PHYSICS

ELECTRIC CHARGES AND FIELDS, ELECTRIC POTENTIAL AND CAPACITORS AND CURRENT ELECTRICITY

111. If an electric dipole is kept in a uniform electric field, then it will experience
(1) A force
(2) A couple and force
(3) A couple and rotates
(4) A force and moves

112. The ratio of the electric field due to an electric dipole on its axis and on the perpendicular bisector of the dipole is
(1) 1 : 2 (2) 2 : 1
(3) 1 : 4 (4) 4 : 1

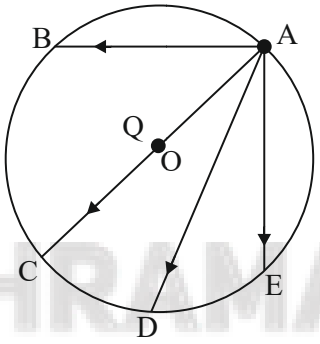
113. A uniformly charged rod with charge per unit length λ is bent in to the shape of a semicircle of radius R. The electric field at the centre is
(1) $\frac{2k\lambda}{R}$ (2) $\frac{k\lambda}{2R}$
(3) zero (4) none

114. If three electric dipoles are placed in some c1osd surface, then the electric flux emitting from the surface will be
(1) Zero (2) Positive
(3) Negative (4) None

115. A cylinder of radius (R) and length (L) is placed in a uniform electrical field (E) parallel to the axis of the cylinder. The total flux for the surface of the cylinder is given by
(1) $2\pi R^2E$ (2) πR^2E
(3) $\frac{\pi R^2 + \pi R^2}{E}$ (4) zero

116. Two parallel infinite line charges with linear charge densities $+\lambda$ C m^{-1} and $-\lambda$ Cm^{-1} are placed at a distance of 2R in free space. What is the electric field mid-way between the two line charges?
(1) zero (2) $\frac{2\lambda}{\pi\varepsilon_0 R}$ N C^{-1}
(3) $\frac{\lambda}{\pi\varepsilon_0 R}$ N C^{-1} (4) $\frac{\lambda}{2\pi\varepsilon_0 R}$ N C^{-1}

117. In the electric field of charge Q, another charge is carried from A to B, A to C, A to D and A to E, the work done will be



(1) Minimum along path AB
(2) Minimum along path AD
(3) Minimum along path AE
(4) Zero along all the paths

118. A point charge q of mass m is located at the centre of a ring having radius R and charge Q. When it is displaced slightly, the point charge accelerates along the X-axis to infinity, the ultimate speed of the point charge
(1) $\sqrt{\frac{2kQq}{mR}}$ (2) $\sqrt{\frac{kQq}{mR}}$
(3) $\sqrt{\frac{kQq}{2mR}}$ (4) Zero

119. Four charges 2 C, –3 C, –4 C and 5 C respectively are placed at all the corners of a square. Which of the following statements is true for the point of intersection of the diagonals

(1) E = 0, V = 0 (2) E ≠ 0, V = 0

(3) E = 0, V ≠ 0 (4) E ≠ 0, V ≠ 0

120. A solid conducting sphere having a charge Q is surrounded by an uncharged concentric conducting spherical shell. Let the potential difference between the surface of the solid sphere and that of the outer surface of the shell be V. If the shell is now given a charge of –3Q, the new potential difference between the same two surfaces is

(1) V (2) 2V

(3) 4V (4) –2V