_2(0)$ ,  $v_1(\infty)$  and  $v_2(\infty)$ .

[15] Using the Laplace Transform, find  $v_o(t)$  for  $t > 0$ , in the circuit shown in Fig. 15. Assume that the circuit has reached steady state before switching the source off.

[16] For the circuit shown in Fig. 16, find  $i(t)$  for  $t > 0$ .

[17] Find the Z-Parameters of the two-port network shown in Fig. 17a. If the same network is used in Fig. 17b, calculate  $i_2(t)$  for  $t > 0$ .

[18] Find  $v_o(t)$  for  $t > 0$  in the circuit shown in Fig. 18.

[19] Derive the expression of the output voltage  $v_o(t)$  for the circuit shown in Fig. 19a if the input is  $v(t)$  shown in :

i) Fig. 19b.

ii) Fig. 19c.

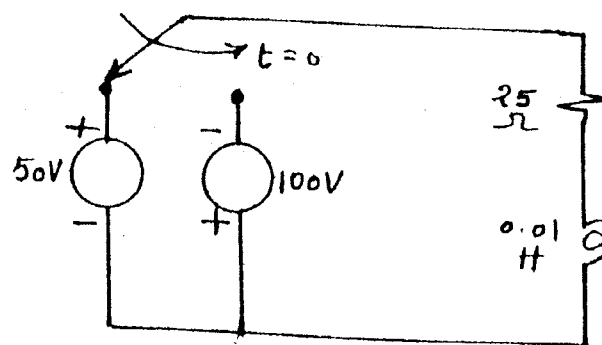
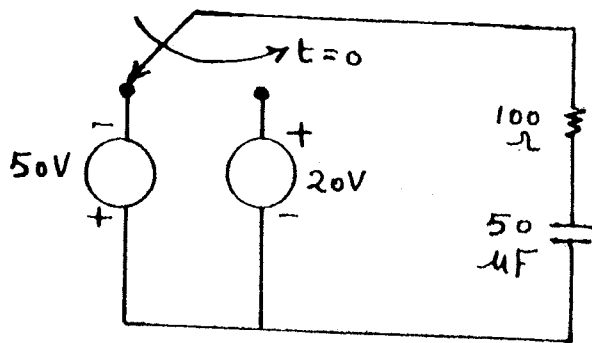
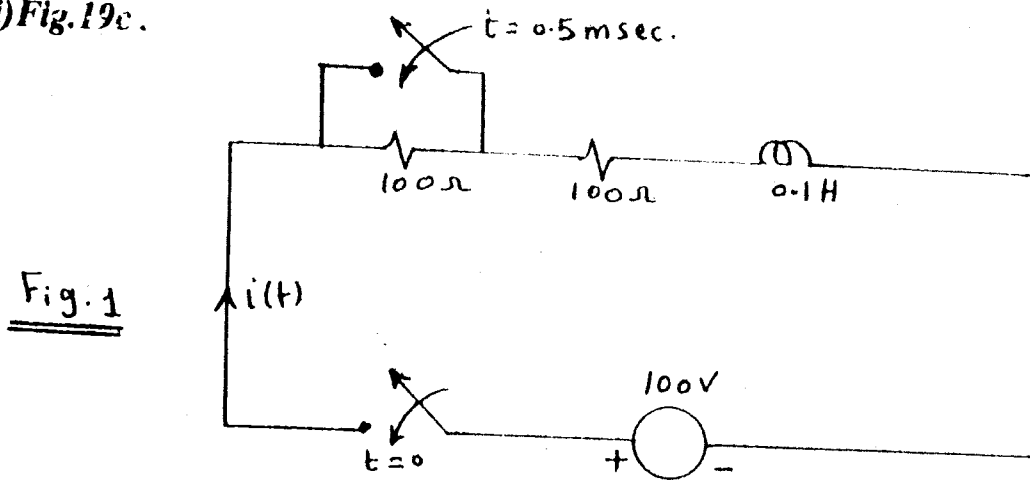


