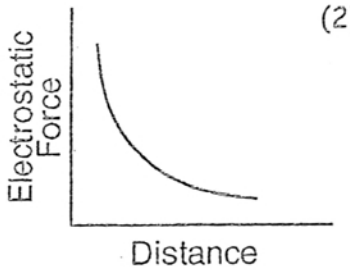
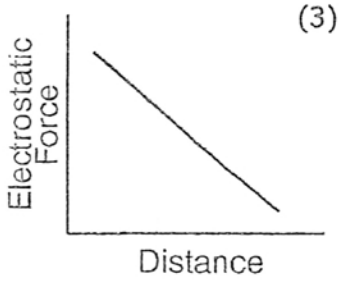
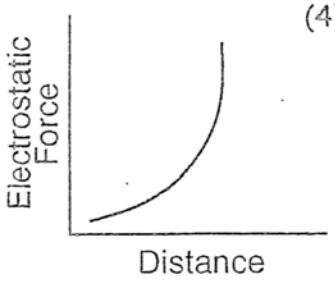
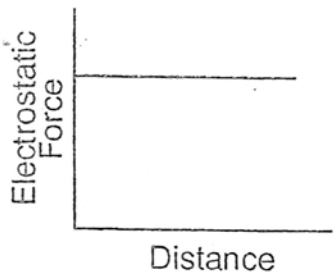
19. Which graph best represents the electrostatic force between an alpha particle with a charge of +2 elementary charges and a positively charged nucleus as a function of their distance of separation?

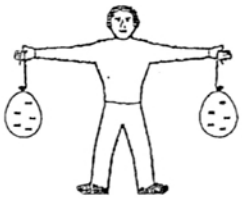
(1)


(2)


(3)


(4)


20. The diagram below shows two negatively charged balloons suspended from nonconducting strings being held by a student.



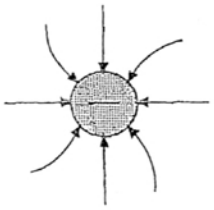
What occurs as the student brings the balloons closer to each other without allowing them to touch?

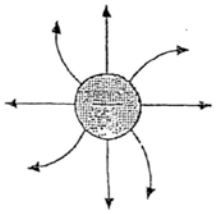
(1) The magnitude of the electrostatic force between the balloons decreases, and they attract each other.
(2) The magnitude of the electrostatic force between the balloons decreases, and they repel each other.
(3) The magnitude of the electrostatic force between the balloons increases, and they attract each other.
(4) The magnitude of the electrostatic force between the balloons increases, and they repel each other.

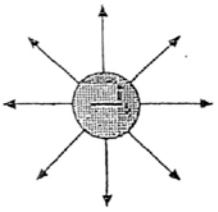
21. Which procedure will double the force between two point charges?

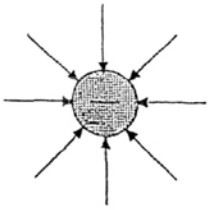
(1) doubling the distance between the charges
(2) doubling the magnitude of one charge
(3) halving the distance between the charges
(4) halving the magnitude of one charge

22. Which diagram best represents the electric field around a negatively charged conducting sphere?

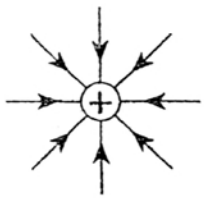
(1)


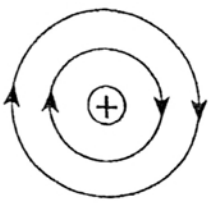
(3)


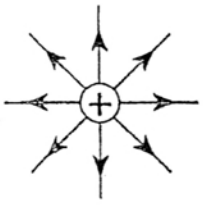
(2)


(4)


23. Which diagram best represents the electric field near a positively charged conducting sphere?

(1)


(3)


(2)


(4)