PH 2023 Quiz 8 Nachmi Fall 2014

Name Solutions Section C_

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$$R = V/I = \frac{.45}{1.5} = \boxed{0.3\,\Omega}$$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$$R = \frac{\rho l}{A} \rightarrow \rho = \frac{AR}{l} = \frac{\left(1\times10^{-3}\right)^2\times\pi}{10}\times .3$$

$$= \boxed{3\pi\times10^{-8}\ \Omega\cdot m}$$

c) What is the power dissipated in this wire? *(4 points)*

$$P = I^2R = 2.25\times .3 = \boxed{.675\ W}$$

PH 2023 Quiz 8 Fall 2014

Name Naman Mody Section C3

10/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$V = IR$

$R = \frac{0.45}{1.5} = 0.3\ \Omega$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$0.3 = \rho \frac{l}{A}$

$\frac{0.3 \times \pi \times (0.01)^2}{10} = \rho$

$9.4 \times 10^{-8}\ \Omega m = \rho$

c) What is the power dissipated in this wire? *(4 points)*

$P = I^2R$

$= 1.5^2 \times 0.3$

$= 0.675\ W$

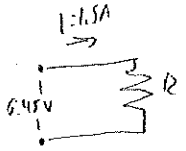
PH 2023 Quiz 8 Fall 2014

Name Aaron Chin Section C3

10/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*



$V = IR$

$R = \frac{V}{I} = 0.3\,\Omega$

$R = 0.3\,\Omega$ ✓

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho l}{A}$

$\rho = \frac{RA}{l} = \frac{0.3\,\Omega \cdot (1\times10^{-3}\,m)^2\pi}{10} = 9.4\times10^{-8}\,\frac{\Omega}{m}$

$\rho = 9.4\times10^{-8}\,\frac{\Omega}{m}$ ✓

c) What is the power dissipated in this wire? *(4 points)*

$P = IV = (1.5A)(0.45V) = 0.675\,W$

$P = 0.675\,W$ ✓

PH 2023 Quiz 8 Fall 2014

Name Saba Salim Section C_

9/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$V = IR$

$R = \frac{V}{I}$

$= \frac{0.45V}{1.5A}$

$R = 0.3\Omega$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \rho \frac{L}{A}$ $\quad A = (2.0mm)^2 \left(\frac{1m}{1000mm}\right)^2$

$\rho = \frac{RA}{L}$ $\quad A = 4.0\times10^{-6} m^2$

$= \frac{(0.3\Omega)(4.0\times10^{-6} m^2)}{10m}$

$\rho = 1.2\times10^{-7}\ \Omega m$ −1

c) What is the power dissipated in this wire? *(4 points)*

$P = \frac{V^2}{R} = \frac{(0.45V)^2}{0.3\Omega}$

$P = 0.675\ V^2/\Omega$

PH 2023 Quiz 8 Fall 2014

Name Ryan Kubik Section C_

8/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$R = \frac{\rho L}{A}$ $V = IR$

$.45 = 1.5R$

$R = .3$ Ohms

2.

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$2.0\text{mm} = .02\text{cm} = .0002\text{m}$

$R = \frac{\rho L}{A}$

$.3 = \frac{\rho(10\text{m})}{(.0002\text{m})} = .00006 = 10\rho$

$\rho = 6.0 \times 10^{-6}$

2

c) What is the power dissipated in this wire? *(4 points)*

$P = \frac{V^2}{R} = P = \frac{(45\text{v})^2}{.3\text{ohms}} = .675 \frac{\text{v}^2}{\Omega}$

V^2

PH 2023 Quiz 8 Fall 2014

Name Mahmoud Dolah Section C_

9/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V. r = 1mm

1mm
0.01cm
0.0001 m

a) What is the resistance of the wire? *(2 point)*

$V = IR$

$\frac{V}{I} = R$

$\frac{0.45V}{1.5A} = R$

$0.3\ \Omega = R$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \rho \frac{l}{A}$ $A = \pi r^2$