Fig. 3

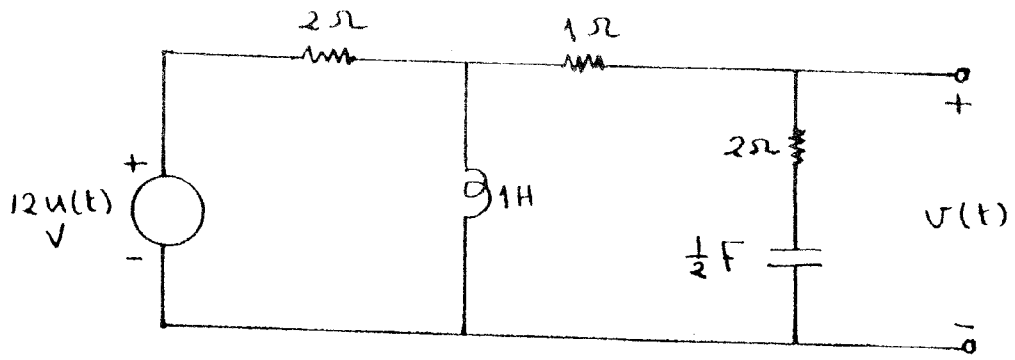


Fig. 4

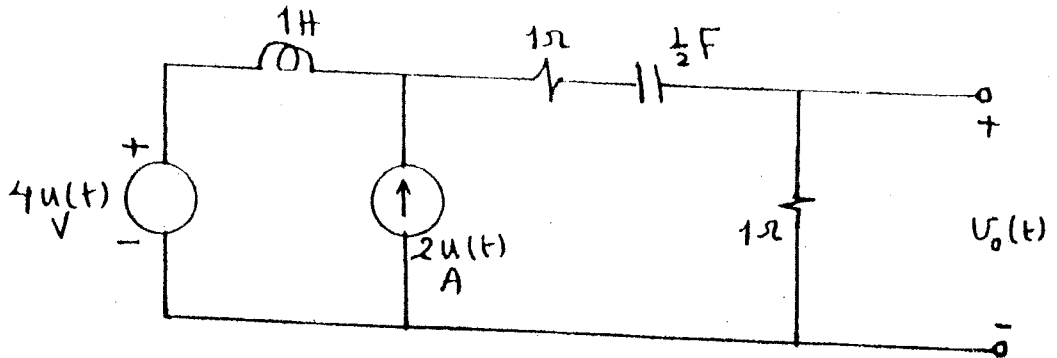


