

Solutions to Fall 2005 Final Exam:

Problem 1

- a) 5v
- b) type: cap value: 250uF

Problem 2

- a) $V_{out}(0^-) = 6v$
- b) $7500(3s+8000)/s(s^2+5750+(3162)^2)$
- c) $V_{out}: 6(1-e^{-t/\tau})$

Problem 3

- a) $S = 1000VA$
- b) $Pf = .816$ lagging
- c) $C = 107\mu F$
- d) $I_{diff} = 1.5A$

Problem 4

a) $H1(s) = \frac{R/L}{s + R/L}$

$$H2(s) = 2$$

$$H3(s) = \frac{s}{s + 1/RC}$$

$$H4(s) = 5$$

$$H1(s) = \frac{10s(R/L)}{(s + R/L)(s + 1/RC)}$$

- c) $A = .5$
- d) none

Problem 5

- a) $Z_{load} = 50 - j50$
- b) $I_{line} = 70.7$
- c) $P_{line} = 1.5MW$
- d) $Eff = 60\%$

Problem 6

- a) $\omega = 1000rps$
- b) $\omega_{cutoff} = 1000$
- c) 2nd order LPF
- d) $A_v = 10$

Problem 7

- a) $5*(2G/(G+2))$
- b) $V_{out} = 10\cos(1000t + 30)$
- c) $H(s) = \frac{200s}{(s^2 + 200s + (1000)^2)}$
- d) $5\cos(1000t)$