

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. a) Define Thevenin's Theorem. Find the Thevenin equivalent of the circuit shown in Fig. 1.

[5][CO-1]

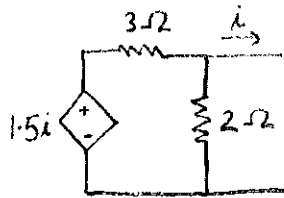


Fig. 1

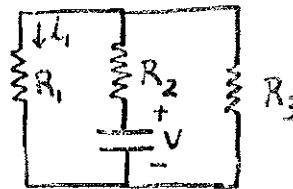


Fig. 2

Q2. Find $v(0^+)$ and $i_1(0^+)$ for the circuit shown in Fig. 2 if $v(0^-) = V_0$.

[4][CO-1]

Q3. Find the current response in a simple series RL circuit, when the forcing function is a rectangular voltage pulse of amplitude V_0 and duration t_0 as shown in Fig. 3.

[5][CO-1]

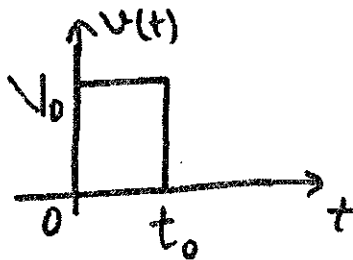


Fig. 3

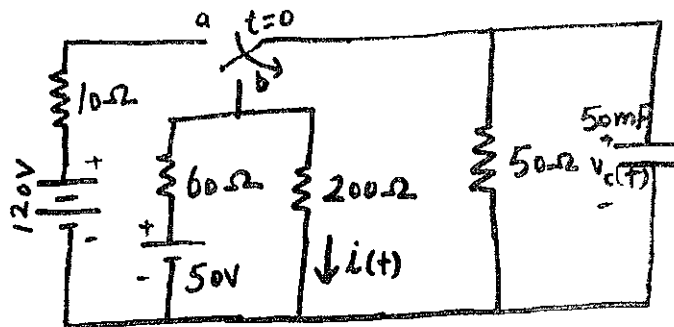


Fig. 4

Q4. Find the capacitor voltage $v_c(t)$ and the current $i(t)$ in the $200\ \Omega$ resistor of Fig. 4 for all time.

[5][CO1]

Q5. a) Find the angle by which i_1 lags v_1 if $v_1 = 120\cos(120\pi t - 40^\circ)$ and $i_1 = -0.8\cos(120\pi t - 110^\circ)$. [2][CO-2][CO3]

b) Let $\omega = 2000$ rad/s and $t = 1$ ms. Find the instantaneous value of current $20 + j(10\angle 20^\circ)$

[3][CO2][CO3]

Q6. Define impedance and its representation for inductive and capacitive circuit. Find the equivalent impedance of the network shown in Fig. 5 given an operating frequency of 5 rad/s.

[5][CO3]

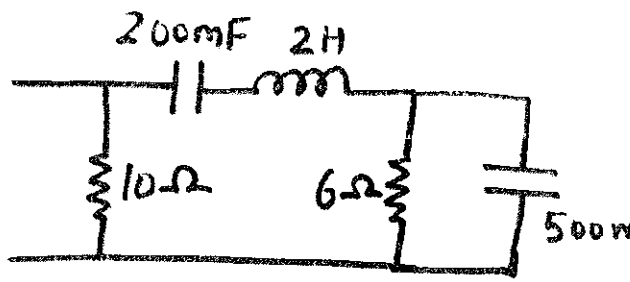


Fig. 5

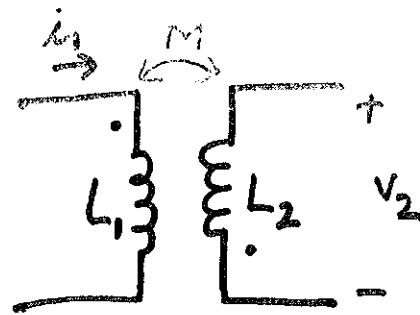


Fig. 6

Q7. a) What is step-up and step-down transformer? For the circuit shown in Fig. 6, assume $M = 10$ H, coil L_2 opened and $i_1 = -2e^{-5t}$ A, find the voltage v_2 . [3][CO-4]

b) What is biomedical signal? Describe the process of acquisition of biomedical signals through electrodes in ECG. [3][CO5]