Fig. 5

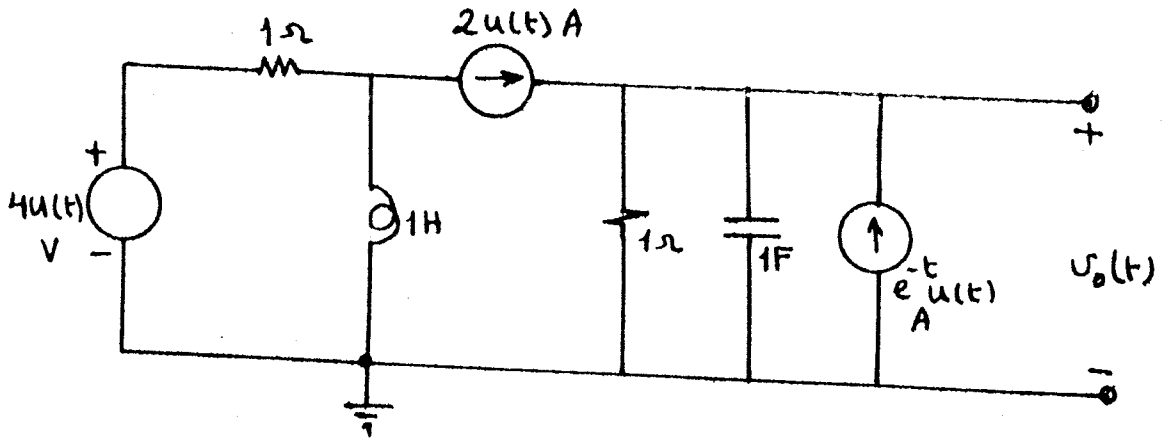
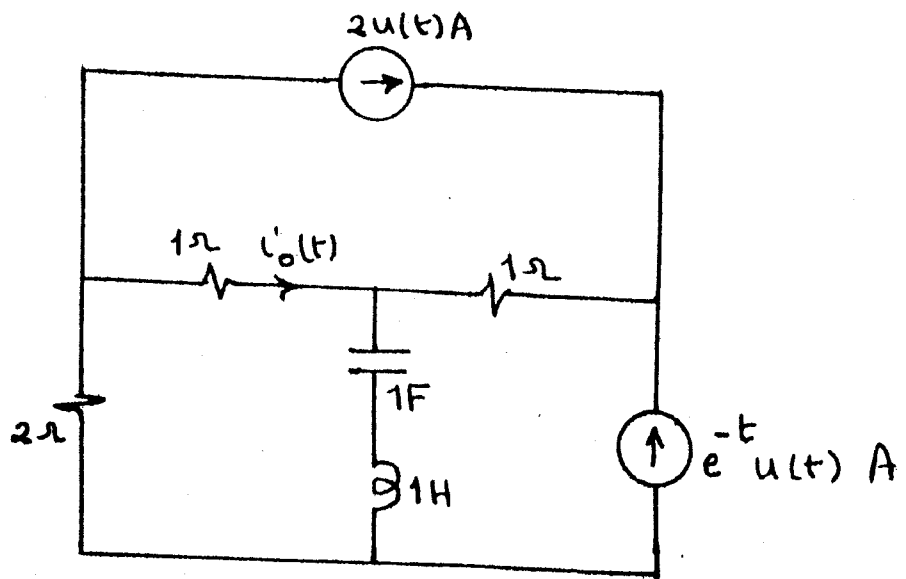


