0-1

The standard (SI) unit for mass is the __________________, represented by __________.

0-2

The SI unit for length or distance is the ______________________, represented by _________.

0-3

The SI unit for time is the _____________________, represented by _________.

0-4

Variable	**Symbol**	**Unit**
Mass		
Distance		
Time		
Velocity		
Acceleration		
Force		

0-5

The higher the degree of accuracy in a measurement, the greater the number of ________________ ___________________ we can use for that measurement.

0-6

How many significant figures are in the following numbers?

0.45　　9004.7
0.01　　607
130　　130.

0-7

Calculate the following, taking significant figures into account:

(203.7m)(76m)=
(8.967kg)/(2.3kg)=

0-8

How many significant figures are in:

2.3×10^{14} m

5.684×10^{3} s

0-9

$(3.45 \times 10^{12}\,\text{m})(1.6 \times 10^{8}\text{m})=$

$(7.8 \times 10^{2}\text{kg})(6 \times 10^{2}\text{m})=$

0-10

Solve:

$$\frac{(4.5 \times 10^{15}\ \text{kg})(3.34 \times 10^{4}\text{m})}{(6.7\text{s})^{2}}$$

1-1 What is the difference between distance and displacement? Which is a vector? Which is a scalar?	<u>1-2</u> If an object moves 2m north, then 4m east, then 2m south, what is its distance traveled? What is its displacement? (Be able to solve mathematically or graphically)
<u>1-3</u> If an object travels 6m west, then 5m south, What is its distance traveled? What is its displacement? (Be able to solve mathematically or graphically)	1-4 What is the difference between speed and velocity? Which is a scalar? Which is a vector?
<u>1-5</u> What is the average speed of an object which travels 63m in 3.4s?	<u>1-6</u> What is the average velocity of an object that moves 57m, N in 3.1s?
<u>1-7</u> If an object goes from rest to 60.m/s in 15s uniformly, what is its average speed?	<u>1-8</u> In 1-7, how far will the object travel in those 15s?
<u>1-9</u> In 1-7, what will be the object's acceleration rate?	<u>1-10</u> What is the average speed of an object that accelerates uniformly from 3.6 m/s to 5.7 m/s?

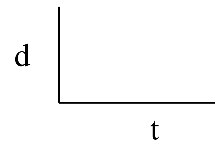
<u>1-11</u> How far will an object going 6.3m/s travel in 16.7 s?	<u>1-12</u> What is the acceleration of an object which uniformly changes its velocity from 6.6 m/s to 18.4 m/s in 8.2 s?
1-13 If an object uniformly accelerates from rest and it takes 6.8s to cover a distance of 72m, how fast will It be going at the end of those 6.8s?	1-14 In 1-13, what is the rate of acceleration?
1-15 How far will an object go in 9.7 s if it undergoes a uniform acceleration of 2.9 m/s^2?	1-16 When an object is slowing down, the value of its acceleration will be ____________ (+ or -).
<u>1-17</u> What is the final velocity of an object after 6.0s if it starts from rest and accelerates at 4.3 m/s^2?	<u>1-18</u> What is the final velocity of an object after a distance of 216m if it has an acceleration of 3.6 m/s^2?
1-19 In a displacement-time graph, the slope equals the object's ______________________.	1-20 In a velocity-time graph, the slope equals the object's _________________________.

1-21

In a velocity-time graph, the area beneath the curve equals the object's ________________.

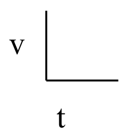
1-22

Sketch the displacement-time graph that shows an object with a non-zero constant velocity:



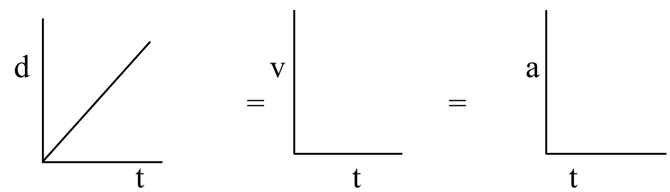
1-23

Sketch the velocity-time graph for an object undergoing uniform positive acceleration:



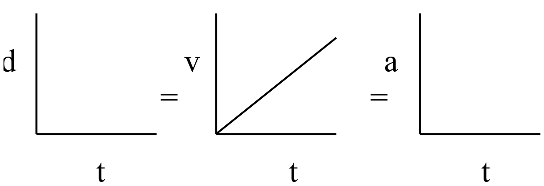
1-24

Sketch the velocity-time and acceleration-time graphs for the given displacement-time graph:



1-25

Sketch the d-t and a-t graphs for the given v-t graph:



1-26

What's the final velocity of an object that starts at 5.9 m/s, and accelerates at 4.0 m/s^2 for 2.8s?

