CAIRO UNIVERSITY FACULTY OF ENGINEERING	ELECTRIC CIRUITS	ELECTRONICS AND COMMUNICATION DEPT. 2^{nd} Year SHEET (8)

[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 ∞ .

[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 ∞ .

[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 instantanuous 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 :

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

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 $v_0(t)$ 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 theZ-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 $v_0(t)$ 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 .

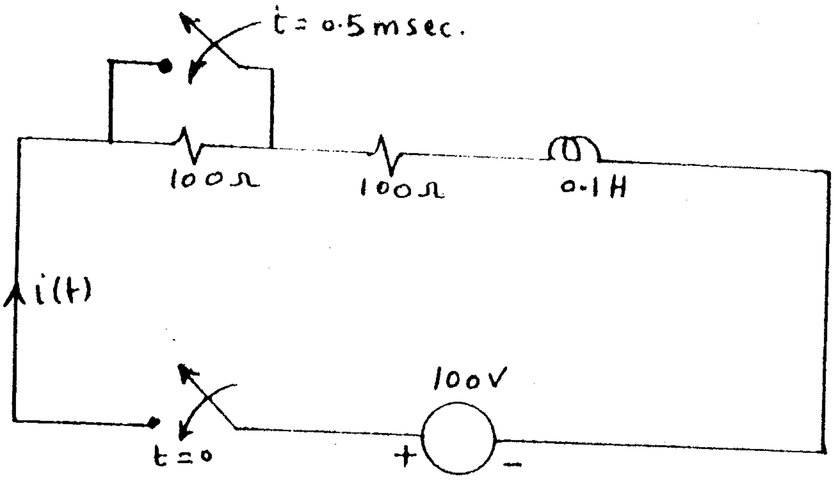


Fig. 1

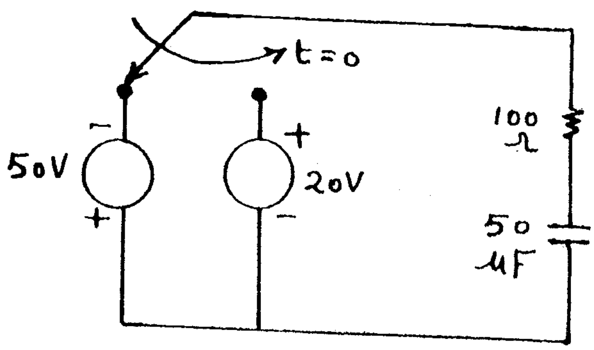


Fig.2a

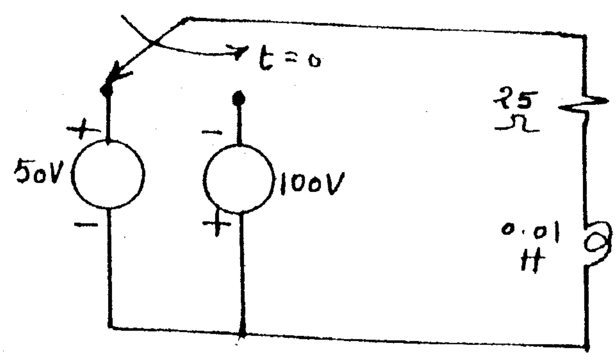


Fig.2b

Fig. 3

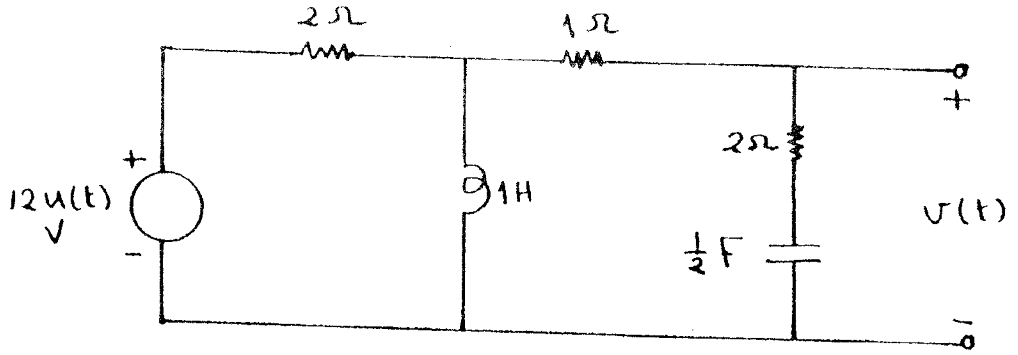


Fig. 4

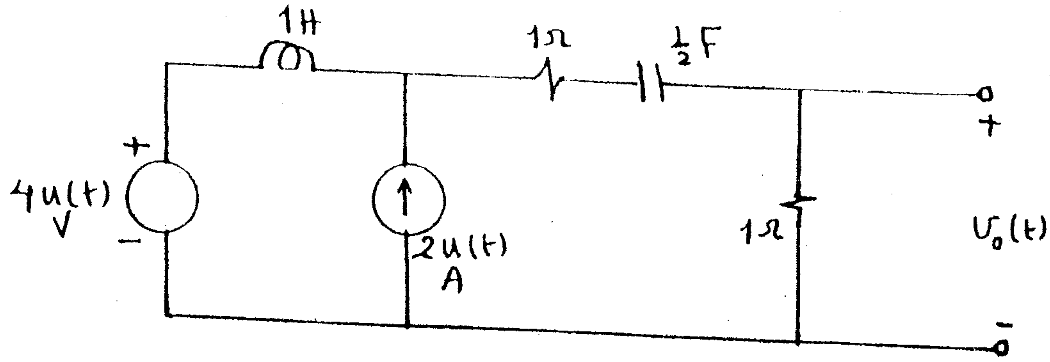


Fig. 5

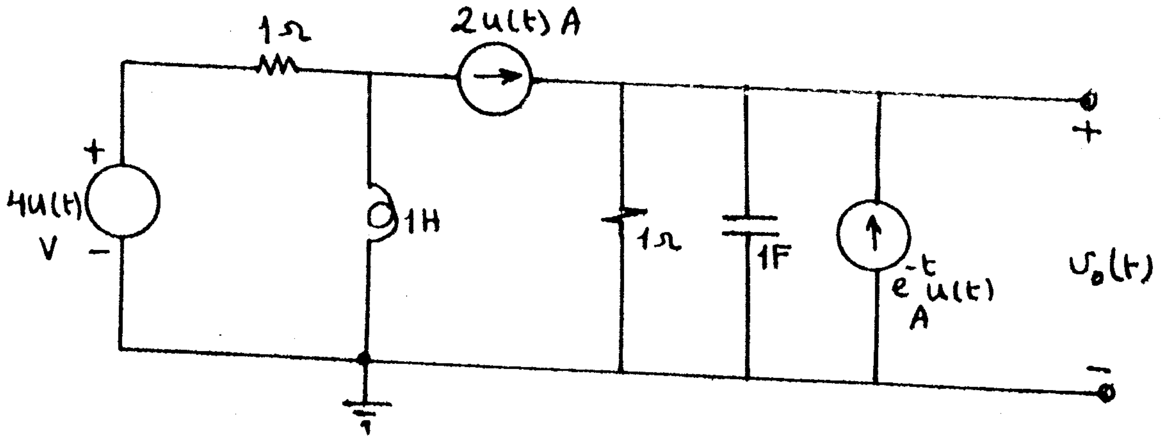
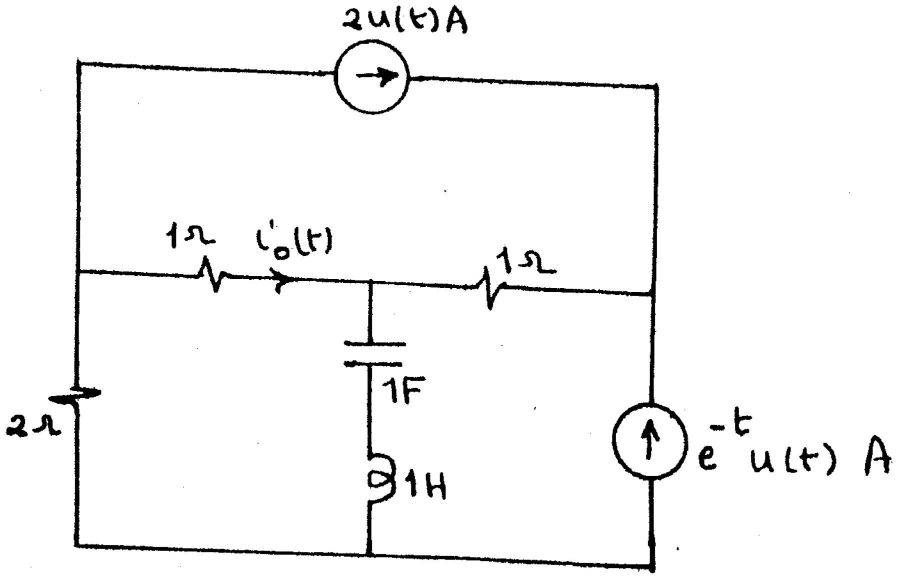


