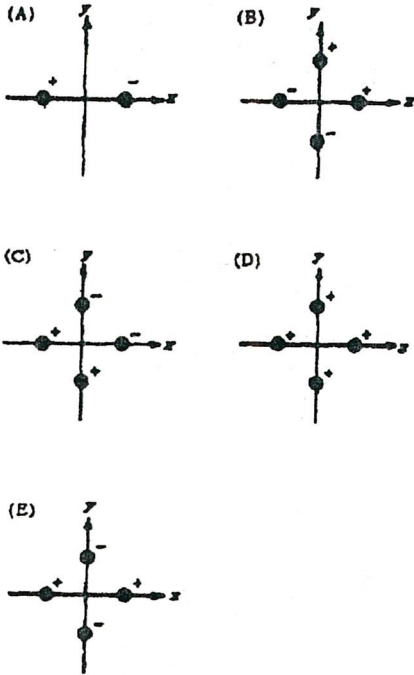


Questions 45–46 refer to five different charge configurations on the xy -plane using two or four point charges of equal magnitude having signs as indicated below. All charges are the same distance from the origin. The electric potential infinitely far from the origin is defined to be zero.



No. 45

In which configuration are both the electric field and the electric potential at the origin equal to zero?

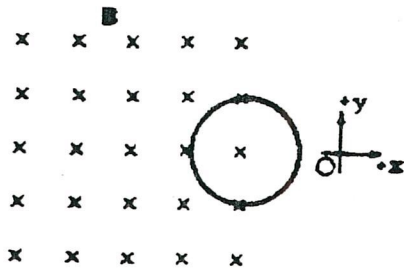
- (A) A (B) B (C) C (D) D (E) E

No. 46

In which configuration is the value of the electric field at the origin equal to zero, but the electric potential at the origin not equal to zero?

- (A) A (B) B (C) C (D) D (E) E

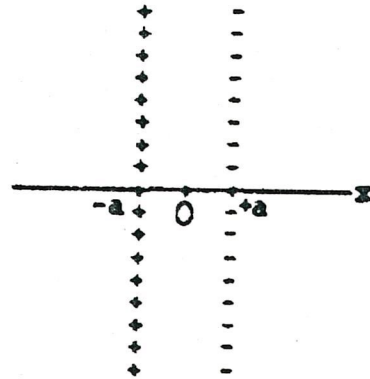
No. 47



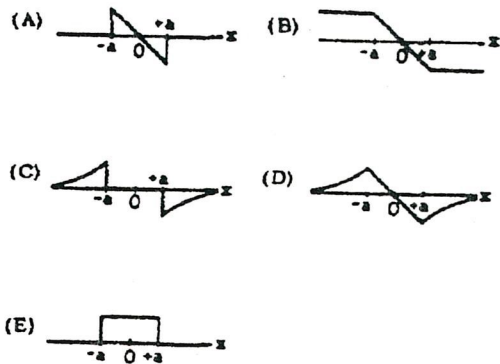
A circular loop of wire is positioned half in and half out of a square region of uniform magnetic field B which is directed into the page as indicated in the figure. A positive clockwise current will be induced in the loop if the

- (A) loop is translated in the $+x$ -direction
 (B) loop is translated in the $+y$ -direction
 (C) loop is translated in the $-y$ -direction
 (D) loop is translated in the $-x$ -direction
 (E) magnetic field strength is increased

Questions 48–49



Two infinite parallel sheets of charge perpendicular to the x -axis have equal and opposite charge densities as shown above. The sheet that intersects $x = -a$ has uniform positive surface charge density; the sheet that intersects $x = +a$ has uniform negative surface charge density.



No. 48

Which graph best represents the plot of electric field as a function of x ?

- (A) A (B) B (C) C (D) D (E) E