Total number of question –10 , (10 Points each) Total Mark : 100 points

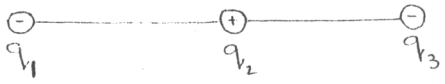
Q1.A particle moves along x-axis.Its position as a function of time is given by $x=At^2+B$ where $A=2.10\ m/s^2$ and $B=2.8$ m. (a).Determine the displacement of the particle during the time interval from $t_1=3.00$ s to $t_2=5.00$ s.(b) Determine the average velocity during during this interval.\

Q2.If the original height of a stone is h=3.0 m. Calculate the the stone's speed when it has fallen to 1.0 m above the ground.Also Calculate the speed of the stone, 1 m above ground, if it is sliding down a frictionless inclined plane.

Q3 a) A 10 Kg ball travel at a speed of 24 m/s strikes an identical ball at rest. If both lock together as a result of collision .What is their common speed afterwards.

b) Calculate the recoil velocity of a 5.0 Kg rifle that shoots a 0.005 Kg bullet at a speed of 120 m/s.

Q4.Three charged particles are arranged in a line as shown in fig. Calculate the net

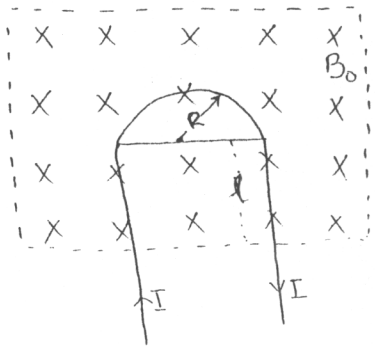


$q_1 = -8\mu C$
$q_2 = +3\mu C$
$q_3 = -4\mu C$

electrostatic force on particle 3.

Q5.An electric charge Q is distributed uniformly through out a non-conducting sphere of radius r_0. Determine the electric field (a)outside sphere ($r>r_0$) and (b)inside the sphere ($r<r_0$).

Q6.A rigid wire, carrying a current I, consist of a semi-circle of radius R and two straight portion as shown in figure. There wire lies in a plane perpendicular to a uniform magnetic field B_0. The straight portion each have length ℓ within field. Determine the net force on the wire due to the magnetic field.



(背面仍有題目,請繼續作答)

Q7.An electron travels at 2.0×10^7 m/s in a plane perpendicular to a 0.010 T magnetic field. Describe its path , qualitatively and quantitatively.

Q8.A highway is to be made of block of concrete 10.0 m long placed end to end with no space in between them to allow for expansion. If the blocks were placed at a temperature of 10^0C, what force of compression would occur if the temperature reached 40^0C? The contact area between each block is $0.20m^2$.

Q9.A 1.00 Kg piece of ice at 0°C melts very slowly to water at 0°C. Assume the ice is in contact with a heat reservoir whose temperature is only infinitesimally greater than 0°C.Determine the entropy change of (a) the ice cube and
(b) The heat resrvoir

Q10. Estimate the average kinetic energy of hydrogen atom (or molecule) room temperature (T=300 K) and use the result to explain why nearly all H atoms are in ground state at room temperature and hence emit no light.