Fig. 6



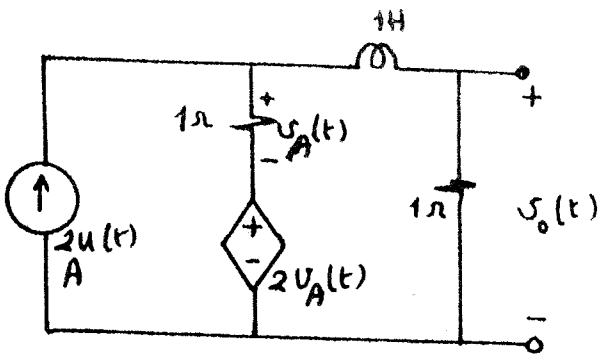


Fig. 7

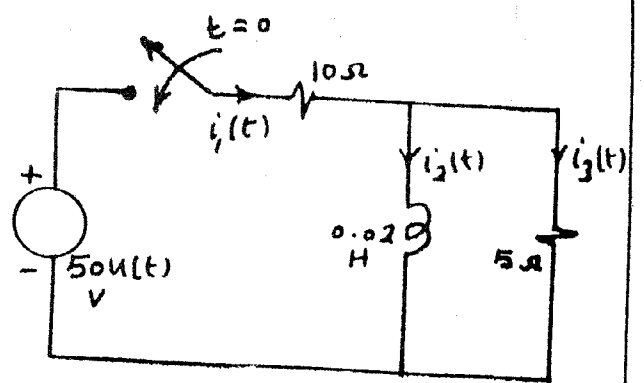


Fig. 8

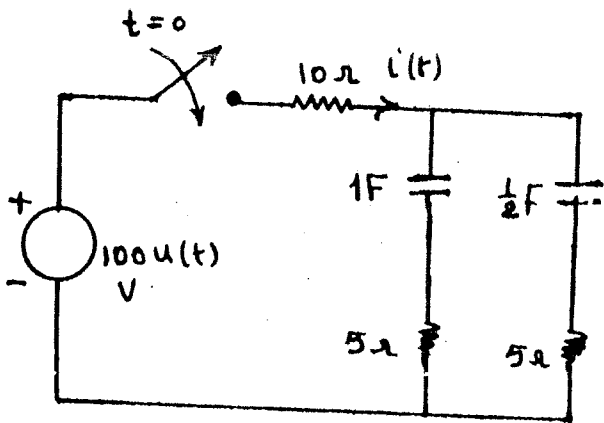


Fig. 9

