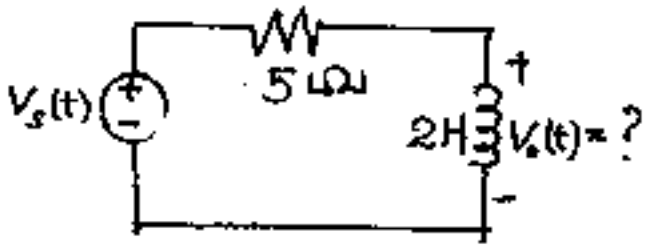
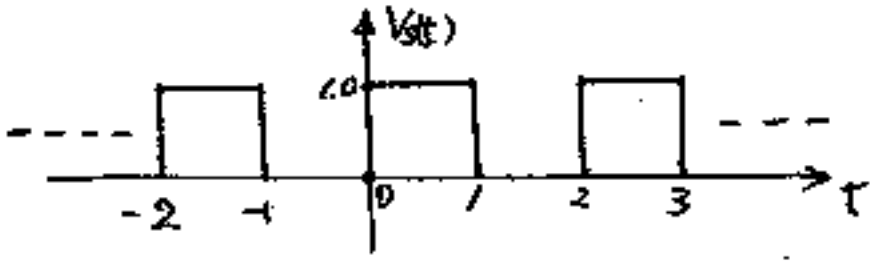
1.Let the voltage source $V_s(t)$ be given as below,

(a) Find the Fourier series of the voltage source. (10%)

(b) Find the first three soinusoidal terms of the output voltage $V_o(t)$. (10%)

You don't need to calculate the values of $\sqrt{(\,)}$ and $\tan^{-1}(.)$ in the answer.



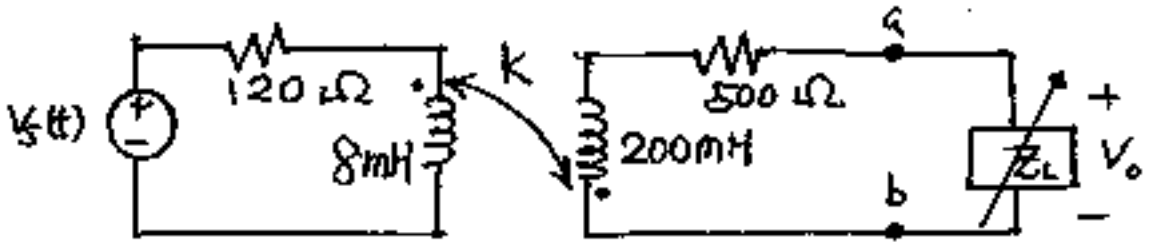


2.(a) Find the Thevenin's equivalent circuit as seen from terminals a-b.

Please use amplitude voltage phasor and impedance! (15%)

(c) Find the load impedance Z_L for maximum output power. (5%)

The coefficient of coupling of the mutual inductors k is equal to 0.8 and the input voltage source is $V_s(t) = 125 \cos 5000t$ V.



3.Calculate the reading of each wattmeter in the following circuit. (10%)

