(8) 2. $PE = \frac{1}{2}mv^2$

$PE = \frac{1}{2}(1kg)(12\,m/s)^2$

$PE = 72\,J$

(9) 1. Comparing $PE = \frac{1}{2}kx^2$ and $KE = \frac{1}{2}mv^2$

(10) 1. Slows down so KE↓ and the energy must go somewhere so it becomes internal

(11) $PE = \frac{1}{2}kx^2$

$PE = \frac{1}{2}(150\,N/m)(0.050\,m)^2$

$PE = 0.1875\,J$

(12) PE = PE

$0.1875\,J = mgh$

$0.1875\,J = (0.02\,kg)(9.81\,m/s^2)h$

$h = 0.956\,m$

Practice Questions Static Electricity

(1) 4 $F = \frac{mmk}{r^2}$, don't forget r is squared

(2) 2 What A exerts on B, B will exert on A

(3) 3.

(A) −2 (B) −4

(A)(B) −6

(A) −3 (B) −3

Pages

(4) 1 $2(-1.6\times10^{-19}C) = -3.2\times10^{-19}C$

(5) 1. $V = \frac{W}{q} = \frac{1C}{1J} = 1V$

(6) 1 When brought into contact, total charge is $3\times10^{-7}C$, when separated, $1.5\times10^{-7}C$ and $1.5\times10^{-7}C$, therefore Sphere A became more negative or gained electrons

(7) 3. The only one that will give you a whole number when you divide by $1.6\times10^{-19}C$

(8) 1. Gravity is always attractive, electrostatic can be either

(9) 2. $F = \frac{kq_1q_2}{r^2}$

$F = \frac{(8.99\times10^9)(1\times10^{-6}c)^2}{(4.0\times10^{-1}m)^2}$

$F = 0.056\,N$

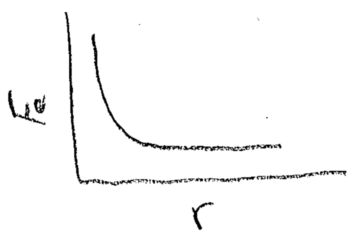
(10) 3 Repelling the point upward due to the two positive charges

(11) a) $F = \frac{kq_1q_2}{r^2}$

$F = \frac{(8.99\times10^9)(8\times10^{-19})(4.8\times10^{-19})}{(1.2\times10^{-4})^2}$

$\boxed{F = 2.4\times10^{-19}N}$

b)



Practice Questions - Current

(1) 2 Field strength is a vector because it has a direction

(2) 2. $V = \frac{W}{q} = \frac{60J}{5C}$

$\boxed{V = 12V}$

(3) 1 As resistance increases, the current decreases

(4) 1. Always towards the negative.

(5) 4 Electric field = $\frac{\text{Force}}{\text{Charge}}$

$E = \frac{\text{Newtons}}{\text{Coulomb}}$

(6) 2 $V = IR$

$V = (1.2A)(10\Omega)$

$\boxed{V = 12V}$

(7) 4 $R = \frac{\rho L}{A}$ and $R = \frac{\rho(2L)}{\frac{1}{2}(A)}$

$R = 4\frac{\rho L}{A}$

(8) 4. Close the switch and the light will light It's lit!

(9) 1 6, 100W means 600W

$P = VI$

$600W = (120V)I$

$\boxed{I = 5A}$

(10) 1 As resistance increases, current decreases. It is a squared term because has to do with resistance cross-sectional area which is squared

(11) 3 $R_{total} = 8\Omega$

$P = \frac{V^2}{R} = \frac{(16V)^2}{(8\Omega)}$

$\boxed{P = 32W}$

(12) 2 For a parallel circuit, $V_T = V_1 = V_2 = V_3 = \ldots$ so

$V = IR$

$12V = I(6\Omega)$

$\boxed{I = 2A}$

(13) 3 $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$

$\frac{1}{R_T} = \frac{1}{6} + \frac{1}{12} + \frac{1}{36} + \frac{1}{18}$

$\frac{1}{R_T} = \frac{6}{36} + \frac{3}{36} + \frac{1}{36} + \frac{2}{36} = \frac{12}{36}$

$36/12 = 3\Omega$

(14) 4 $P = \frac{V^2}{R} = \frac{(12V)^2}{36\Omega} = \boxed{4W}$

(20) electric energy is work

$W = VIt$

$W = (115V)(20A)(60s)$

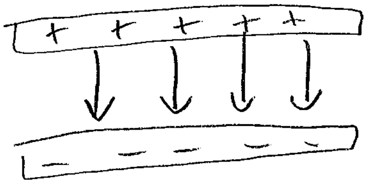
$W = 138000J$

$\boxed{W = 1.4 \times 10^3 J}$

(15) 3 The formula $R = \frac{\rho L}{A}$ tells us that the material with the least resistivity has the least resistance