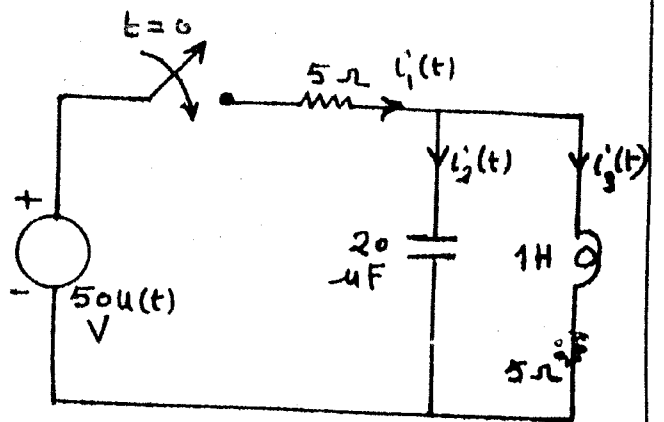


Fig. 10

Fig. 11

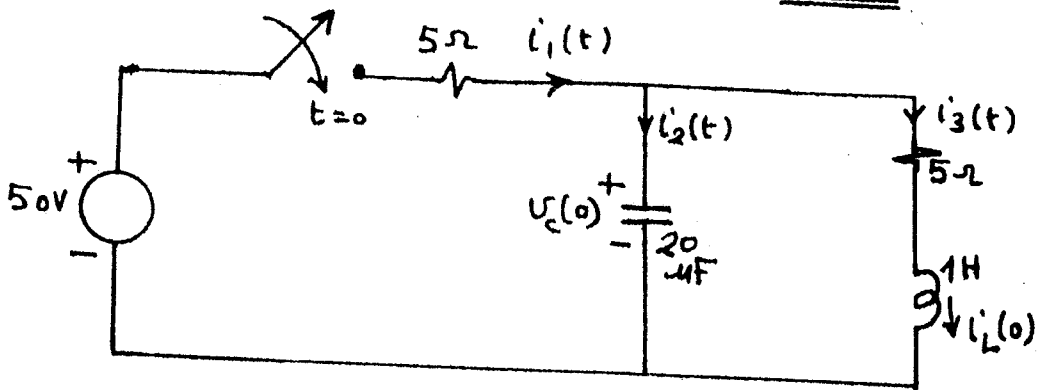


Fig. 12

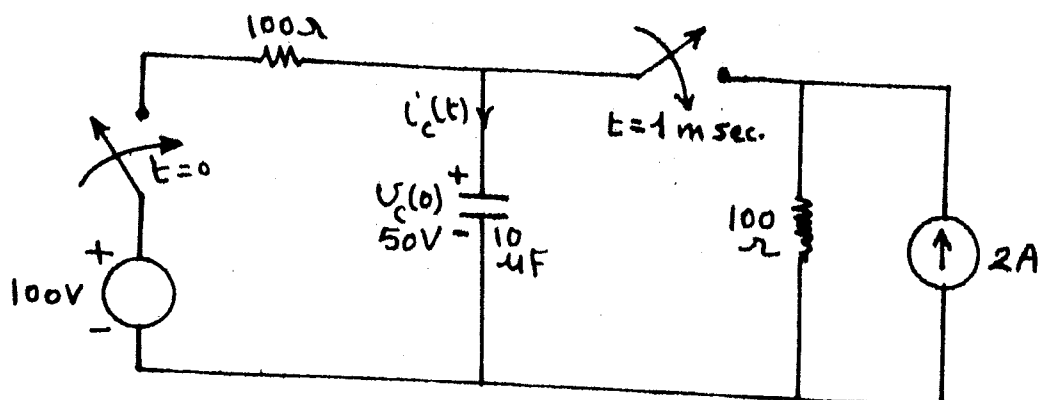


Fig. 13

