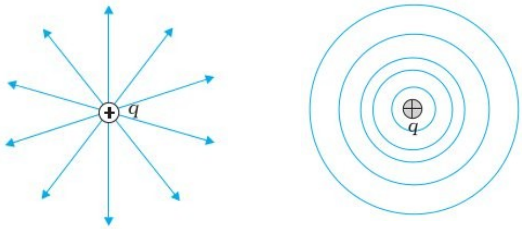
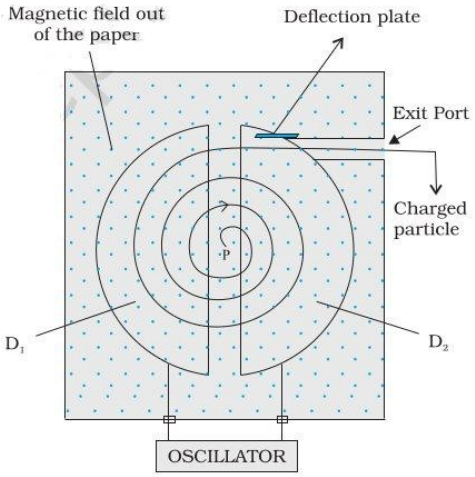
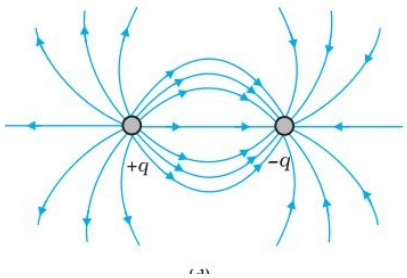
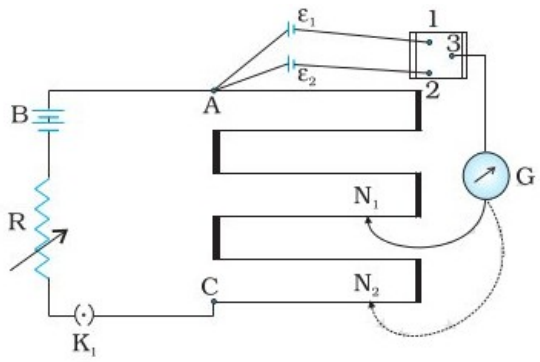
Higher Secondary First Terminal Examination August 2017

HSE II PHYSICS

Qn No	Scoring Indicators	Total score
1	(c) quantization of electric charge	1
2	Zero	1
3	(b) VA^{-1}	1
4	False	1
5	$F=qE \rightarrow (1\,score)$ $F=1.6\times10^{-19}\times3.2\times10^{4}=5.12\times10^{-15}\,N \rightarrow (1\,score)$	2
6	$\vec{\tau}=\vec{p}\times\vec{E} \rightarrow (1\,score)$ $\vec{\tau},\vec{p} \rightarrow (1\,score)$ OR $\vec{\tau},\vec{E} \rightarrow (1\,score)$	2
7	1 score each 	2
8	(a) series combination (1 score) $\frac{1}{C}=\frac{1}{C_1}+\frac{1}{C_2}$ OR $C=\frac{C_1C_2}{C_1+C_2}$ (1score)	2
9	Figure or equation $\frac{1}{R}=\frac{1}{20}+\frac{1}{20}$ (1score) Substitution or final answer (10 ohm) (1score)	2
10	(a) Statement (1 score) (b) $I=1\,A$ (1 score)	2
11	(a) greater (1score) (b) is nearly independent of temperature (1 score)	2
12	(a) toroid (1 score) (b) $B=\mu_0 n i$ (1 score)	2
13	Statement (1 score) Equation (1 score)	2
14	Correct derivation (3 score)	3
15	(a) scalar (1 score) (b) $\frac{kQ}{r^2}=20$ and $\frac{kQ}{r}=10$ (1 score) $r=0.5\,m$ (1 score)	2
16	(a) any one factor (1 score) (b) Correct derivation (2 score)	3
17	(a) Meter Bridge (1 score) (b) Wheatstone's Principle (1 score)	3

	(c) $\frac{R}{S}=\frac{x}{y-x}$ (1 score)	
18	(a) R_1, R_2 and R_3 (1 score) (b) $I_1 R_1+I_3 R_3=V_1$ (2 score)	3
19	(a) ammeter (1socre) (b)Correct derivation (2 score)	
20	(a) Cyclotron (1 score) (b)  (1 score) (c) In this device ***electric*** field accelerates the particle and ***magnetic*** field is responsible for the circular motion of the particle. (1 score)	3
21	(a) Statement (1 score) (b) Derivation (3 score)	4
22	(a) Any two properties (2 score) (b)  (2 scores)	4
23	(a) $E=-\frac{dV}{dr}$ or $E=\frac{V}{d}$ (1 score) (b) correct derivation (3score)	4
24	(a) increases (1 score) $C=\frac{\epsilon_0 A}{d}$ (1 score) $C=\frac{8.85\times10^{-12} x\, 6\times10^{-3}}{3\times10^{-3}}$	4

	$C=1.77\times10^{-11}F$ (1 score) $Q=CV=1.77\times10^{-11}\times100=1.77\times10^{-9}C$ (1 score)	
25	(a)  (2 score) (b) $E_1\propto l_1$ $E_2\propto l_2$ (1 score) $\frac{E_1}{E_2}=\frac{l_1}{l_2}$ (1 score)	4
26	(a) Parallel (1 score) (b) $\frac{1}{R}=\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}$ $\frac{1}{R}=\frac{1}{4}+\frac{1}{6}+\frac{1}{12}$ $R=2\,\Omega$ (2) $R_{eff}=1+3+2=6\,\Omega$ (1)	4
27	Diagram (1 score) Correct Derivation (3)	4
28	(a) Ampere's circuital law (1) (b) Correct Derivation (3)	4