Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 7_ Electric Field

Name of the Student:_____
Max. Marks : 18 Marks **Time :18 Minutes**

Mark Schemes

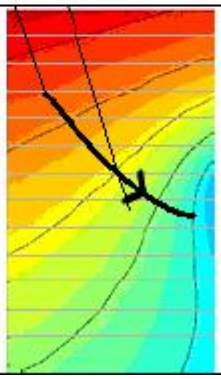
Q1.

Question Number	Answer	Mark
	C	1

Q2.

Question Number	Acceptable answers	Additional guidance	Mark
	• Equipotential lines would be further apart (1)		(1)

Q3.

Question Number	Acceptable answers	Additional guidance	Mark
(i)	• States a value of ΔV (1) • Uses $\Delta V/\Delta d$ with a difference in distance (1) • $E = 560$ V m^{-1} (1) allow range 500-560 V m^{-1}	Example of calculation: $E = \frac{(80-75)V}{0.009m} = 556$ V m^{-1} (Alt: 5.6 V cm^{-1})	(3)
(ii)	• Line perpendicular to a least 2 equipotential lines (1) • Arrow pointing towards flower (1)		(2)

(iii)	• States $V \times r$ = constant (1) • One corresponding pair of values of V and r (1) • At least two pairs of values used to show that the product is not constant therefore not radial (1) (MP3 dependent on MP2)	Example of calculation: Using $V = 95$ and $r = 2.0 - 2.2$: $Vr = 190 - 209$ $V = 90$ and $r = 2.1 - 2.5$: $Vr = 189 - 225$ $V = 85$ and $r = 2.5 - 2.8$: $Vr = 212 - 238$ $V = 80$ and $r = 3.5 - 3.8$: $Vr = 280 - 304$ $V = 75$ and $r = 4.3 - 4.7$: $Vr = 323 - 353$ $V = 70$ and $r = 5.8 - 6.2$: $Vr = 406 - 434$ Using $r = 3$ and $V = 82-83$: $Vr = 246-249$ $r = 4$ and $V = 77-78$: $Vr = 308-312$ $r = 5$ and $V = 72-73$: $Vr = 360-365$	(3)

Q4.

Question Number	Answer	Mark
(a)	(Electric field strength (at a point in a field) is) the force per unit charge (1) (accept force per coulomb of charge) Acting on a (small) positive charge. (1)	2
(b)(i)	Use of $E = kQ/r^2$ (1) Electric field due to $Q_1 = 4.1(1) \times 10^6$ (N C^{-1}) (1) Use of 11.9 cm to find field due to Q_2 (1) **Or** Use of $E = kQ/r^2$ (1) Use of $E1/E2 = Q1\ r22/\ Q2\ r12$ (1) $E_1/E_2 = 1$ (1) Example of calculation Electric field due to Q_1 $= (8.99 \times 10^9$ N m^2 $C^{-2}) \times (3 \times 10^{-6}$ C) / $(8.1 \times 10^{-2})^2$ $= 4.11 \times 10^6$ N C^{-1} Electric field due to Q_2 $= (8.99 \times 10^9$ N m^2 $C^{-2}) \times (6.5 \times 10^{-6}$ C) / $(11.9 \times 10^{-2})^2$ $= 4.13 \times 10^6$ N C^{-1}	3
(b)(ii)	(Force on charge is) zero/negligible/approx zero (1) (Allow values less than 0.1 N)	1
(b)(iii)	At midpoint repulsive force due to Q_2 > repulsive force due to Q_1 **Or** the resultant field/force is repulsive (1) Work must be done against the repulsive force/field to move the charge to this position. (1)	2
	Total for question	8