$0.3 = \rho \frac{10m}{\pi (0.0001)^2}$

$\rho = 9.4248 \times 10^{-10}$

c) What is the power dissipated in this wire? *(4 points)*

$P = VI$

$P = (0.45V)(1.5A)$

$P = 0.675\ W$

PH 2023 Quiz 8 Fall 2014

Name Jared Franklin Section C_

10/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

r = .001 I = 1.5A r = .001 ℓ = 10m V = .45

a) What is the resistance of the wire? *(2 point)*

V = IR

.45 = 1.5R = .3Ω ✓

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho \ell}{A}$

$R = \frac{\rho \ell}{(.001)^2 \pi}$

$.3 = \frac{\rho 10}{(.001)^2 \pi}$

$\rho = 9.425 E^{-8}$ ✓

c) What is the power dissipated in this wire? *(4 points)*

$P = I^2 R$

$P = (1.5)^2 R$

$P = 2.25 R$ ✓

$P = 1.5^2 (.3)$

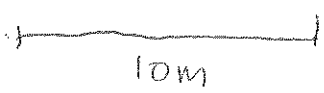
$P = .675 W$

PH 2023 Quiz 8 Fall 2014

Name Jimmy Fung Section C_

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*



$I = 1.5A$ $d = 2mm$ $V = 0.45V$

$V = IR$ $R = \frac{V}{I} = \frac{0.45V}{1.5A} = 0.3\Omega$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho L}{A}$ $A = \pi r^2 = \pi (1mm)^2$

$0.3\Omega = \frac{\rho (10m)}{\pi (1mm)^2} = \frac{0.3(\pi(1mm))}{10m} = 9.4 \times 10^{-8}$ resistivity

c) What is the power dissipated in this wire? *(4 points)*

$P = IV = I^2R$

$1.5^2 \times 0.3\Omega = 0.675W$

PH 2023 Quiz 8 Fall 2014

Name Mo Money Section C_

8/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$V = IR \ldots R = \frac{V}{I}$

$\frac{0.45}{1.5} = 0.3\ \Omega$ ✓

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$\rho = \frac{kg}{m^3}$

$R = \rho \frac{\ell}{A} = \frac{4 \rho_{wire} \ell}{\pi d^2}$ 10 m

$R = \frac{4 \rho_{wire} (10\,m)}{\pi \cdot (2 \times 10^{-3})^2} = \Omega$ ✓ −2

c) What is the power dissipated in this wire? *(4 points)*

$P = I^2 R$ ✓

$P = (1.5A)^2 (0.3\Omega)$

$P = 0.675$ watts

PH 2023 Quiz 8 Fall 2014

Name Mari kobakhidze Section C_

10/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$I = 1.5$
$d = 0.002$
$U = 0.45$
$l = 10$

$V = IR$

$R = \frac{V}{I} = \frac{0.45}{1.5} = 0.3$ ✓

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \rho \frac{l}{A}$

$0.3 = \rho \frac{10}{0.002^2 \times \pi}$

$0.3 \cdot (2 \times 10^{-3})^2 \pi = 40\rho$

$\rho = \frac{(1.2 \times 10^{-6})\pi}{40} = 0.0942 \times 10^{-6}$ ✓

c) What is the power dissipated in this wire? *(4 points)*

$P = IV = 1.5 \times 0.45 = 0.675$ ✓

PH 2023 Quiz 8 Fall 2014

Name Nicole Forney Section C_

7/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V. 0.002 m

a) What is the resistance of the wire? *(2 point)*

10m

$V = IR$

$R = \frac{0.45\,V}{1.5\,A} = 0.3\,\Omega$ ✓

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho l}{A} = \frac{10m\ \rho_{wire}}{\pi(0.001m)^2}$ ✓

-2

$R = \rho_{wire} \cdot (3.2 \times 10^6)\,\Omega$

c) What is the power dissipated in this wire? *(4 points)*

$P = IV = (1.5)(0.45) = 0.675$ Watts? ✓

PH 2023 Quiz 8 9/10 Fall 2014

Name Maazid Ahmed Section C_

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$$R = \frac{V}{I} = \frac{0.45}{1.5} = 0.3\,\Omega$$

