PHYS 223 University Physics III Exam 5

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Proctor's signature

- 1. A 12.0-V battery is connected in series with a resistor and an inductor, with R = 10.0 Ohms and L = 6.00 H respectively. Find the energy stored in the inductor
 - a. when the current reaches its maximum value and 4.325
 - b. at an instant that is a time interval of one time constant after the switch is closed. 1:73 J

at t= 2

 $I_{MAX} = \frac{V_{b}}{R} = \frac{12}{10} = 1.2.A$

i(t) = Imax (1-e-t/2)

a) $U = \frac{1}{2}LJ^2 = \frac{1}{2}\times6\times(12)^2 = 4.32J$

ハ(セ)= 1,2(1-モ)

i = 0.759

=1,2 × 0.632)

 $U = \frac{1}{2} \times 6 \times (0.759)^2$

(1 (2) = 1.73 J

R oog L

+

Figure 1



3. In the transformer shown in Figure 3, the load resistance R_L is 150 Ohms. The turns ratio N_1 / N_2 is 4.00, and the rms source voltage is V = 120.0 V.

What is the power GW dissipated in the load?



Figure 3

 $\frac{V_2}{V_1} = \frac{V_2}{V_1} = \frac{1}{4}$ V2 = V1 = 120 = 30V $P = \frac{\sqrt{2}}{R} = \frac{(30)^2}{150} = \frac{900}{150} = 6 W$

 $I = \frac{30}{150} = 0.200A$