The three-phase voltage is given as

$V_a(t)=120\sqrt{2}\cos wt$ V

$V_b(t)=120\sqrt{2}\cos(wt-120^0)$ V

$V_c(t)=120\sqrt{2}\cos(wt+120^0)$ V

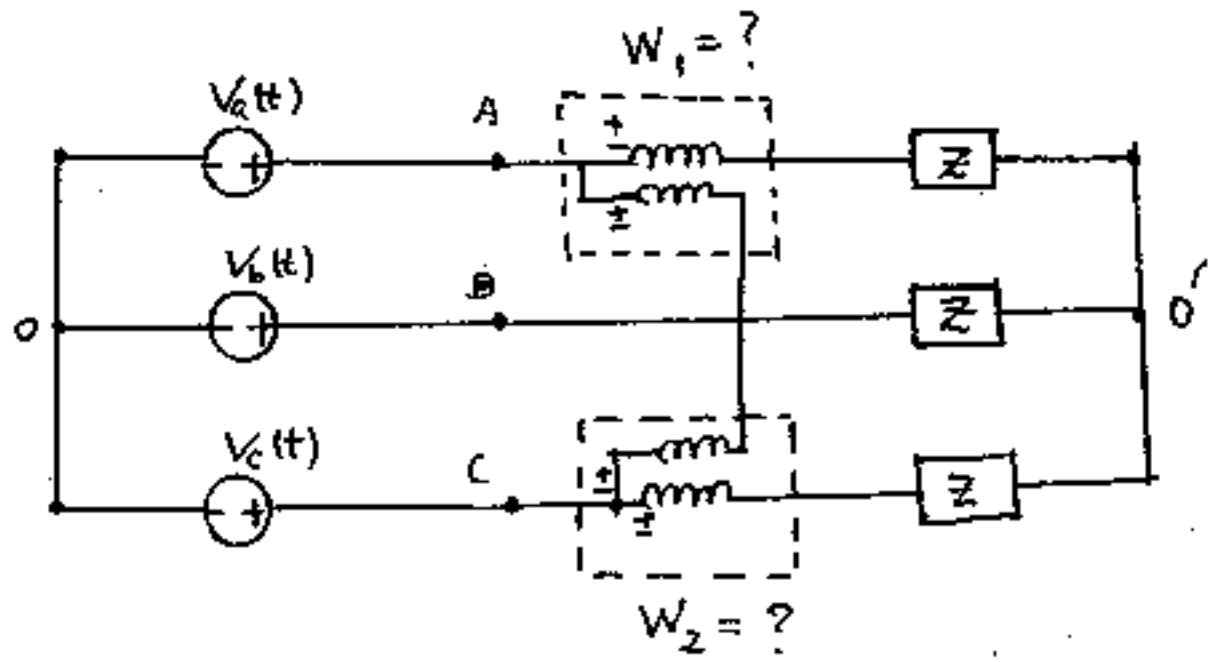
$Z=10\angle -75^\circ\ \Omega$

$\sin 15^0=\cos 75^0=0.2588$

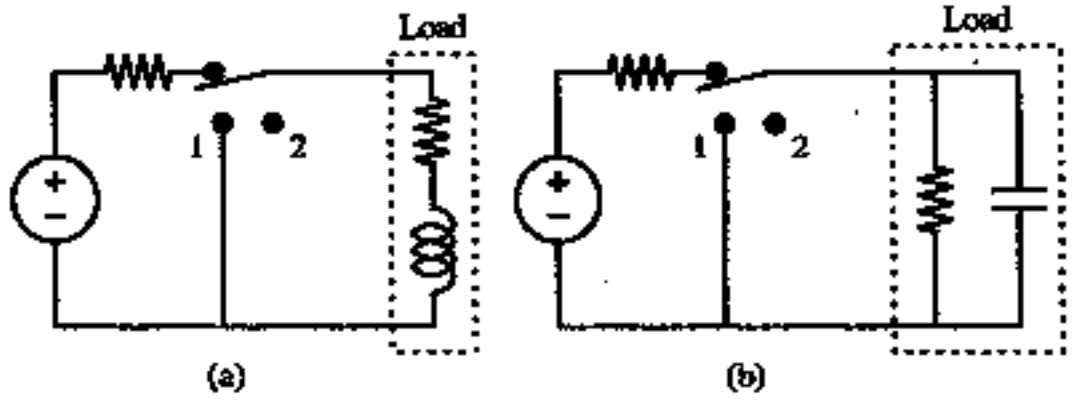
$\sin 45^0=\cos 45^0=0.707$

$\sin 30^0=0.500$

$\cos 30^0=0.866$

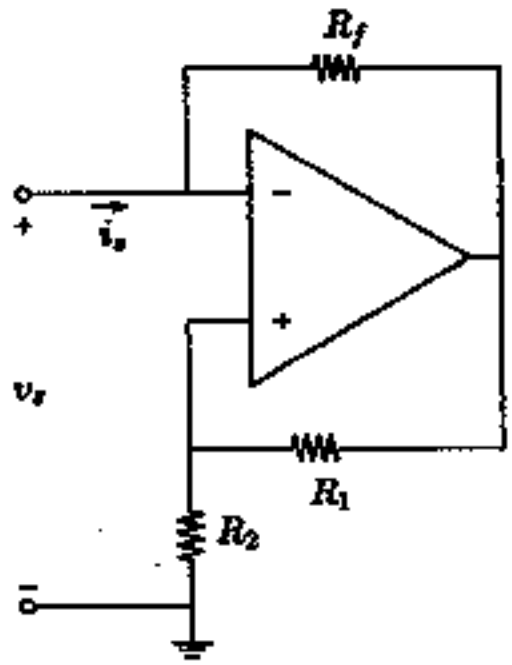


4. For the following circuits, which switch position would you choose to shut down the load? Explain your answer.



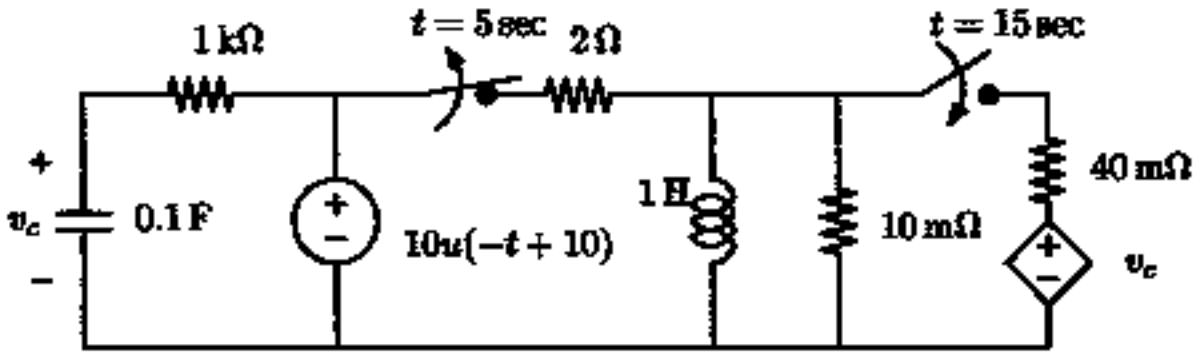
10%

5. Assume the ideal OPAMP is powered by $+V_{cc}$ and $-V_{cc}$. Find the relationship between v_s and i_s in (1) linear operation; (2) positive saturation; (3) negative saturation.



20%

6. Find $i_L(t)$ in the given circuit below. $u(t)$: step function. $(e^{-0.1}=0.9; e^{-0.05}=0.95; e^{-0.01}=0.99)$



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