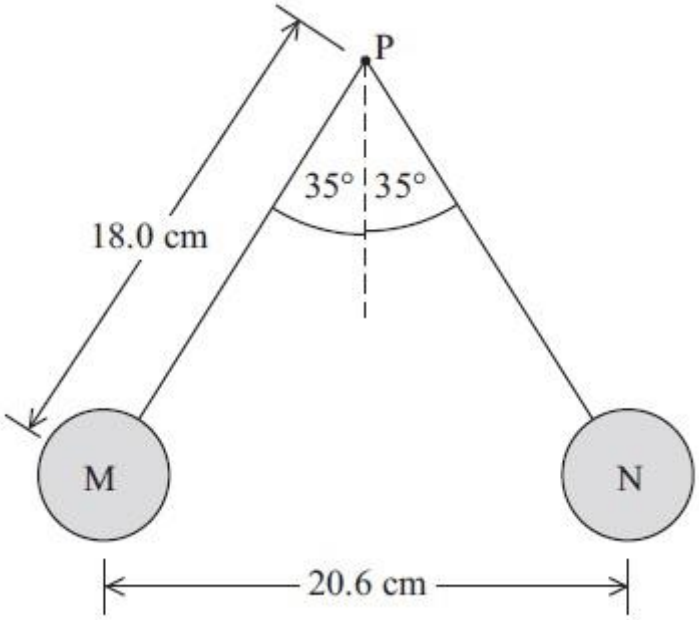
Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic :7_ Electric Field

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Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

Two identical table tennis balls, M and N, are attached to non-conducting threads and suspended from a point P. The balls are each given the same positive charge and they hang as shown in the diagram. The mass of each ball is 2.7 g.



(a) Draw a free-body force diagram for ball M, label your diagram with the names of the forces.

(2)

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(b) (i) Show that the tension in one of the threads is about 3×10^{-2} N.

(3)

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(ii) Show that the electrostatic force between the balls is about 2×10^{-2} N.

(2)

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(iii) Calculate the charge on each ball.

(3)

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Charge = ...

(c) State and explain what would have happened if the charge given to ball M was greater than the charge given to ball N.

Calculate the charge on each ball.

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(2)

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(Total for question = 12 marks)

Q2.
In an experiment to investigate the structure of the atom, α-particles are fired at a thin metal foil, which causes the α-particles to scatter.

(a) (i) State the direction in which the number of α-particles detected will be a maximum.

(1)

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(ii) State what this suggests about the structure of the atoms in the metal foil.

(1)

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(b) Some α-particles are scattered through 180°.

State what this suggests about the structure of the atoms in the metal foil.

(2)

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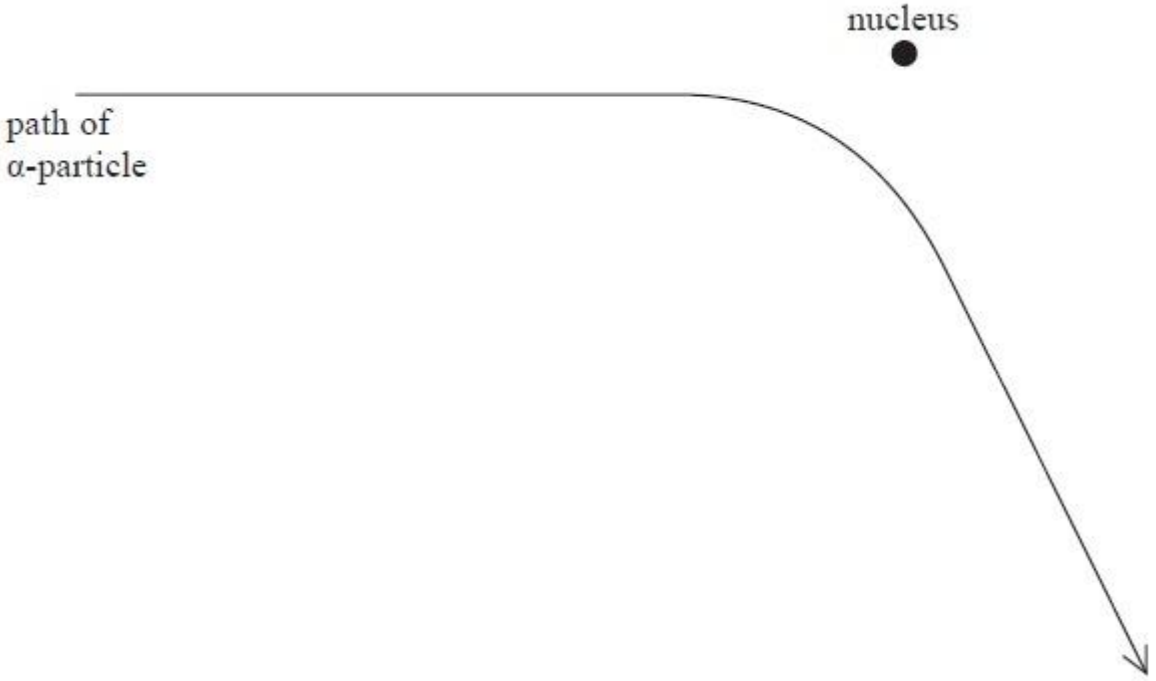
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(c) The diagram shows the path of an α-particle passing near to a single nucleus in the metal foil.

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(i) Name the force that causes the deflection of the α-particle.

(1)

.....

(ii) On the diagram, draw an arrow to show the direction of the force acting on the α-particle at the point where the force is a maximum. Label the force F.

(2)

(iii) The foil is replaced by a metal of greater proton number.

Draw the path of an α-particle that has the same initial starting point and velocity as the one drawn in the diagram.

(2)

(Total for Question = 9 marks)

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