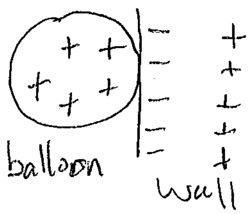
Page 4 in Ref table

(21)



positive to the negative

(16) 4



(17) 3 When electron orientation lines up, we get a magnet

(22) Since the charge is an electron, we know that

$q = 1.6 \times 10^{-19} C$

$E = \frac{F}{q}$

$2 \times 10^3 \frac{N}{C} = \frac{F}{(1.6 \times 10^{-19} C)}$

$\boxed{F = 3.2 \times 10^{-16} N}$

(18) 4 Always flow North to South and magnetic field lines never cross

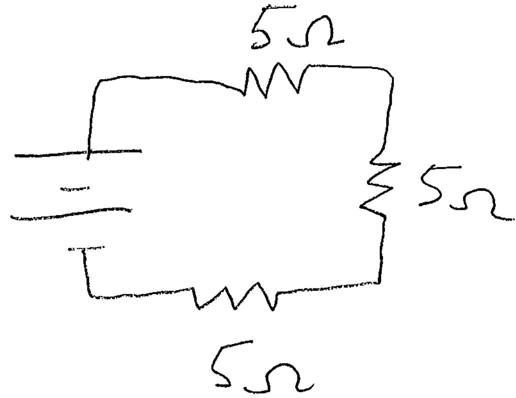
(19) $R = \frac{\rho L}{A}$ From ref table $\rho = 150 \times 10^{-8} \Omega \cdot m$

We need the length in meters. 1 Km is 1,000 meters

$R = \frac{(150 \times 10^{-8} \Omega \cdot m)(1{,}000 m)}{(3.5 \times 10^{-6} m^2)}$

$\boxed{R = 428.6\Omega}$

(23)



$R_T = 5\Omega + 5\Omega + 5\Omega$

$R_T = 15\Omega$

(24) $R_T = V_T I_T$

$R_T = (120V)(0.5A)$

$R_T = 240\Omega$

(25) $R_T = R + 50\Omega$

$240\Omega = R + 50\Omega$

$R = 190\Omega$

(26) $P = I^2 R$

$P = (0.5A)^2 (50\Omega)$

$P = 12.5W$

Practice Questions - Waves

(1) 1 Vibration to cause Sound = resonance

(2) 4 mechanical waves need a material, an example is Sound

(3) 2 Sound in air 331 m/s

radio in air 3×10^8 m/s

(4) 3 Changing the amplitude won't change the frequency

(5) 3 $1Hz = \frac{1}{s}$ so m·Hz is a m/s

(6) 2 Speed!

(7) 1 $n = \frac{c}{v}$

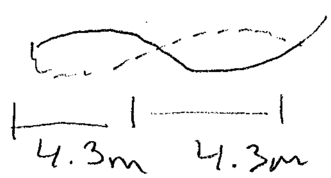
$1.66 = \frac{3 \times 10^8 m/s}{v}$

$n = 1.81 \times 10^8 m/s$

n was taken from the ref table page 2

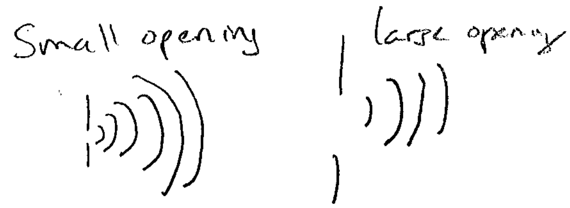
(8) 4 Waves always transfer energy NEVER mass

(9) 4. double the wave because we need a crest and a trough



4.3m
× 2
= 8.6m

(10) 1.



(11) 1 ↓ amplitude because it gets Softer and frequency ↓ because of the Doppler Effect

(12) 1. $n_1 \sin\theta_1 = n_2 \sin\theta_2$

$(1)\sin 40° = 1.52 \sin\theta_2$

$\theta_2 = 25.0°$

(13) 3 Period is measured in Seconds

(14) 2 Crest to crest A to E is also

(15) 2 After waves meet, they Continue traveling in the same direction with the same amplitude

(16) 2 look at the EM spectrum on page 2 in the reference table

(17) 1 If $T = \frac{1}{f}$ and we multiple $\frac{1}{f} \cdot f = 1$

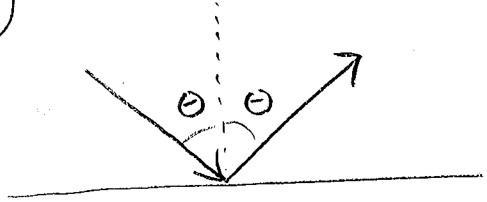
(18)

$$\frac{n_2}{n_1} = \frac{\lambda_1}{\lambda_2}$$

$$\frac{2.42}{1} = \frac{5.89 \times 10^{-7} m}{\lambda_2}$$

$$\boxed{\lambda_2 = 2.4 \times 10^{-7} m}$$

(19)



Angles from normal should be equal!

(20) a) corn oil into air back in air, the angle at point p still should be 35°

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$(1.47)\sin\theta_1 = (1)\sin(35°)$$

$$\boxed{\theta_1 = 23°}$$

b) The light did not bend at the corn-oil glycerol interface because the index of refraction of corn-oil is the same as glycerol

c) The ray should be 35° from the normal at P.