Comment 1: Either of highlighted answers to question 5 was accepted.

Comment 2: Arithmetical errors were not penalized for; where possible they were assumed to be the cause of incorrect answers.
#1. A long straight wire is in the plane of a rectangular conducting loop. The straight wire carries a constant current $i$, as shown. While the wire is being moved toward the rectangle the current in the rectangle is:

A. zero
B. clockwise
C. counterclockwise
D. clockwise in the left side and counterclockwise in the right side

#2. A charged capacitor and an inductor are connected in series. At time $t = 0$ the current is zero, but the capacitor is charged. If $T$ is the period of the resulting oscillations, the next time after $t = 0$ that the voltage across the inductor is a maximum is:

A. $T$
B. $T/4$
C. $T/2$
D. $T$
E. $2T$

#3. Radio receivers are usually tuned by adjusting the capacitor of an LC circuit. If $C = C_1$ for a frequency of 600 kHz, then for a frequency of 1200 kHz one must adjust $C$ to:

A. $C_1/2$
B. $C_1/4$
C. $2C_1$
D. $4C_1$
E. $\sqrt{2}C_1$

#4. A coil has a resistance of 60 $\Omega$ and an impedance of 100 $\Omega$. Its reactance, in ohms, is:

A. 40
B. 60
C. 80
D. 117
E. 160

#5. A charged capacitor and an inductor are connected at time $t=0$. After one and a half periods of the resulting oscillations, which of the following quantities reaches its maximum?

A. Magnetic energy
B. Magnetic flux through the inductor
C. The emf of the inductor
D. $di/dt$
E. None of the above

#6. A 20 mH superconducting inductor in an oscillating LC circuit with angular frequency 3000 s$^{-1}$ stores a maximum energy 1 $\mu$J. The maximum voltage on the capacitor is:

A. 120 V
B. 0.04 F
C. 0.6 mV
D. Zero
E. Impossible to evaluate
F. None of the above