

Some things to know by heart--Review for test 3--Physics for Today Equation	Units
Coulomb's Law -The law that describes the electric force 'F'	$F = k \frac{q_1 q_2}{d^2}$
between two charged objects. It is the electric force that makes objects solid. The electric force is much stronger than gravity. 'k' is a constant.	Newtons
'q' represents charge. No one knows exactly what charge is.	Coulombs
Charge comes in two types, positive and negative. Electrons are charged negatively and protons are charged positively. Objects become charged when they gain or lose electrons. Objects that have the same charge repel each other and objects that have a different charge, attract each other with a force that can be calculated using Coulomb's law.	
'd' is the distance between the two charged objects. Notice that the electric force is inversely proportional to the square of the distance between the objects.	
Ohm's Law - The law that describes the relationship	$I = \frac{V}{R}$
between voltage V , resistance R and electrical current I .	amps
The current I is a measure of the amount of charge that moves through a conductor per second.	$I \equiv \frac{q}{t}$
The voltage 'V' is a measure of the amount of energy available per unit charge.	$\frac{j}{C}$;volts
The resistance 'R' impedes the flow of electrons.	$V \equiv \frac{E}{q}$
Sound and light have wave properties.	ohms
The distance from one crest to the next is the wavelength (λ).	meters, nanometers
The frequency (f) of a wave the number of waves per second that pass a fixed position.	$\frac{\#}{\text{sec}}$; Hz
The velocity of a wave is constant in a given medium and always equals its frequency times its wavelength.	$v = f\lambda$
The period (T) of a wave is the time for one complete wave to pass a fixed position.	m/s seconds
There is an inverse relationship between the frequency of a wave and its period.	$f = \frac{1}{T}$
The human ear can detect sound frequencies ranging from 20-20,000 Hz	$\frac{\#}{\text{sec}}$;Hz
Sound travels at about 340 m/s in air.	
Light comes in bundles of energy called photons and travels at 3×10^8 m/s in a vacuum. The amount of energy in a photon depends	$E_{\text{photon}} = hf$
on its frequency or wavelength.	$E_{\text{photon}} = \frac{hc}{\lambda}$ $E = hc/\lambda$
	joules
	joules

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Refraction is the bending of a wave as it moves from one medium to another.

Diffraction is the bending of a wave through an opening as the wave passes by the opening.

Radio waves, infrared, visible, ultraviolet, x-rays and gamma

rays are the main forms of electromagnetic radiation that are called light. Only visible light with a wavelength range of 400 to 700 nanometers can be seen by the human eye.

Radiation: Alpha (${}^4_2\text{He}$), Beta (${}^0_{-1}\beta$), and gamma (${}^0_0\gamma$) are three types of radiation.

Alpha occurs when 2 protons and 2 neutrons are ejected from the nucleus of an atom.

Beta occurs when a neutron changes into a proton while emitting an electron.

gamma occurs when a nucleus emits a photon of light as it rearranges itself into a less energetic state.

Here is a 10 point sample question for test 3: In the circuit drawn below, $R_1 = 2$ ohms, $R_2 = 3$ ohms and $R_3 = 1.8$ ohms.

Find:

1) The series equivalent of the two parallel resistors.

$$\frac{1}{R} = \frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$
$$R = \frac{6}{5} = 1.2 \text{ ohms}$$

2) The total resistance in the circuit below.

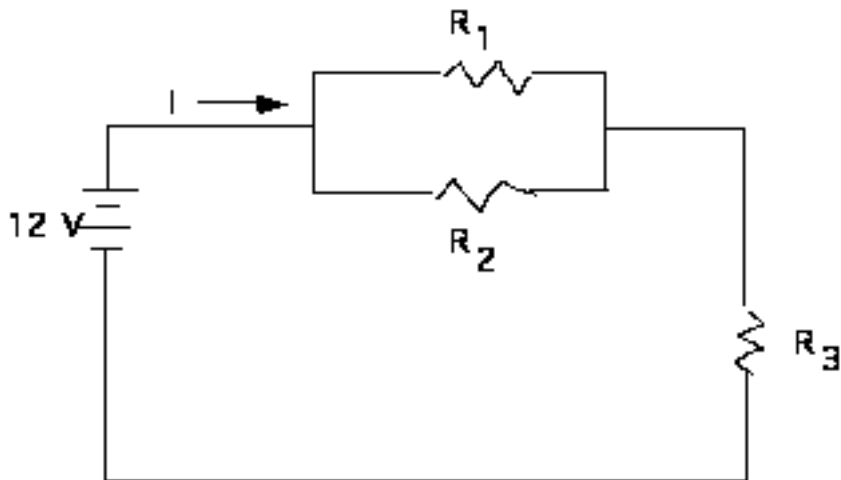
$$R_T = 1.2 \text{ ohms} + 1.8 \text{ ohms} = 3 \text{ ohms}$$

3) The current 'I'.

$$I = \frac{V}{R} = \frac{12}{3} = 4 \text{ amps}$$

4) The power required by the circuit is:

$$P = IV = 4 \text{ A}(12 \text{ V}) = 48 \text{ watts}$$



Study hard and good luck on the exam.