Fig. 6



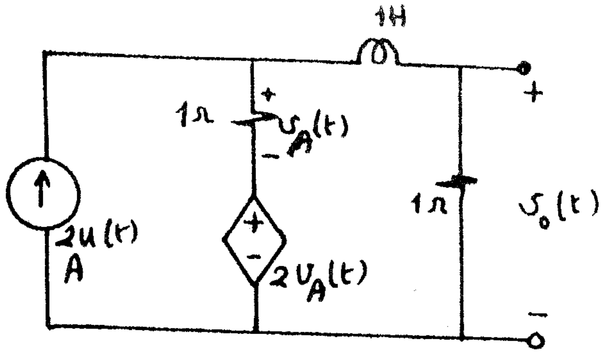


Fig.7

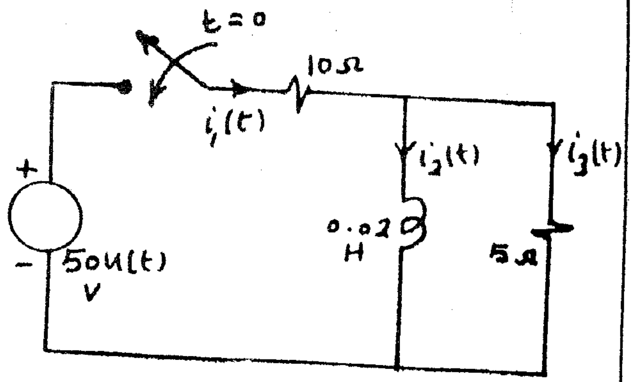


Fig.8

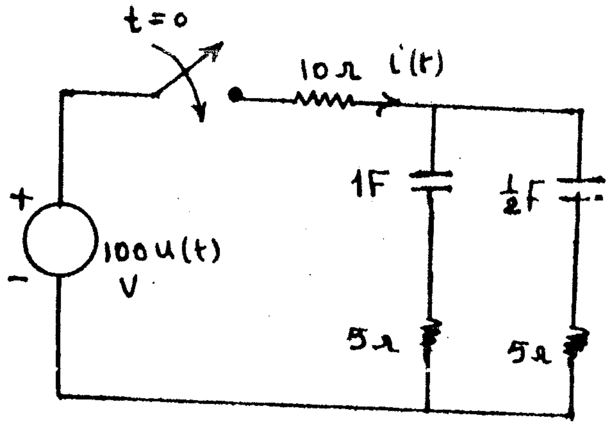


Fig.9

