Multiple Choice. Choose the one alternative that BEST completes the statement or answers the question, and mark your scan sheet. Only the scan sheet will be graded. The correct answers are: B, B, B, D, A.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Three electrons are placed at the vertexes of an equilateral triangle with side length of 5.1 nm. A proton is placed at the center of the triangle. What is the potential energy of this arrangement of charges?
   A) $9.9 \times 10^{-20}$ J  
   B) $-9.9 \times 10^{-20}$ J  
   C) $3.7 \times 10^{-20}$ J  
   D) $-3.7 \times 10^{-20}$ J

2) An electron was accelerated from rest through a potential difference of 9900 V. What is its speed?
   A) $2.9 \times 10^7$ m/s  
   B) $5.9 \times 10^7$ m/s  
   C) $3.9 \times 10^7$ m/s  
   D) $4.9 \times 10^7$ m/s

3) An electric field, $\vec{E} = \frac{1}{r^2} \hat{r}$ N·m$^2$/C, is located in the $xy$-plane. What is the potential difference between $r = 6$ m and $r = 8$ m?
   A) $\frac{9}{28}$ V  
   B) $-\frac{1}{24}$ V  
   C) $\frac{9}{296}$ V  
   D) $\frac{9}{10}$ V

4) The figure shows a current entering a truncated solid cone made of a conducting metal. The electron drift speed at the 3.0 mm diameter end of the cone is $4.0 \times 10^{-4}$ m/s. What is the electron drift speed at the 1.0 mm diameter end of the wire?

   A) $1.2 \times 10^{-3}$ m/s  
   B) $4.4 \times 10^{-5}$ m/s  
   C) $1.3 \times 10^{-4}$ m/s  
   D) $3.6 \times 10^{-3}$ m/s

5) What is the current through resistor $R_3$ in this circuit? (Note, these are batteries, not capacitors!)

   A) 0.043 A  
   B) 1.5 A  
   C) 0.086 A  
   D) 0.028 A