✓

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$$R = \rho \frac{l}{A}$$

$$\therefore \rho = \frac{AR}{l}$$

$l = 10\,m$

$A = \pi r^2 = \pi \left(\frac{2}{1000}\right)^2$

$\therefore \rho = 9.4 \times 10^{-8}\,\Omega m$

✓

c) What is the power dissipated in this wire? *(4 points)*

$P_{out} = IV = 1.5 \times 0.45 = 0.675\,V$

✓ X

-1

PH 2023 Quiz 8 Fall 2014

Name Vincent Fung Section C_

6/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V. $\ell = 10m$ $d = .002m$ $I = 1.5A$ $V = .45$

a) What is the resistance of the wire? *(2 point)*

$V = IR$

$R = IV = 1.5A(.45V) = .675\,\Omega$ −2

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$r = .001$

$R = \rho\frac{\ell}{A} \rightarrow \frac{RA}{\ell} = \rho \rightarrow \frac{(.675\,\Omega)(\pi(.001)^2)}{10} = 2.12\times10^{-7}\,\Omega\cdot m$

$.675\,\Omega$

$\Omega\frac{m^2}{m}$ −1

c) What is the power dissipated in this wire? *(4 points)*

$P = IV = I^2R = \frac{V^2}{R}$?

$P = I^2R$

$R = 1.5^2(.675\,\Omega) = 1.52W$ −1

PH 2023 Quiz 8 Fall 2014

Name AKSHAY PATIDAR Section C3

9/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$V = IR$

$R = \frac{\rho l}{A} = \frac{V}{I}$

$\rho = \frac{VA}{Il} = \frac{\pi r^2 V}{Il} = \frac{\pi \cdot (2 \times 10^{-3})^2}{4} \times \frac{0.45}{1.5} =$

$R = \frac{V}{I}$

$= \frac{0.45}{1.5} = 0.3\,\Omega$

$= 0.94 \times 10^{-6}$

$\rho = 9.4 \times 10^{-7}\ \Omega m$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho l}{A} = \frac{V}{I}$

$\rho = \frac{\pi r^2}{l} \cdot \frac{V}{I} = \frac{\pi \cdot (2 \times 10^{-3})^2}{4} \times \frac{0.45}{1.5} = 9.4 \times 10^{-7}\ \Omega m$

c) What is the power dissipated in this wire? *(4 points)*

Power dissipated $= I^2 R$

$= (1.5)^2 \times 0.3\ \Omega$

$= 0.675\ J$

PH 2023 Quiz 8 Fall 2014

Name Rafiul Islam Section C_

2/10

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$V = IR$

$R = \frac{I}{V}$

$R = \frac{1.5\,A}{.45\,V} =$

10 m = l

2×10^{-3} m = d

1.5 A = I

.45 = V

? = R

$R = \rho \frac{\ell}{A}$

$R = \frac{(.675\,A \cdot V)(10\,m)}{(2 \times 10^{-3})^2 \pi} = 2148528232 \approx 2.15 \times 10^{9}\,V$

$P = I^2 R$

$P = IV \rightarrow P = (1.5\,A) \cdot (.45\,V)$

$P = \frac{V^2}{R}$ $P = .675\,A \cdot V$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho \ell}{A}$

$\frac{RA}{\ell} = \rho$

Using R from A

$\rho = \frac{(2.15 \times 10^{6}\,\Omega)(3.14 \times 10^{-6}\,m^2)}{10\,m} =$

$\rho = .675$

c) What is the power dissipated in this wire? *(4 points)*

$P = I^2 R$

$P = (1.5\,A)^2 (2.5 \times 10^{6}\,V)$

$P = 5.6 \times 10^{6}\,J$

PH 2023 Quiz 8 Fall 2014

Name RESHU SHARMA Section C_

6/10

2.0mm/1x 1m / 1000mm

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$V = I \cdot R$

$\frac{V}{I} = R$

$R = \frac{(L) \cdot (V)}{(A) \quad (I)}$

$V = IR$

$R = \frac{V}{I}$

$\frac{0.45}{1.5} = 0.3$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\ell \cdot V}{A \, I}$

$\frac{10\,(0.45V)}{(0.00012566)(1.5)} =$

537420

c) What is the power dissipated in this wire? *(4 points)*

P_{out}

$P_{out} = I \cdot V$

$(1.5A) \cdot (0.45)$

$0.675W$

PH 2023 Quiz 8 3/10 Fall 2014

Name Jarin Khan V = 0.45V Section C_

A 10-m-long wire of a 2.0 mm diameter carries a 1.5 A current when the voltage between its ends is 0.45 V.

