Exam 3 — Fall 2015   (24 November 2015)

Problem 1:   Part A

$V_{rms} = 2.3V$, $V_{peak-to-peak} = 6.5V$, $f = 5mHz$

$w(t) = 3.25 \cos(10^7\pi t + 90°) V$

$\overline{V} = 3.25\angle 90°$

Problem 1: Part B

$1 + j2.73$ or $2.9\angle 69.9°$

$4.39 - j0.122$ or $4.39\angle -1.59°$

Problem 1: Part C $1600 - j3200$ or $3578\angle -63.4°$

Problem 2:

$-12V$	$-12V$	$-5.31V$	$2.4V$
$0A$	$9mA$	$4.82mA$	$0A$
$18V$	$0V$	$0V$	$0V$
$0A$	$9mA$	$5.65mA$	$1.8mA$

Problem 3:

$0A$, $0A$,   KCL @ i_2 : $500i_2 + 25\dfrac{di_2}{dt} + 7\dfrac{di_s}{dt} = 0$

Exam 3 — Spring 2015 (3 April 2015)

Problem 2: $\tau = 526nS$, $T = 30ms$

Problem 3:

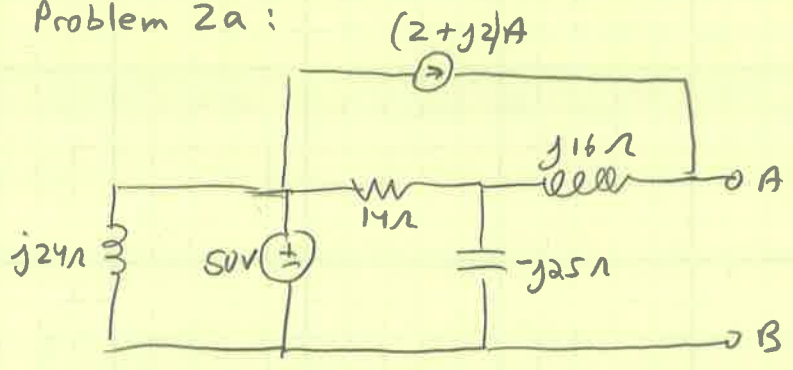| 0	$6.75mA$	0
$1mA$	$-0.6875mA$	$1mA$
$-120V$	$-120V$	$150V$
$150V$	$-103.125V$	$150V$

$N_c(t) = 150 - 270e^{-1000t} V$

$i_c(t) = 6.75\times10^{-3} e^{-1000t} A$

Extra Credit: $10\mu J$, $40\mu J$, $24mW$

Exam 4 - Spring 2015 (22 April 2015)

Problem 1: $2.5V$, $2ms$, $1.77V$, $2.5 \cos(1000\pi t - 60°)$

$15 \underline{/20°}$ mV, $25 \underline{/-25°}$ A

$1.2 \cos(50,000\pi t - 40°)$, $2 \cos(50,000\pi t + 65°)$

$6.41 - j1.6$ or $6.6 \underline{/-13°}$

$1.39 + j7.88$ or $8 \underline{/80°}$

Problem 2a:

$(2+j2)A$

$j16\Omega$

14Ω

$j24\Omega$ $50V$ $-j25\Omega$

A

B

Exam 3 - Fall 2014 (25 November 2014)

Problem 1: $i_2(0^-) = i_2(0^+) = 0$ A

KVL @ i_2: $i_2 R_0 + 25 \frac{di_2}{dt} - 15 \frac{di_s}{dt} = 0$

Problem 2:

0 A	0.4667 A
0.5833 A	0.5833 A
0.1167 A	0 A
0 V	-7 V
7 V	0 V

Problem 3:

$V_c(t) = 5 - 5e^{-40(t-5\times10^{-3})}$ V

$V_R(t) = 5e^{-40(t-5\times10^{-3})}$ V

Problem 4:

$4 \underline{/45°}$ V

$25 \underline{/-10°}$ mA

$6 \cos (10,000 \pi t + 40°) \, V$

$21 \cos (10,000 \pi t + 65°) \, A$

$6.414 + j1.414$ or $6.568 \underline{/12.43°}$

$10 \underline{/70°}$ or $3.42 + j9.397$

$12 - j32$ or $34.18 \underline{/-69.44°}$

Problem 5:

$\bar{V}_g = 9 - j15 \, V$

$\bar{I}_g = -j3 \, A$

Exam 3 - Spring 2013 (5 April 2013)

Problem 1:

$i_2 R_o + 40 \frac{di_2}{dt} + 5 \frac{di_1}{dt} = 0$

$N_1(t) = 32 e^{-400t} + 5 \frac{di_2}{dt} \, V$

Problem 2:

$i_1(0^+) = 4.67 A, \quad i_1(\infty) = 10.5 \, A$

$i_1(t) = 10.5 - 5.83 e^{-6000t}$

Problem 3:

$N_1(0^- \mu s) = -20 V$	$N_2(0^- \mu s) = 0 V$
$N_1(0^+ \mu s) = 0 V$	$N_2(0^+ \mu s) = 0 V$
$\bar{N}_1(5 \mu s) = -1.21 V$	$N_2(5 \mu s) = 0 V$
$N_1(15 \mu s) = -2.92 V$	$N_2(15 \mu s) = -32.9 V$

Exam 4 - Spring 2013   (26 April 2013)

Problem 1:

$$\overline{V}_g = 9 - j15 \text{ V} \quad \text{or} \quad 17.5 \underline{/-59°} \text{ V}$$

$$\overline{I}_g = -j3 \text{ A} \quad \text{or} \quad 3 \underline{/-90°} \text{ A}$$

Extra Credit   (switch closes at $t = 10$ ms)

$$i_1 (10^- \text{ms}) = 0 \text{ A}$$

$$i_1 (10^+ \text{ms}) = \frac{14}{3} \text{ A}$$