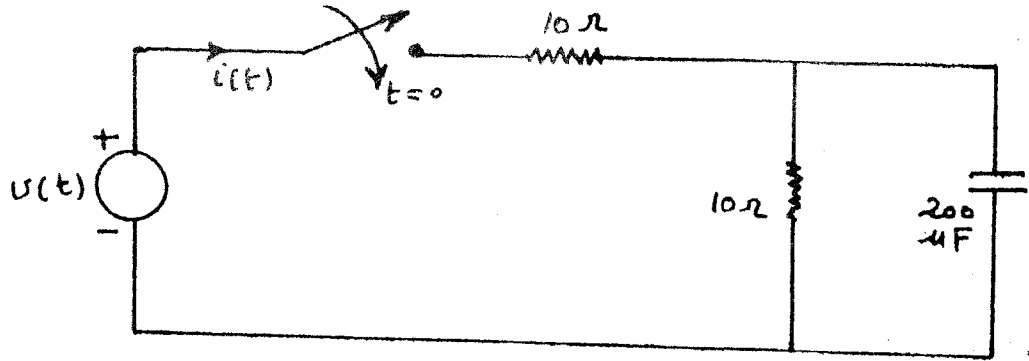


Fig. 14

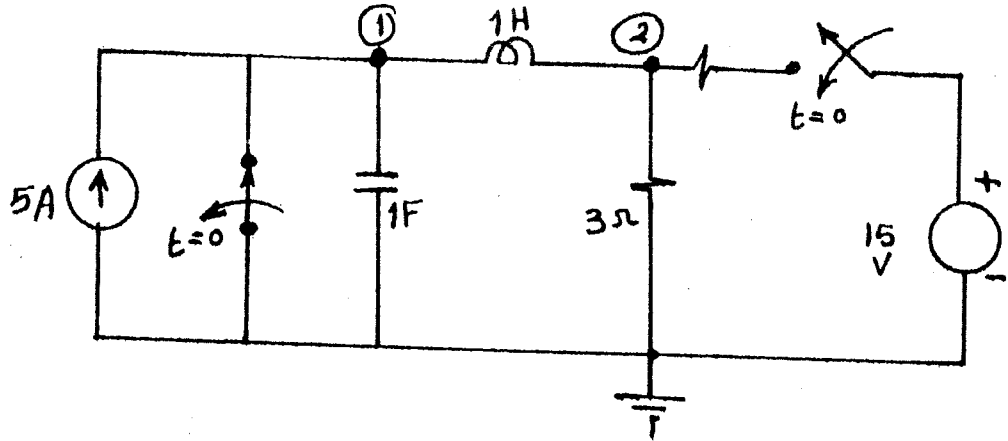


Fig. 15

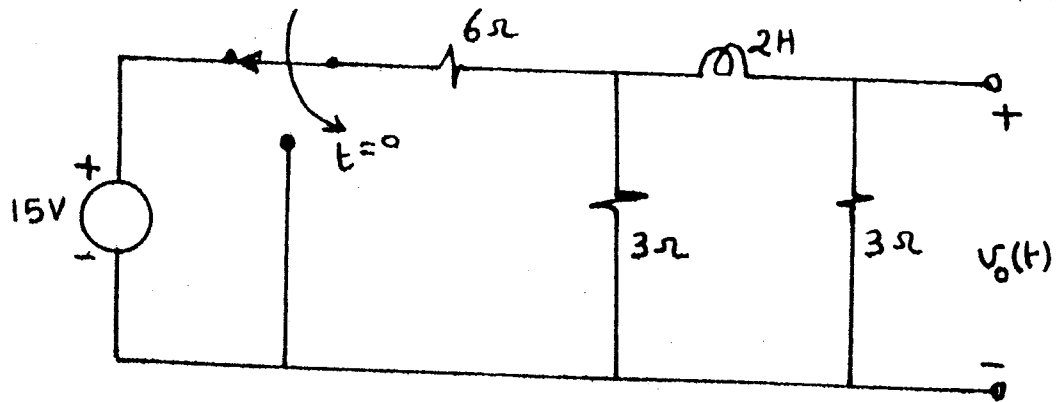
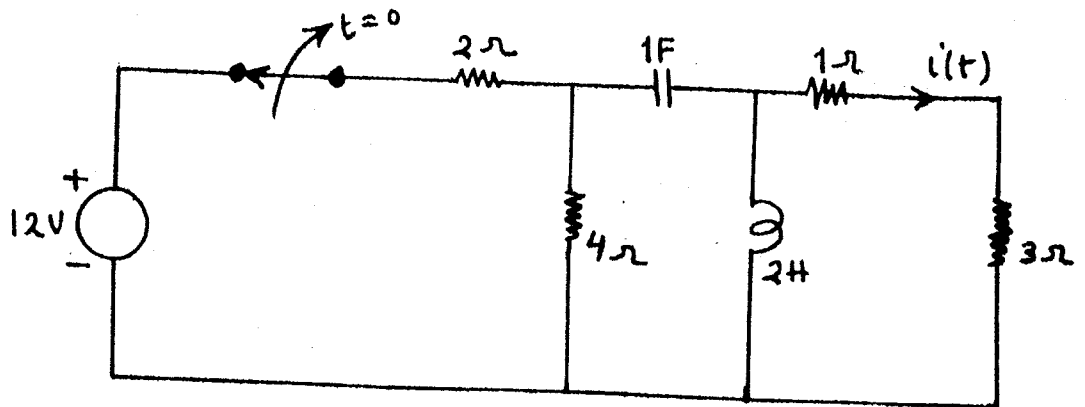


