1. A rigid conducting rod of mass $M$ is perpendicular to and slides down a set of conducting parallel rails (see Fig. 1) with constant speed $v_0$. The rails make an angle of 60° with the vertical gravitational acceleration ($g = 9.8 \text{ m/s}^2$). There exists a uniform vertical magnetic field $\vec{B}_0$. The rails are connected to a light bulb of resistance $R$. Neglect the resistance of the rails and rod. If the magnetic field strength is doubled, the constant velocity now becomes

(1) $v_0/4$  (2) $v_0/2$  (3) $v_0$  (4) $2v_0$  (5) $4v_0$

2. How long (in cm) should a quarter-wave length antenna be so as to be optimal for Classic 89 (F = 89.1 MHz)?

(1) 84  (2) 1.2  (3) 708  (4) 350  (5) 150

3. The motor shown in Fig. 2.1 is rotating clockwise. The DC generator shown in Fig. 2.2 is also rotating clockwise.

[i] What is the direction of the current flow at point P?

[2] What is the direction of the current flow at point Q?

(1) [i] to the left and [ii] to the right
(2) [i] to the right and [ii] to the left
(3) [i] to the right and [ii] to the left
(4) [i] to the left and [ii] to the left
(5) none of the above