1-27

How far will an object travel if it starts from rest and accelerates at 7.82 m/s^2 for 9.0 s?

1-28

What will be the final velocity of an object that starts at 1.5 m/s, and accelerates at 6.3 m/s^2 for a distance of 72m?

1-29

What is the rate of acceleration due to gravity? (neglecting air resistance)
What is it represented by?

1-30

When an object is dropped from a height of 28m. how long will it take to hit the ground?

1-31 In the above question, how fast will the object be going when it hits the ground?	1-32 How fast will an object be going after 6.4 s when it is dropped from rest?
1-33 How fast will an object be going after 6.7 s when it is dropped with an initial downward velocity of 1.9 m/s ?	1-34 Is gravity a vector or a scalar?
1-35 If it takes a thrown object 1.7s to go as high as it will go, how long will it take to come back down?	1-36 How far will an object fall in 5.8s?
2-1 The study of forces at rest is ________________	2-2 The unit for force is the ____________ One of these results in a mass of _____kg having an acceleration of ______m/s^2.
2-3 Are forces vectors or scalars?	2-4 Draw a force of 4.5N pulling due east on an object.

2-5

Two or more forces acting on an object at the same time are called ____________________ forces.

2-6

A single force equal to two or more concurrent forces combined is called the ________________.

2-7

At what angle should two concurrent forces be to obtain the smallest resultant?

At what angle should they be to obtain the largest resultant?

2-8

What is the greatest resultant obtainable with two concurrent forces of 4.8 N and 2.3N?

What's the smallest?

2-9

Forces are added ________ to __________.
The resultant can be found graphically, or if the two concurrent forces are at right angles, the resultant can be found using the ___________________
________________________.

2-10

If a force of 5.5N acts due west on an object while another of 7.8N acts due north, what is the magnitude of the resultant?

What is the direction of the resultant?

2-11

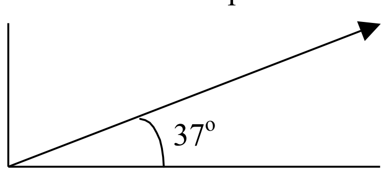
Using the parallelogram method, find the resultant (magnitude and direction) of a due south 18N force and a due east 26N force.

2-12

Just as concurrent forces can be combined into a resultant, a single force can be ________________ into two or more ________________ forces.
Commonly, these are the X and Y components.

2-13

What are the X and Y components of this force?



2-14

The force equal in magnitude but opposite in direction to the resultant is called the
________________________.

2-15

Draw a free-body diagram for this problem and solve mathematically: A rod pushes with a force of 23N on a cable that holds an 84N sign. If the cable is at 36^{o} to the building, what is the tension on the cable?

2-16

If a 22N box sits on a 32^{o} ramp, find the parallel and perpendicular forces mathematically.

2-17

An object is being held up by two ropes, 120^{o} apart from each other and 120^{o} from the object. What is special about the tension on the ropes in this situation?

2-18

If a girl is pulling on a sled rope with a force of 24N at an angle of 47^{o} to the ground, find the horizontal and vertical components of her force.

3-1

Dynamics is the study of forces affecting objects that are in ____________________.

In one word, describe Newton's First Law of Motion ________________________.

3-2

An object that has no net force acting on it may be at _______________, or may be moving at ___________________ ________________.

If there is an unbalanced force, the object will ___________________________.

3-3

What will be the acceleration resulting from a 6.7N force acting on a 8 kg mass?

3-4

What force is needed to accelerate a 345 kg object at 2.3 m/s^2 ?

3-5

By definition, one Newton =

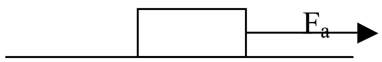
3-6

If you weigh 100N and sit on a chair, with what force is the chair pushing on you?

3-7 What’s the difference between mass and weight? As an object travels from Earth to the Moon, what happens to the objects mass and weight?	<u>3-8</u> What is the weight of an 18.4 kg object? What is the mass of a 34N object?
3-9 If two objects of 36 kg and 24 kg are accelerated with equal forces, which will have the greater acceleration?	3-10 If two objects of different mass are dropped from a window, how does the force of gravity on each compare? How do their accelerations compare?
3-11 Is force a vector or scalar quantity? Is mass a vector or a scalar? Is weight a vector or a scalar?	<u>3-12</u> If a 67 kg person weighs 300 N on a different planet, what is the gravitational acceleration on that planet?
4-1 What are the two types of friction and how do their magnitudes compare?	4-2 What is the normal force?
4-3 How does the magnitude and direction of the normal force compare to the magnitude and direction of an object’s weight?	4-4 How does the direction of the frictional force compare to the direction of the applied force?