a) What is the resistance of the wire? *(2 point)*

$R = \frac{0.45}{1.5}$ $0.3 = \rho$ ✓

$V = IR$

$R_{TOT} = \frac{\rho l}{A}$ $= \frac{d = 2mm}{1.5\ A}$

$R = V/I$ $R =$

$V = IR$

$R = V/I$ $= \frac{0.45V}{1.5A} = 0.3\ \Omega$

b) What is the resistivity of the conductor the wire is made of? *(4 points)*

$R = \frac{\rho l}{A}$ $4\ \frac{(10)(0.3)}{\pi(0.002m)^2} = \frac{12}{\rightarrow} = 95492965$

✓4 Ans= 954929.65

c) What is the power dissipated in this wire? *(4 points)*

$R = \rho \frac{l}{A}$ ✓3

$P_{out} = I^2 R$

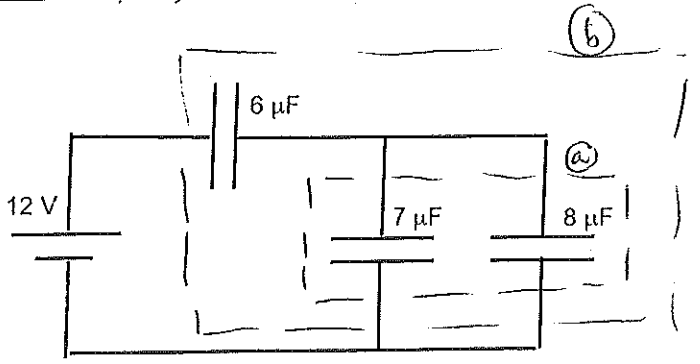
$= (1.5)^2 \times 954929.65$

$P_{out} = 2148591.713$

Nachum

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Solutions ID



(4 points) For the circuit above, find the equivalent capacitance.

(a) $7\mu F \parallel 8\mu F \rightarrow 15\mu F$

(b) $15\mu F$ ser. $6\mu F \rightarrow \frac{15\times 6}{15+6} = \frac{90}{21} = \boxed{\frac{30}{7}\mu F}$

(2 points) What is the charge stored on the 6 μF capacitor?

Total charge will appear on the ± plates of the series capacitor, so

$$Q = CV = \frac{30}{7}\mu F \times 12V = \boxed{\frac{360}{7}\mu C}$$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

The voltage drop across each of these is the same. So using $Q=CV$, whatever V is (and it's not 12V!)

$$\left.\begin{aligned} Q_7 &= 7_\mu \times V \\ Q_8 &= 8_\mu \times V \end{aligned}\right\} \rightarrow \frac{Q_7}{Q_8} = \frac{7}{8} \quad \text{so ease } 15^{\text{ths}}$$

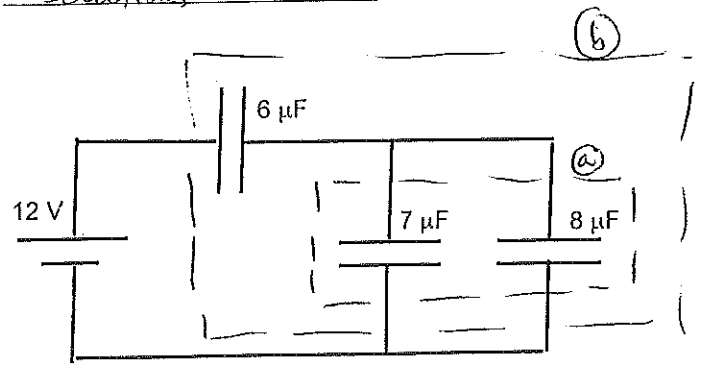
$$Q_7 = \frac{7}{15} \times \frac{360}{7}\mu C = \frac{360}{15}\mu C = \boxed{24\mu C}$$

$$Q_8 = \frac{8}{15} \times \frac{360}{7} = \frac{8}{7} \times 24\mu C = \boxed{\frac{192}{7}\mu C}$$

Nachman

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Solutions ID



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The voltage drop across each of these is the same. So using $Q=CV$, whatever V is (and it's not 12V!)

$$Q_7 = 7_\mu \times V \qquad Q_8 = 8_\mu \times V \rightarrow \frac{Q_7}{Q_8} = \frac{7}{8} \quad \text{so else } 15^{\text{th}}\text{s}$$

