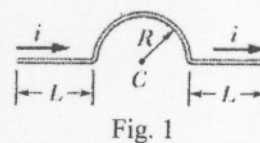


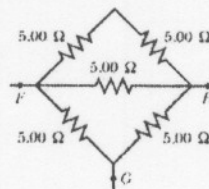
可以使用計算機

1. What is the phase difference of the waves from the two slits when they arrive at the m th dark fringe in a Young's double-slit experiment? (10%)

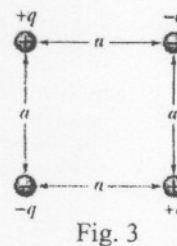
2. The wire shown in Fig. 1 carries current i . What magnetic field is produced at the center C of the semicircle by (a) each straight segment of length L , (b) the semicircular segment of radius R , and (c) the entire wire? (15%)



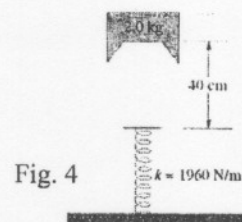
3. In Fig. 2, find the equivalent resistance between points (a) F and H and (b) F and G . (15%)



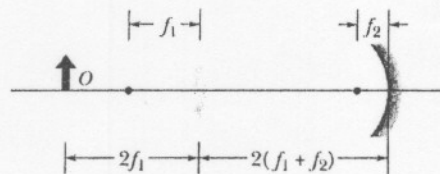
4. Derive an expression for the work required to set up the four-charge configuration of Fig. 3, assuming the charges are initially infinitely far apart. (15%)



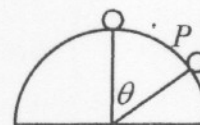
5. A 2.0 kg block is dropped from a height of 40 cm onto a spring of spring constant $k = 1960 \text{ N/m}$ (Fig. 4). Find the maximum distance the spring is compressed. (15%)



6. In Fig. 5, an object is placed a distance in front of a converging lens equal to twice the focal length f_1 of the lens. On the other side of the lens is a concave mirror of focal length f_2 separated from the lens by a distance $2(f_1 + f_2)$. Find the location, type, orientation, and lateral magnification of the final image, as seen by an eye looking toward the mirror through the lens and just past the object. (15%)



7. A body of mass m is seated on a hemispherical mound of ice as shown in the figure. If he starts sliding from rest (assume the ice to be frictionless), where is the point P (i.e. find θ) at which the body leaves the mound? (15%)



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