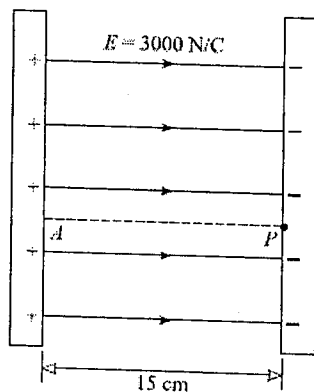


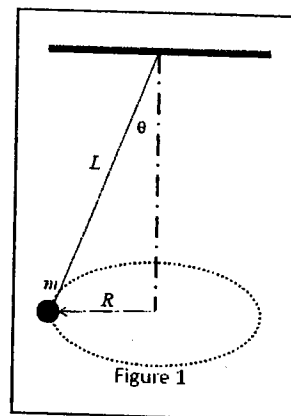
1. A conducting bar of mass m slides down the conducting wedges. The wedges are separated by a distance ℓ , connected at the top by a resistance R , and make an angle θ with the vertical. A uniform magnetic field B points horizontally. When released from rest the bar soon reaches a constant speed. Find an expression for this speed. (10%)
2. A square conducting loop of side $s = 50 \text{ cm}$ and resistance 5Ω moves to the right with speed $v = 25 \text{ cm/s}$. At time $t = 0$, its rightmost edge enters a uniform magnetic field $B = 1.0 \text{ T}$ pointing into the page. The magnetic field covers a region of width $w = 75 \text{ cm}$. Plot (a) the current and (b) the power dissipation in the loop as functions of time, taking a clockwise current as positive and covering the time until the entire loop has exited the field region. (10%)
3. Two charges are placed on the x -axis: $+3.0 \text{ mC}$ at $x=0$ and -5.0 mC at $x=40 \text{ cm}$. Where must a third charge q be placed if the force it experiences is to be zero? (10%)
4. Two charged metal plates in vacuum are 15 cm apart as shown in the figure below. The electric field between the plates is uniform and has a strength of $E=3000 \text{ N/C}$. An electron ($q = -1.6 \times 10^{-19} \text{ C}$, $m = 9.1 \times 10^{-31} \text{ kg}$) is released from rest at point P just outside the negative plate. (a) How long will it take to reach the other plate? (b) How fast will it be going just before it hits? (10%)



5. A source of electromagnetic waves with 10^7 W of power radiates uniformly in all directions. Calculate the amplitude of the electric field vector for waves at distance of (a) 100 m from the source and (b) 1.0 km from the source. (10%)
6. Find the average force exerted by the sun's light on the earth if the average intensity of radiation from the sun is 1.4 kW/m^2 . (10%)

注意：背面有試題

7. A conical pendulum is showed as Figure 1, the bob (mass m is 1.5 kg) whirls along with a horizontal circle at constant speed v at the end of a string (length L is 2.0 m, angle θ is 30°). Find the period of the pendulum (the time for the bob to make one revolution). (10%)



8. A satellite has the circularly orbit 800 km above the earth's surface. Calculate the period and speed of the satellite. (10%)
 (NOTE: earth's radius = 6.4×10^6 m, gravity = 9.8 ms^{-2})
9. Please explain the mechanisms of blue sky, red sunset and white cloud, respectively. (10%)
10. Assume that the indices of refraction of air and a plate glass are 1.0 and 1.732, respectively. If the wavelength of incident ray in air is 600 nm, what is the wavelength in glass (the speed of light in air is 3×10^8 m)? (10%)

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