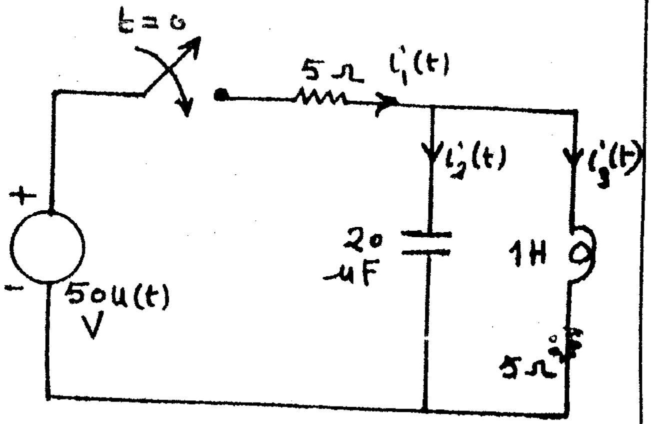


Fig.10

Fig.11

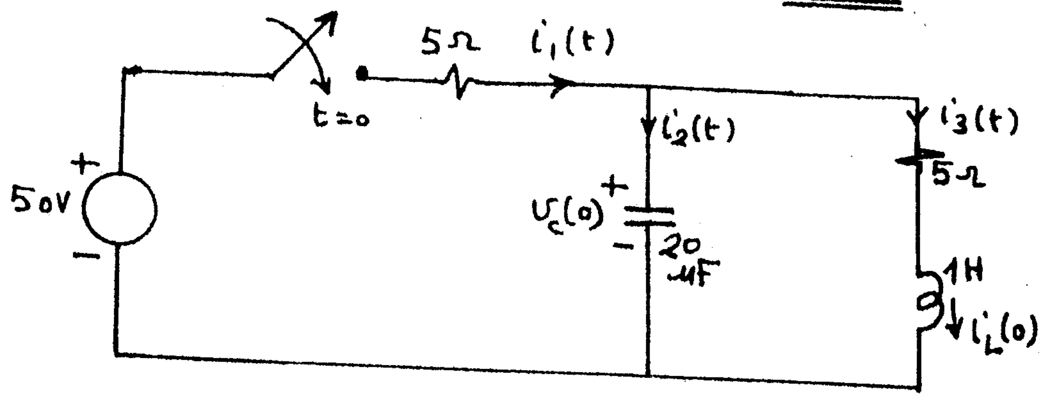


Fig.12

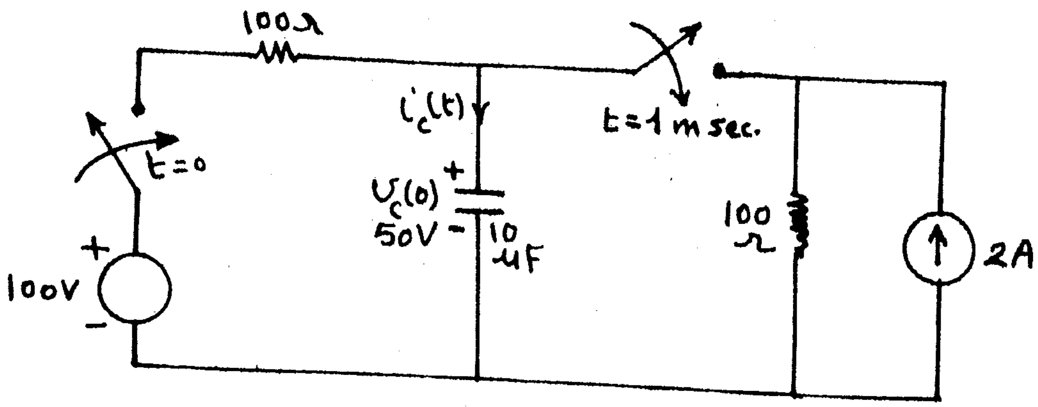


Fig. 13