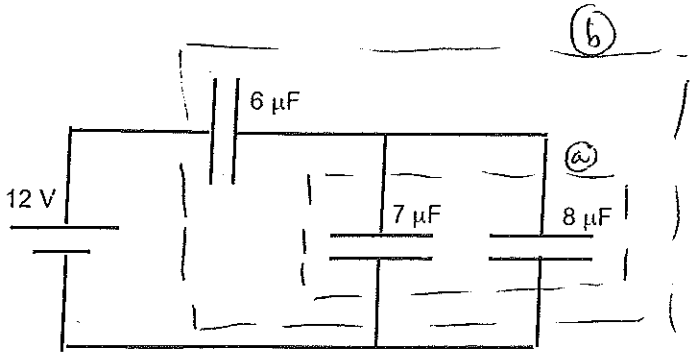
$$Q_7 = \frac{7}{15} \times \frac{360}{7}\mu C = \frac{360}{15}\mu C = \boxed{24\mu C}$$

$$Q_8 = \frac{8}{15} \times \frac{360}{7} = \frac{8}{7} \times 24\mu C = \boxed{\frac{192}{7}\mu C}$$

Nachman

PH2023 C Sections Quiz 7 Oct. 24, 2014

Name Solutions ID



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(a) $7\mu F \parallel 8\mu F \rightarrow 15\mu F$

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$$Q_7 = 7_\mu \times V \qquad Q_8 = 8_\mu \times V \rightarrow \frac{Q_7}{Q_8} = \frac{7}{8} \quad \text{so these } 15^{th}\text{s}$$

$$Q_7 = \frac{7}{15} \times \frac{360}{7}\mu C = \frac{360}{15}\mu C = \boxed{24\mu C}$$

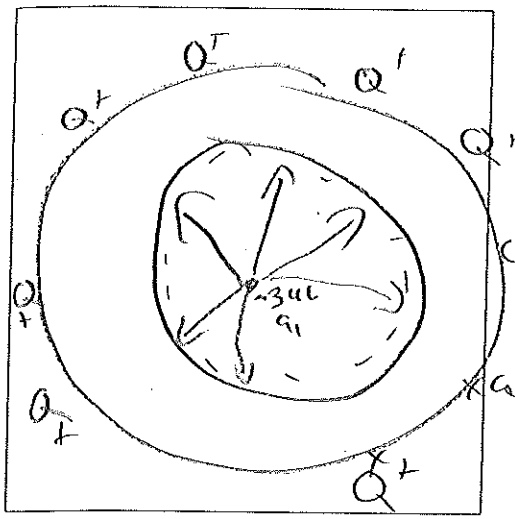
$$Q_8 = \frac{8}{15} \times \frac{360}{7} = \frac{8}{7} \times 24\mu C = \boxed{\frac{192}{7}\mu C}$$

PH 2023 Quiz 5 Fall 2014

Name Jared Frankston Section C__

6/10

1. *(6 points)* A –3 nC point charge is placed at the center of a conducting spherical shell of inner radius of 12 cm and outer radius 18 cm. The shell itself carries a +7 nC charge.
Find the electric field at the following distances from the center (*sketch the locations of the charges and the electric fields at the points of interest*):



(a) $r = 6$ cm

$E = kq_1/r^2$

$E = \frac{(9\times10^9)(+3\times10^{-9})}{.06^2} = +7500$

(b) $r = 16$ cm

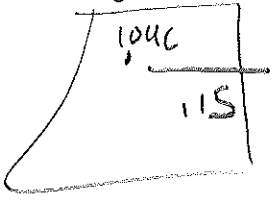
$E = 0$

(c) $r = 22$ cm

$E = \frac{kq_1+q}{r^2}$

$\frac{k(9\times10^9 \times -3\times10^{-9}) + (7\times10^{-9})}{.22^2} = +557.85$

2. *(4 points)* A charge +10 μC is located at the origin and a +20 μC is located at x = 15 cm. Find the total electric flux through sides of a cube with sides of 10 cm which is centered at the origin (x = 0).



