

Question 1 B

12.0 V RMS is equivalent to a peak voltage of $12 \times \sqrt{2} = 17.0$ V and a peak-to-peak voltage of $17.0 \times 2 = 34.0$ V.

Question 2 D

$$\begin{aligned}\text{electric force} &= \frac{kq_1q_2}{d^2} \\ &= \frac{8.99 \times 10^9 \times 10 \times 10^{-6} \times 100 \times 10^{-6}}{0.01^2} \\ &= 9.0 \times 10^4 \text{ N}\end{aligned}$$

Question 3 B

The electric field strength equation is $E = \frac{kq}{d^2}$ for each charge, where d = the distance from each charge to the centre.

$$d^2 = \left(\frac{a}{2}\right)^2 + \left(\frac{a}{2}\right)^2 = \frac{a^2}{2}$$

Substituting for d^2 gives $E = \frac{2kq}{a^2}$.

Question 4 A

There is no charge at the dot, so there can be no force (force = charge at that point \times resulting electric field).

Question 5 B

The net acceleration is centripetal and of value $g \cdot \tan(\theta)$. Thus $a = 9.8 \times \tan(20^\circ) = 3.6 \text{ m s}^{-2}$.