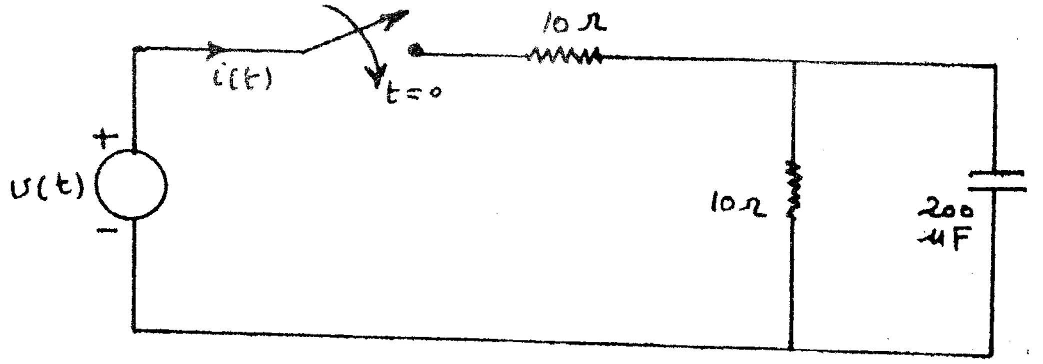


Fig. 14

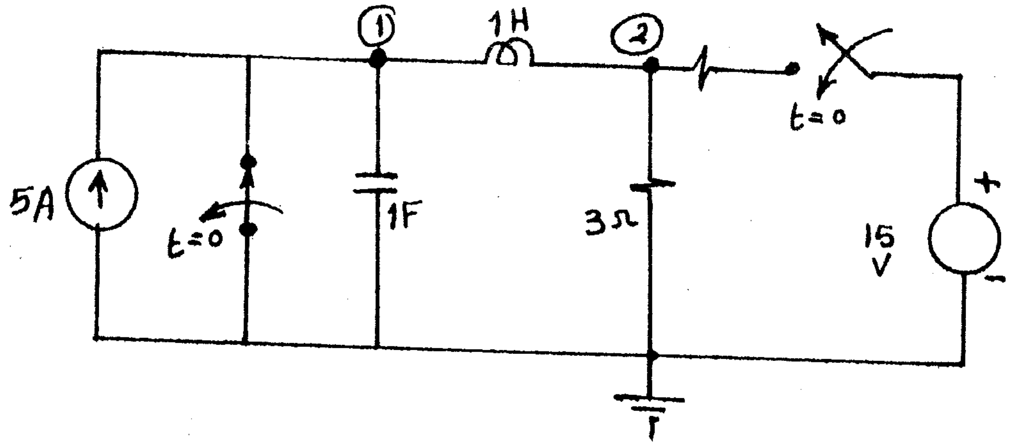


Fig. 15

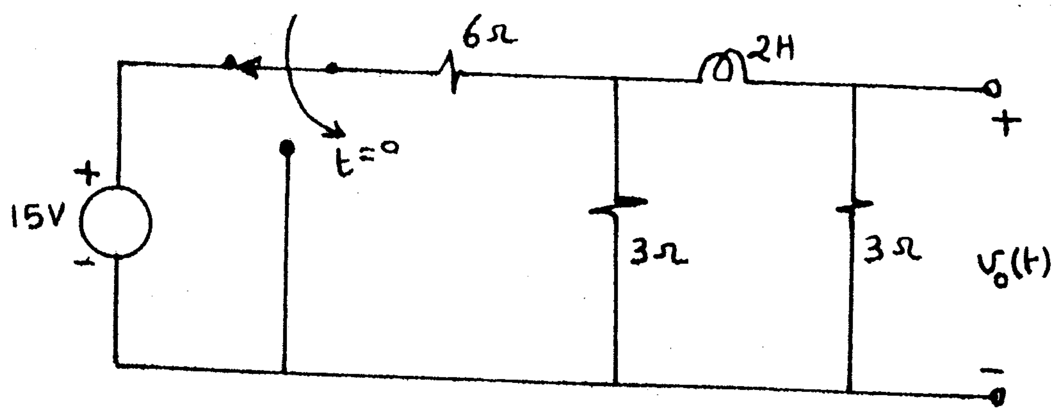
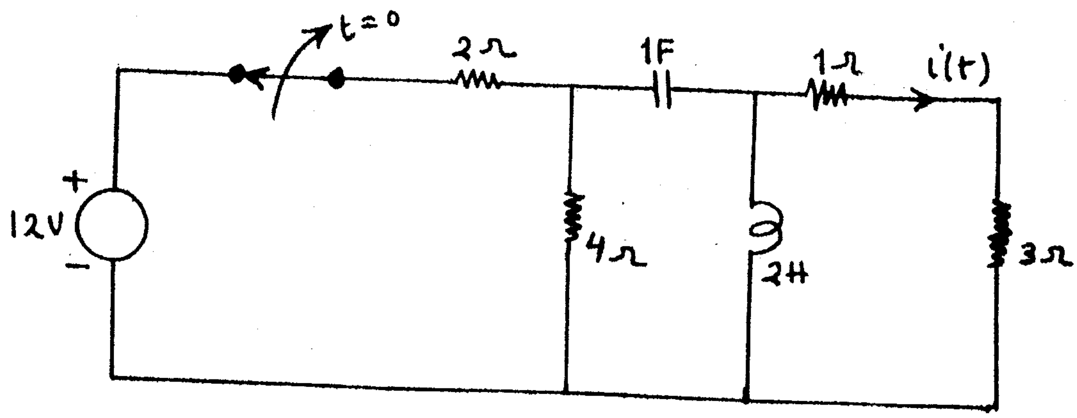


