Electrical Engineering Department
Faculty of Engineering at Shoubra
Banha university

Subject: Electrical Circuit
1st semester, 2015/2016
Sheet No. 1

(1) For each of the following voltage and current $v_s = 12\sin(10^3t+24^o)$ V, $i_s = 8\cos(500\pi t - 25^o)$ A, Find;
- (a) The angular frequency?
- (b) The frequency of the source?
- (c) Express v_s in cosine form.
- (d) Determine v_s and i_s at t = 2.5 ms

(2) For the following pairs of sinusoids, determine which one leads and by how much.
- (a) $v(t) = 10\cos(4t-60^o)$, $i(t) = 4\sin(4t+50^o)$
- (b) $v_1(t) = 4\cos(377t+10^o)$, $v_2(t) = -20\cos(377t)$
- (c) $x(t) = 13\cos 2t + 5\sin 2t$, $y(t) = 15\cos(2t-11.8^o)$

(3) Transform the following sinusoids to phasors:
(a) $-10\cos(4t+75^o)$ (b) $5\sin(20t-10^o)$ (c) $4\cos 2t + 3\sin 2t$

(4) Obtain the sinusoids corresponding to each of the following phasors:
(a) $V_1 = 60\angle 15^o$, $\omega = 1$ (b) $V_2 = 6+j8$, $\omega = 40$ (c) $I_1 = 2.8e^{-j/3}$, $\omega = 377$ (d) $I_2 = -0.5-j1.2$, $\omega = 10^3$

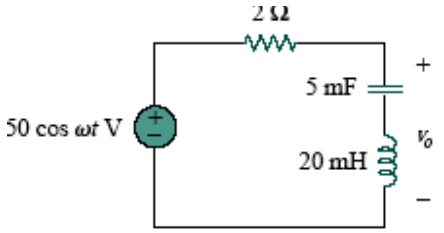
(5) Determine the current that flows through an 8-Ω resistor connected to a voltage source $v_s = 110\cos 377t$

(6) What is the instantaneous voltage across a 2-μF capacitor when the current through it is:
$i = 4\sin(10^6t+25^o)$ A?

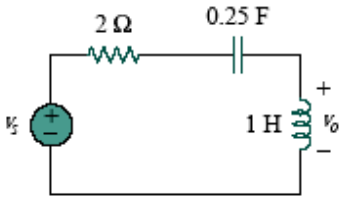
(7) The voltage across a 4-mH inductor is $v(t) = 60\cos(500t-65^o)$ V Find the instantaneous current through it?

(8) A current source of $i(t) = 10\sin(377t+30^o)$ A is applied to a single element load. The resulting voltage across the element is $v(t) = -65\cos(377t+120^o)$ V. What type of element is this? Calculate its value.

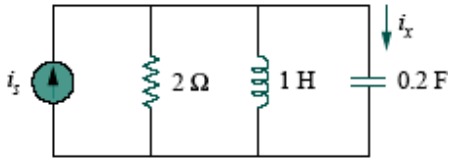
(9) What value of ω will cause the voltage v_o in the figure to be zero?



(10) If $v_s = 5\cos 2t$ V in the figure. Find v_o using voltage divider rule.



(11) Find i_x using current divider rule, when $i_s = 2\sin 5t$ A is supplied to the circuit shown in figure.



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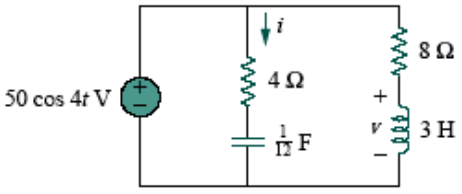
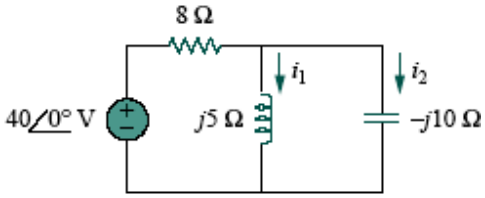
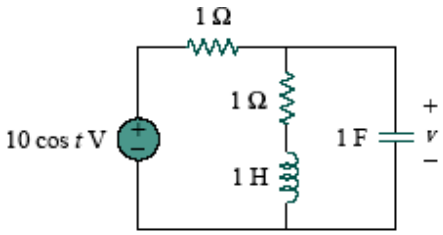
(12) Find i(t) and v(t) in the circuit shown, if the source frequency is 60 Hz.



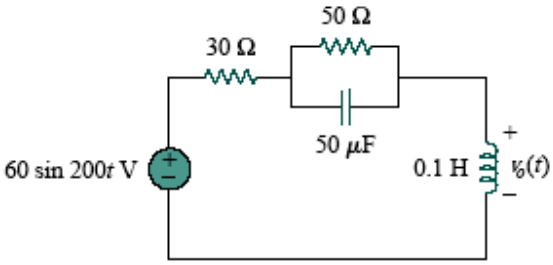
(13)) In the circuit shown in fig. Calculate i_1(t) and i_2(t) using current divider rule.



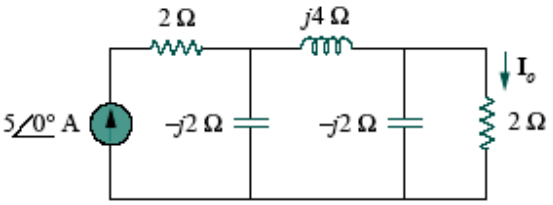
(14) Find v(t) in the RLC circuit



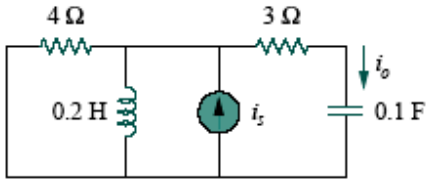
(15) In the circuit shown in fig. Calculate v_o(t) using voltage divider rule.



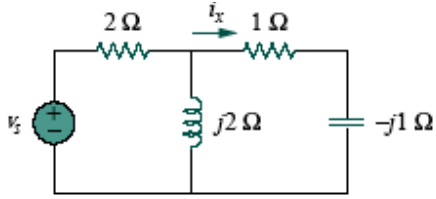
(16) Find current I_o in the network shown



(17) If $i_s = 5\cos(10t+40^o)$ A find i_o



(18) Find v_s(t) in the circuit shown if the current i_x through the 1-Ω resistor is 0.5 sin200t A.



(19) If $V_o = 8\angle 30^o$ V find I_s.