$\Phi = \frac{Q}{\varepsilon_0} = \frac{10\times10^{-9}}{8.85\times10^{-12}} = 1129.94$ $\frac{N}{C}$ $\frac{CN}{m^2}$

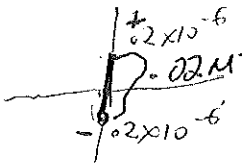
PH 2023 Quiz 4 Fall 2014

Name Timothy Ramchoosingh Section C__

4/10

1. An electric dipole is made of two charges of equal magnitudes of 0.2 μC and opposite signs. The positive charge is located at the point (x, y) = (0, 0.01 m) while the negative charge is located at the point (x, y) = (0, -0.01 m).

a) What is the dipole moment of this dipole (the magnitude and direction)? *(3 points)*



$P = 2l$

$P = 4\times10^{-9}$ −1

b) What is the torque on this dipole in an electric field $\vec{E} = (2.5\hat{i})\cdot10^6$ N/C? *(3 points)*

$\tau = rF_\perp$ $r = .01$ $F = qE$

$F = .2\times10^{-6} \times 2.5\times10^6$

$F = .5$

$\tau = .01 \times .5$

$\tau = .005$ 3

2. A proton was injected into uniform electric field of 50,000 N/C. Assuming the proton starts from rest, what is its speed after it travels 10 cm in this field? (Take the mass of a proton as 1.66×10^{-27} kg) *(4 points)*

$V_f = ?$ $m_p = 1.66\times10^{-27}$ kg $E = 50{,}000$ N/C $V_0 = 0$ m/s distance = .1 meters

$q_p = 1.60\times10^{-19}$ C

$.1m = \frac{1}{2}at^2$

$t^2 = 4.15\times10^{-14}$

$t = 2.04\times10^{-7}$

$F = ma = qE$

$F = 1.66\times10^{-27} \cdot a = 1.6\times10^{-19} \cdot 50{,}000$

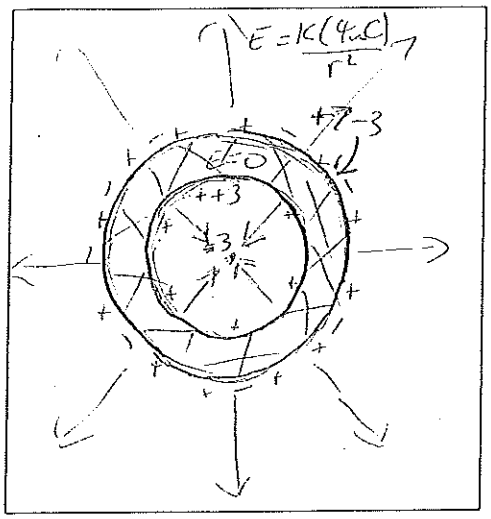
$a = \frac{1.6\times10^{-19}\cdot 50000}{1.66\times10^{-27}}$ $a = 4.82\,m/s^2$ 2

Nachum

PH 2023 Quiz 5 Fall 2014

Name Solutions Section C__

1. *(6 points)* A −3 nC point charge is placed at the center of a conducting spherical shell of inner radius of 12 cm and outer radius 18 cm. The shell itself carries a +7 nC charge.
Find the electric field at the following distances from the center (*sketch the locations of the charges and the electric fields at the points of interest*):



(a) r = 6 cm

$$\vec{E} = \frac{K(-3\times10^{-9})}{.06^2}\hat{r} \approx \frac{-27\times10^{0}}{36\times10^{-4}}\hat{r}$$

$$= -7.5\times10^{3}\ N/C\ \hat{r}$$

(inward)

(b) r = 16 cm

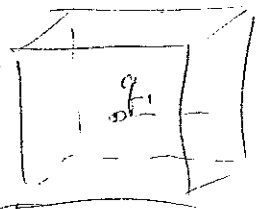
$$\vec{E} = 0$$

(c) r = 22 cm

$$\vec{E} = \frac{K(7\times10^{-9})}{(.18)^2}\hat{r} \approx \frac{9\times7\times10^{0}}{9^2\times2^2\times10^{-4}}\hat{r} = \frac{7}{36}\times10^{4}\ N/C\ \hat{r}$$

(outward)

2. *(4 points)* A charge +10 μC is located at the origin and a +20 μC is located at x = 15 cm. Find the total electric flux through sides of a cube with sides of 10 cm which is centered at the origin (x = 0).



$$\Phi_E = \frac{q_{enclosed}}{\epsilon_0} = \frac{10^{-5}}{8.85\times10^{-12}} \approx \boxed{10^{6}\ N/C\cdot m^2}$$

