

UNIVERSITY OF BAHRAIN
COLLEGE OF SCIENCE
DEPARTMENT OF PHYSICS

PHYCS 102
TEST 1

DATE: 24/10/20000

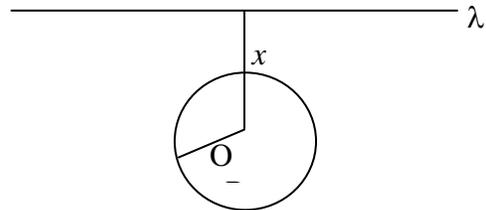
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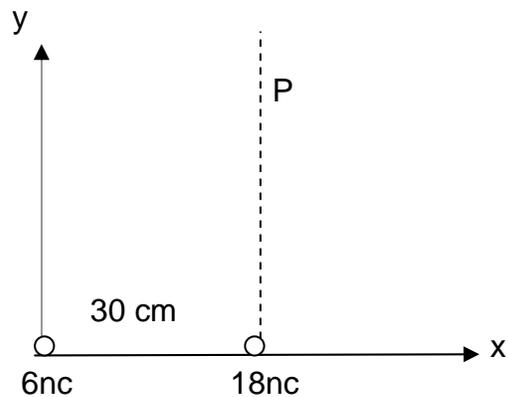
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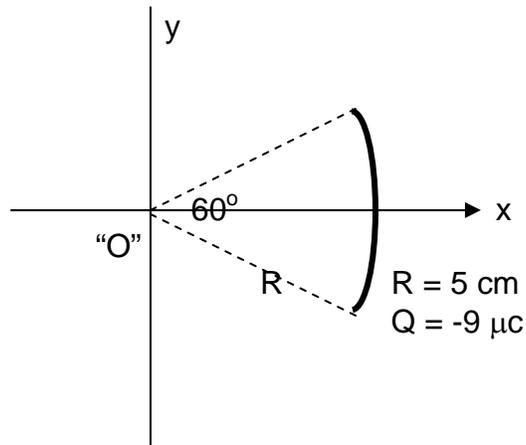
- 1a) A negatively charged ball of mass 1g is moving downward in vacuum with constant velocity through a uniform vertical electric field $E = 10^3 \text{ N/C}$.
- Determine the direction of the electric field.
 - Calculate the charge on the ball.
- b) An infinitely long line of charge having a uniform charge per unit length λ lies at a distance x from a point "O" as shown below: Determine the total electric flux through the surface of a sphere of radius R centered at "O" if :
- $x > R$
 - $x < R$
 - When the line passing through the center "O".



- 2) In the figure given below, compute :
- The electrostatic force between the two charges.
 - The magnitude and direction of electric field at point "P (0.3m, 0.4m)".
 - The potential at point "P".



3. A plastic rod having a uniformly distributed charge ($-9 \mu\text{C}$). The rod has been bent at 60° circular arc of radius (5 cm) as shown in the figure. Find the electric field at point "O".



4. charged spherical shell of radius R has a total charge Q placed inside an uncharged conducting spherical shell that has an inner radius a and outer radius b . **Find :**
- The electric field every where, i.e. in each region 1,2,3 and 4.
 - The induced surface charge densities on the inner and outer surfaces of the uncharged conducting spherical shell.