Fig. 16



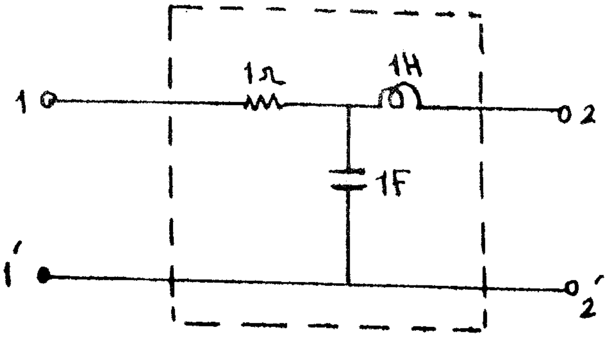


Fig. 17a

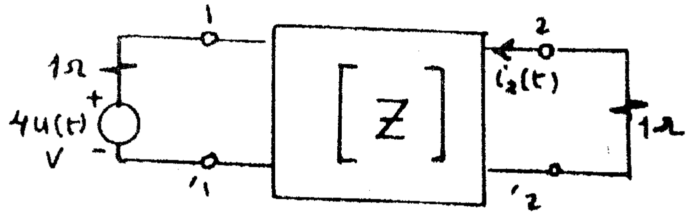


Fig. 17b

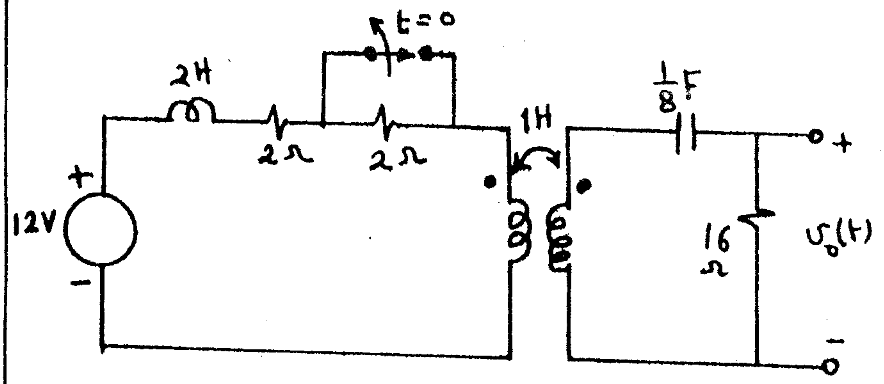


Fig. 18

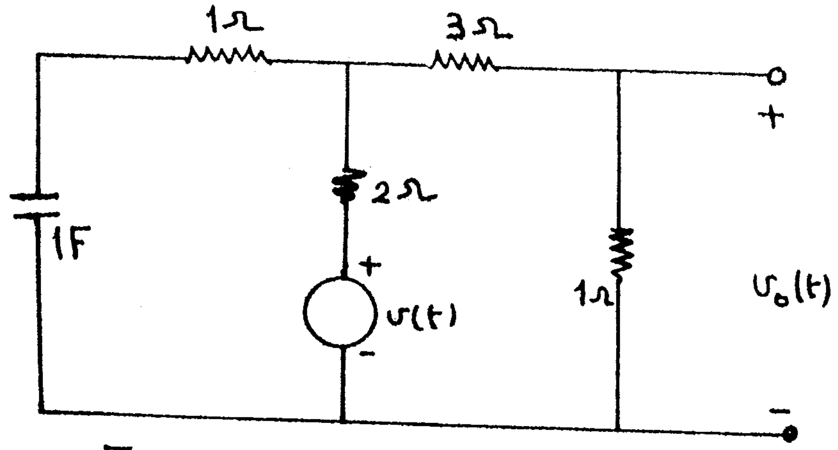


Fig. 19a

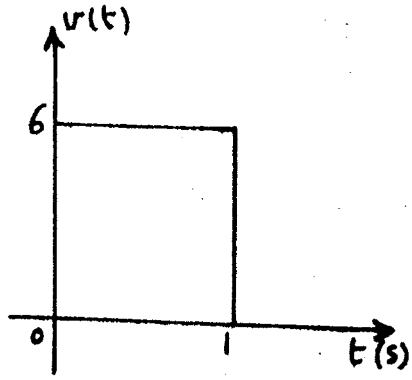


Fig. 19b

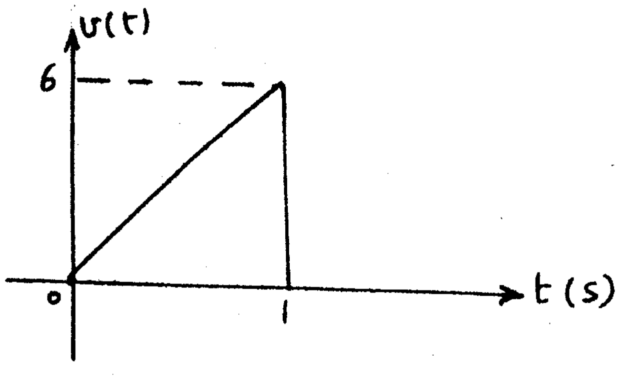


Fig. 19c

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