

58. If air is blown at the mouth of a tube of length 30 cm and diameter 2 cm, closed at one end, the frequency of the second harmonic will be
- (A) 330 Hz
 - (B) 475 Hz
 - (C) 825 Hz
 - (D) 600 Hz
59. For a plane electromagnetic wave propagating in free space, which of the following relations between \mathbf{E} and \mathbf{B} , the electric and magnetic fields at a given point in space, and the unit vector $\hat{\mathbf{k}}$ in the direction of propagation, is not correct
- (A) $\mathbf{B} = \frac{1}{c} \hat{\mathbf{k}} \times \mathbf{E}$.
 - (B) $\mathbf{E} = \frac{1}{c} \mathbf{B} \times \hat{\mathbf{k}}$.
 - (C) $\mathbf{E} = c \mathbf{B} \times \hat{\mathbf{k}}$.
 - (D) $\hat{\mathbf{k}} \cdot \mathbf{B} = 0$.
60. If a positive ion of with charge four times that of an electron ($+4e$) enters a uniform magnetic field \mathbf{B} with a velocity $3 \times 10^5 \text{ m/s}$, normal to the field and experiences a force of $3.84 \times 10^{-13} \text{ N}$, then the strength B of the magnetic field is
- (A) 2.0 T .
 - (B) 2.8 T .
 - (C) 4.2 T .
 - (D) 5.5 T .
61. The drift velocity of electrons constituting a current of 5 Amperes through a metallic wire of 3 sq.mm cross-section is close to (assume 10^{23} electrons per cc in the metal)
- (A) $500 \mu \text{ m/s}$.
 - (B) $50 \mu \text{ m/s}$.
 - (C) $350 \mu \text{ m/s}$.
 - (D) $100 \mu \text{ m/s}$.