

科目：普通物理 適用：電機系二

編號：332

考生注意：1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 試題隨卷繳回。

本試題
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1. (15%) A stone is dropped from rest and falls freely. Determine the position and speed of the body after 1.0, 2.0, and 4.0 sec have elapsed.
2. (15%) Please find (a) the momentum and (b) the kinetic energy of a 10-gm bullet with a speed of 760 m/sec. (c) How fast must a 90-kg man move to have the same momentum?
3. (15%) Two 100-gm ice cubes are dropped into 400gm of water in a cup. If the water was initially at a temperature of 25°C , and if the ice came directly from a freezer operating at a temperature of -15°C , what will be the final temperature of the water? The specific heat of ice is approximately $0.50 \text{ cal/gm } ^{\circ}\text{C}$ in this temperature range and the heat required to melt ice to water is approximately 80 cal/gm .
4. (15%) What is the electric potential at the surface of a gold nucleus? The radius is $6.6 \times 10^{-5} \text{ \AA}$ and the atomic number is 79. The nucleus, assumed spherically symmetrical, behaves electrically for external points as if it were a point charge, equal to that of 79 protons. ($e = 1.6 \times 10^{-19} \text{ coul}$, $\epsilon_0 = 8.85 \times 10^{-12} \text{ farad/meter}$, $\pi = 3.14$).

5. (15%) (a) In the Fig. 1, what is the equivalent resistance of the network?
(b) What are the currents in each resistor? Put $R_1 = 100\Omega$, $R_2 = R_3 = 50\Omega$, $R_4 = 75\Omega$, and $E = 6 \text{ V}$.

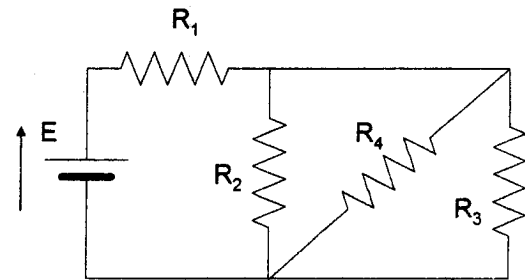


Fig. 1

6. (25%) Please briefly explain the following terms.
 - (a) Snell's Law (b) Ohm's Law (c) Doppler Effect
 - (d) Newton's Laws of Motion (e) Young's Experiment