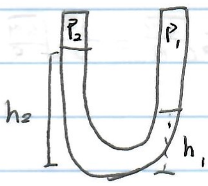
F

1) Power dissipated $= IV = \frac{V^2}{R} = I^2 \cdot R$

therefore, a, b, C, are all correct

2) C



As time passes, the pressure of liquid would naturally equalize ~~so~~, and the water will elevate until both are equalized.

3) A

$F = \frac{Gm_1m_2}{r^2}$ and according the N 3rd, Forces appear in pairs.

4) B

$T\theta = W$ $P = \frac{W}{t} = \frac{T\theta}{t} = T\cdot\omega = FR\cdot\frac{V}{R} = FV$

$= 20\cdot\left(18\cdot\frac{1000}{3600}\right)$

$= 100W$

5) C

$F\cdot\Delta t = I = mV_f - mV_i$

$= -\cancel{m}\cdot 2 - \cancel{m}\cdot 2$

$F\cdot\Delta t = \cancel{-4m}\ -4$

$F = |-40N|$

$F = 40N$

6) A

The momentum must be conserved, therefore, only A fulfills the requirement.

7) B

The F_x of 2 5μC charges ~~do~~ cancelled out. Therefore, there's only a Force pointing downward.

8)

$\frac{V}{(R_1+R_2)} = I$ $I\cdot R_1 = V_1$

$\frac{V}{(R_1+R_2)}\cdot R_1 = V_1$ By observing the equation, you can tell that the increase in R_1 increases V_1 since the multiplication of R_1 is impacting more of V_1.

9) B

A, D, C all change the positions of the pattern of waves, while the change in amplitude doesn't influence the area of increased and decreased sound

10) B

$$\frac{GMm}{r^2} = \frac{mv^2}{r}$$

$$v = \sqrt{\frac{GM}{r}}$$

$$V_A = \sqrt{\frac{GM}{R}} \quad V_U = \sqrt{\frac{GM}{2R}} = \frac{1}{\sqrt{2}}\sqrt{\frac{GM}{R}} = \frac{\sqrt{2}}{2}\sqrt{\frac{GM}{R}}$$

11) C

By longest duration, T = period, must be the longest

Assuming there's a graph of the wave with $\lambda = 0.0005$ and $V = ?$ and $f = 2000\ Hz$

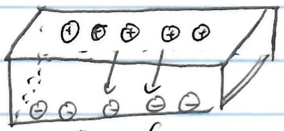
$$T = \frac{1}{f} = \frac{\lambda}{v}$$

$$\frac{1}{2000} = \frac{0.0005}{v}$$

$$v = 1 m/s$$

12) C

By right hand Rule, the positions of positive and negative particles are:



the Field is to the negative "y" direction

$$Qn = \frac{Q}{V} = \frac{C}{m^3}$$

charge density given $= 0.2 \frac{\mu C}{m^2}$

$= n \cdot d \cdot Q$

$$V_H = \frac{BI}{nQd}$$

$$= \frac{1.4\times10^{-3} \cdot 0.5}{0.2\times10^{-6}}$$

$= 3.5 kV$

n = charge density

Q = charge

d = width

13) A

14) D

Consider water as a spring and set the surface as $y=0$

as the block continues to go down, the potential energy of water increases with the potential energy of the block decreases

15) B

16) B

$10^{-3} m = 0.001 m = 0.1 cm = 1 mm$ By common sense, the thickness of paper is definitely not 10^{-5} ~~ad~~, 10^{-6}, and 10^{-7}, while 10^{-3} seems to be too long.

Another way to do this is to assume the length, weight and density of a piece of A4 paper.

17) C

You can do this question step by step, but if you have heard a theory called "A ~~paper~~ piece of paper cannot be folded for more than 7 times", it would easier for you to answer this question.

18) E

All these consequences can be achieved by placing different resisters in series or parallel.

19) C

$F = \frac{GMm}{r^2}$ if $r \to \infty$ then $F \to 0$

20)

$\Delta y = \frac{\lambda L}{D}$, if L increases Δy increases and the Intensity of light According to the equation $I = \frac{P}{4\pi r^2}$, as r gets further the pattern gets dimmer.

21) C

$\frac{1}{2}mv^2 = mgh$ since $KE \propto v^2$, The slope of the curve

$KE = mgh$ $v = \cancel{2gh}^2$ at must be steeper and steeper.

22) B

opitical power is defined as the degree to which a lens diverges or converges light.

$n_1 \sin\theta_1 = n_2 \sin\theta_2$ If n_1 increases then ~~the~~ the glass is deflecting less since $\theta_2 - \theta_1$ decreases.

23) B

$P = \frac{V^2}{R}$ $V_A = V_B + V_C = \frac{V}{2} + \frac{V}{2}$ and $\begin{cases} P_B = \frac{(\frac{V}{2})^2}{R} = \frac{V^2}{4R} \\ P_C = \frac{(\frac{V}{2})^2}{R} = \frac{V^2}{4R} \\ P_A = \frac{V}{R} = \frac{V^2}{R} \end{cases}$ $P_B + P_C = \frac{V^2}{2R}$

24) B

$\xleftarrow{F_f} \bullet \xrightarrow{F}$ F = force exerted

when the box is not moving $F = F_f$ and this only happens

when $F_f < \mu_s N \leq F_{fs}$

25) B

$0.5 \frac{kW}{m^2} \cdot 0.2 = 0.1 \frac{kW}{m^2 \cdot h}$ $\frac{\$40}{0.069} = 579.71$ kwh per month,

$\frac{579.71}{30} = 19.3237$ kwh per day

$\frac{19.3237}{24} = 0.80$ kwh per hour $\frac{0.8}{0.1} = 8\ m^2$ closest to $9m^2$