4-5

If F_a is the applied force, draw and label the other three forces:



4-6

The frictional force can be __________than or ___________ to the applied force, but never _______________than it.

4-7

What is the coefficient of friction?

What is its symbol?

4-8

If an applied force of 6.2 N keeps an object moving at a constant velocity, what is the frictional force?

4-9

What's the formula used to find the frictional force when the weight and the coefficient of friction are known?

4-10

If a 16 N object has a coefficient of friction of .23 with a tabletop, what is the frictional force?

4-11

In 4-10, if a force of 5.0 N is applied, what will be the net force?

4-12

In 4-11, what will be the resulting acceleration of the object?

4-13

If a box is sitting on a ramp and not sliding down, the frictional force must be equal to the ____________________ force.
(perpendicular or parallel?)

4-14

An applied force of 4.7 N is needed to keep a wooden object moving at constant velocity across a wooden floor. What is the weight of the object?

5-1 What is the symbol for momentum? What are the units? What is momentum?	5-2 What is the momentum of a 13.8 kg object moving at 6.0 m/s?
5-3 One 4 kg object moving at 3 m/s strikes an 8 kg object and stps (transfers all of its energy to the 8 kg object). How fast will the 8 kg object travel?	5-4 What is the symbol for impulse? What are the units for impulse? What is impulse?
5-5 If a force of 15 N is applied for 3 s, what is the impulse produced?	5-6 A force of 9 N applied for 5 s to a 7 kg object will cause what change in the object's velocity?
5-7 When a rifle is fired, how does the momentum of the bullet compare to the momentum of the rifle?	5-8 If a 50 kg skater moving at 3.5 m/s strikes a 100kg skater at rest, and they cling together, what will be the velocity of the pair?
5-9 If someone standing on a frictionless surface throws a 6.2 kg ball at 7.8 m/s, with what speed will that person go backwards?	5-10 If a 340. kg object traveling at 56 m/s collides head-on with a 170. kg going 112 m/s, what will be the result?

6-1 What is the gravitational constant? What is its symbol? What are its units?	6-2 How do changes in two objects' masses affect the gravitational force between them?
6-3 How do changes in the distance between two objects Affect the gravitational force between them?	6-4 6-4 If object A has a gravitational force of X on object B, and object B's mass is twice that of A, what will be the gravitational force that object B has on object A?
<u>6-5</u> If one object has a mass of 47.5 kg, and a second object has a mass of 67.9 kg, and they are 24m apart, what is the gravitational force of attraction between them?	6-6 If one mass doubles the gravitational force becomes________ what it was. If the distance is doubled the gravitational force becomes __________ what it was.
7-1 What is the symbol for work? What is the unit for work? What is work?	7-2 What is the symbol for power? What is the unit for power? What is power?
7-3 By definition, 1 Joule equals ____________ __________________________________, and 1 Watt equals_____________________________.	7-4 The less time it takes to do a certain amount of work, the ____________ power it takes.

7-5 If a 26N force moves an object 16m, how much work has been done?	7-6 How much work is done in lifting a 9.4 kg object 3.5 m upwards?
7-7 In 7-6, if this work was done in 4.7 s, what power was required?	7-8 If a bulldozer pushes against a building with 4.5 x 10^{15}N of force for 52 s, but the building didn't move, how much work was done?
8-1 What's the difference between potential and kinetic energy? What are some types of potential energy? What are the units for energy?	8-2 What's the potential energy of a 22.6 kg object located 16.89m above the ground?
8-3 What's the kinetic energy of a 7.2 kg object that is moving at 8.4 m/s?	8-4 In any system, the loss or gain of potential energy _____________ the loss or gain of kinetic energy. Explain this idea using a pendulum.
8-5 The potential energy plus the kinetic energy equals the total ______________ energy of the system. This energy, plus any _______________energy (symbolized by _________) equals the total energy of the system.	8-6 What is the difference between a conservative force and a nonconservative force?

8-7

If a 15 kg object falls 6.3 m, what will be its loss of potential energy?

What will be its gain in kinetic energy?

8-8

In 8-7, how fast will the object be traveling at the end of those 6.3 m? (solve this two different ways)

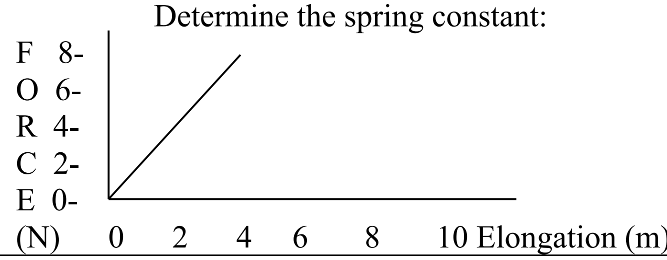
8-9

What is potential elastic energy?

