PHY114 S09 Practice Exam 3

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1. Neon signs require 12kV for their operation. To operate from a120V line, what must be the ratio of secondary to primary turns of the transformer? What would the voltage output be if the transformer were connected backward to the 120V line?

2. A circular loop in the plane of the paper lies in a 0.53T magnetic field pointing into the paper. If the loop's diameter changes from 18.8cm to 7.6cm in 0.48s.What is the magnitude of the average induced emf?

3. A coil has 3.10Ω resistance and $440mH$ inductance. If the current is $3.80A$and is increasing at a rate of $3.37A/s$, what is the potential difference across the coil at this moment?

4. An LRC circuit has inductance $L = 4.13$mH and resistance $R = 4.87$kΩ. What must be the capacitance to produce resonance at 49.0kHz? What will be the maximum current at resonance if the peak external voltage is 150V?

5. In an EM wave the magnetic field has a frequency of $55.0kHz$ and an rms strength of $7.66 \times 10^{-9}T$. Determine the frequency of the electric field. Determine the rms strength of the electric field.

6. What is the wavelength of a $2.788 \times 10^{10}Hz$ radar signal? What is the frequency of an X-ray with wave-length 0.10 nm?

7. The magnification of a convex mirror is m for objects d from the mirror.What is the focal length of this mirror? What is its radius of curvature?

8. In a slide or movie projector, the film acts as the object whose image is projected on a screen.If a 125 -mm-focal-length lens is to project an image on a screen 5.50 m away, how far from the lens should the slide be? If the slide is 37 mm wide, how wide will the picture be on the screen?

9. The minimum thickness needed for an antireflective coating applied to a glass lens in order to eliminate reflections for blue (440 nm) light at normal incidence is found to be 80 nm. What is the minimum thickness if the same coating is to eliminate reflection of red light (730 nm)?