Fig. 16



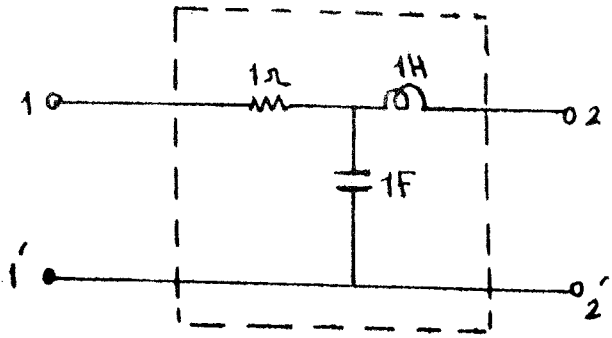


Fig. 17a

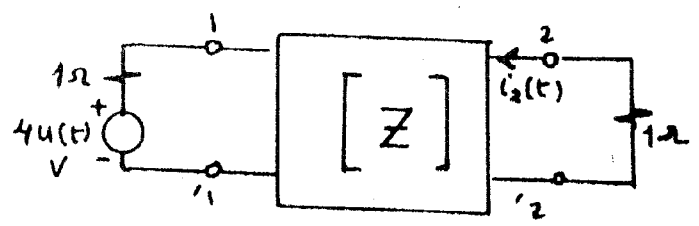


Fig. 17b

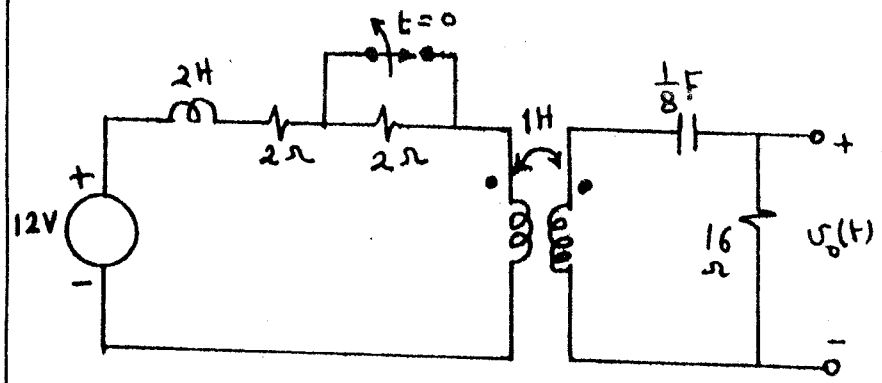


Fig. 18

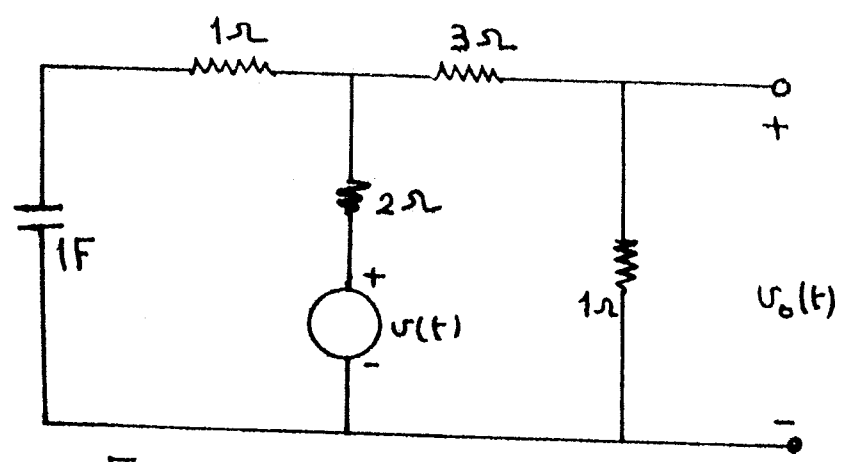


Fig. 19a

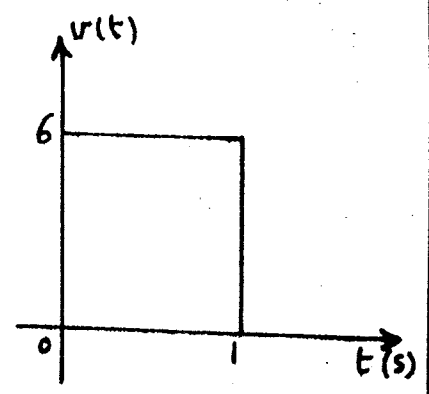


Fig. 19b

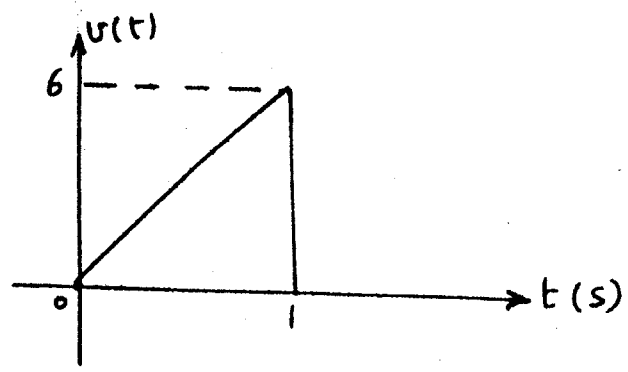


Fig. 19c