

Q2. A proton is kept at rest. A positively charged particle is released from rest at a distance d in its field. Consider two experiments; one in which the charged particle is also a proton and in another, a positron. In the same time t , the work done on the two moving charged particles is

- (a) same as the same force law is involved in the two experiments**
- (b) less for the case of a positron, as the positron moves away more rapidly and the force on it weakens**
- (c) more for the case of a positron, as the positron moves away a larger distance**
- (d) same as the work done by charged particle on the stationary proton**

Sol: (c) Force between two protons is equal to the force between proton and a

positron because their charges are same. As the mass of positron is much lesser than proton, ($1/1840$ times) it moves away through much larger distance compared to proton.

Change in their momentum will be same. So, velocity of lighter particle will be greater than that of a heavier particle. So, positron is moved through a larger distance.

As work done = force \times distance. As forces are same in case of proton and positron but distance moved by positron is larger, hence, work done will be more.