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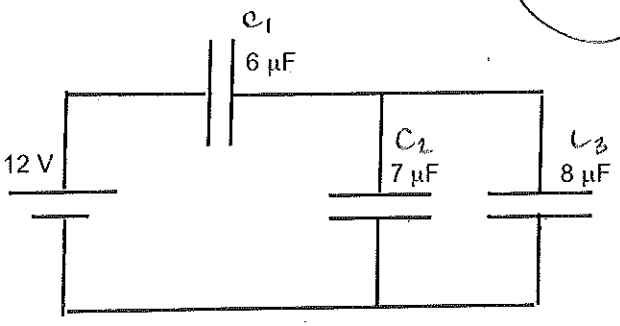

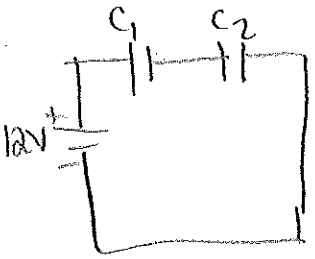

(4 points) For the circuit above, find the equivalent capacitance.

$C_2 || C_3 = 15\mu F$

$C_{eq} = C_1 + C_2 || C_3 = \frac{1}{6\mu F} + \frac{1}{15\mu F} = 4.286\mu F$

$Q = CV$.

(2 points) What is the charge stored on the 6 μF capacitor?

$V_1 = \frac{Q_1}{C_1} = \frac{51.432}{6} = 8.572$

$Q_{TOTAL} = (C_{eq})(V) = 51.432$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$V - V_1$

$V_1 = \frac{Q_{TOTAL}}{15\mu F} = 3.4288V$

$Q_{7\mu F} = (7\mu F)(V - V_1) = (7\mu F)(12 - 3.4288) = 60$

$Q_{8\mu F} = (8\mu F)(V - V_1) = (8\mu F)(12 - 3.4288) = 68.56$

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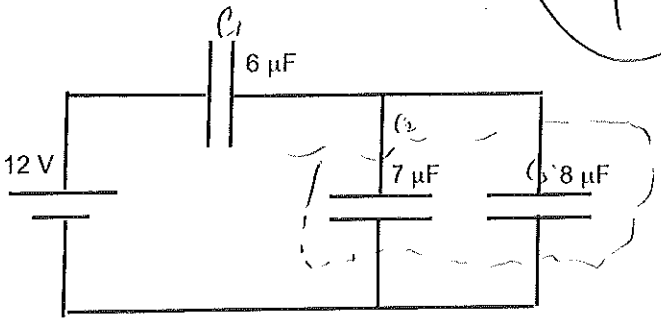

$C_{eq} = 7\mu F + 8\mu F$

$C_2 - C_3$

$C_{eq} = 15\times10^{-6} F$

$C_2 - C_3$

(4 points) For the circuit above, find the equivalent capacitance.

$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2 + C_3}$

$C_{eq} = \frac{C_1(C_2+C_3)}{C_1+C_2+C_3} = \frac{9\times10^{-11}}{.000021} = 4.286 \times 10^{-6}$ F

$\frac{1}{C_{eq}} = \left(\frac{1}{6\times10^{-6} F} + \frac{1}{15\times10^{-6} F}\right)$

$\frac{1}{C_{eq}} = 23333.33 F$

(2 points) What is the charge stored on the 6 μF capacitor?

$Q_1 = C_1 V$

$Q_1 = 6\times10^{-6}(12V)$

$Q_1 = 7.2\times10^{-5} C$

(4 points) What is the charge stored on the 7 μF capacitor? the 8 μF capacitor?

$Q = V(C_2 + C_3)$ "Parallel rule"

$Q = V(C_1 + C_2)$

$Q = C_{eq} V$

$Q = 12V\left((7\times10^{-6} F) + (8\times10^{-6} F)\right)$

$Q = 12\times(15\times10^{-6})$

$Q = 1.8\times10^{-4} C$

Q_{eq}

$V = V_1$

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Quiz 6

PH-UY 2023
C sections

Full Name: Grade:

1) A 5 μC is at x = 0 and a -2.5 μC charge is at x = 12.0 cm. Let V = 0 at r = ∞. At what point along the line joining them is the electric potential zero? (HINT: The point is somewhere between the charges.) (5 pts.)

2) In a region of space where the electric field has the uniform value of (24i) N/C, what is the difference in electric potential in going from the point (2 cm, 1 cm, 0 cm) to the point (-3 cm, 4 cm, 0 cm)? (5 pts.)