What is the spring constant?

8-10

Determine the spring constant:



8-11

If a spring is stretched .03 m by a force of .14 N, what is the spring constant?

8-12

What is the potential energy stored in a spring that is stretched .43 m (k=1.38 N/m)?

9-1

What is the horizontal velocity component of a golf ball launched at 21^{o} and at an initial velocity of 24.6 m/s?

9-2

In 9-1, what is the initial vertical component of the ball's velocity?

9-3

In 9-2, how long will it take the ball to reach the top of its trajectory?

9-4

In 9-3, how long will the ball stay in the air?

How far will it go?

9-5 In 9-3, how high will the ball go?	9-6 When an object is thrown horizontally off a cliff at the same time another object is dropped from the cliff, which object will hit the ground first?
9-7 If an object is thrown horizontally from a 120m high cliff with an initial velocity of 21.3 m/s, how long will it take to reach the bottom?	9-8 In 9-7, how far from the base of the cliff will it land?
9-9 If an object takes 2.78 s to reach the bottom when thrown horizontally at 5.6 m/s off a cliff, how high is the cliff?	9-10 Describe centripetal force:
9-11 What is the symbol for centripetal force? If the centripetal force is removed from an object in circular motion, the object will move in what direction?	9-12 Both centripetal force and centripetal acceleration act in which direction? Besides centripetal force, what other force keeps an object in circular motion?
9-13 What is the centripetal acceleration on a bicyclist going around a curve (radius=20.m) at 6.7 m/s?	9-14 What's the centripetal force on a 95 kg object moving at 5.4 m/s around another object 7.7 m away?

10-1 When an atom is neutral (not an ___________), the number of electrons is______________ the number of protons.	10-2 An atom or material that loses electrons becomes ___________charged, while an atom or material that gains electrons becomes ____________charged. An electron or proton carries one _____________ charge.
10-3 An elementary charge is equal to ______________________C A coulomb is equal to ______________________elementary charges	10-4 Objects can become charged (gain or lose electrons) due to _______________________. Two like-charged objects will ______________, while oppositely charged objects will ____________. A charged object and a neutral object will also usually _________________.
10-5 When a negatively charged rod is brought near a neutral electroscope, what happens and why?	10-6 In 10-5, this is called charging by ______________________
10-7 An object which is capable of donating or accepting a large number of electrons is called an electrical ________________________. What's the major example? If a negatively charged object is grounded,, what will happen?	10-8 What is the law of conservation of charge? If two spheres, one having +5C and the other –9C, touch, when moved apart, each sphere will have a charge of ______________________.
10-9 An object that has 1.34 x 10^{16} extra electrons will have a charge of _________________C	10-10 As the distance between two charged objects triples, the electrostatic force between them_____________.

10-11

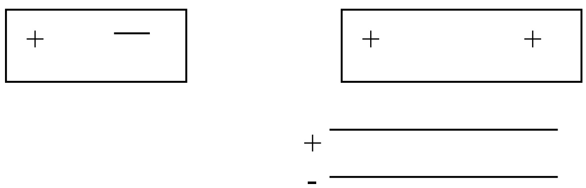
What is the force between two objects, each having a charge of 0.40C, if they are 14m apart?

10-12

An electric field's direction is described according to how it acts on a _________charge.

10-13

Sketch the electrostatic fields:



10-14

What is the field intensity if an object with a charge of 0.60 C is acted on by an electric force of 3.0×10^{-3} N?

10-15

The work needed to move a charged particle from one place to another within an electric field is known as the _________________ ___________________.

10-16

The unit of potential difference is the ________, represented by __________.
Since this is often too large when dealing with charges, the _________, represented by ________, and equal to ____________________________J is used.

11-1

The unit which describes electric current in terms of how much charge passes a given point in a conductor is called the _____________, which is represented by _______________. The meter used to measure this is called an ____________________, and is always connected in ________________.

11-2

If 140C of charge passes a spot in a wire in 7.0 s, how many amperes of current is the wire carrying?

11-3

In order for current to flow in a wire there must be a complete circuit, and a ______________ _________________, or _______________.
The meter used to measure this is a _____________, which is always connected in _________________.

11-4

What is the schematic symbol for:
A battery (cell)?
A voltmeter?
An ammeter
A resistor?
A switch?

11-5 Metals and other materials with many free electrons are called ___________________________, because they allow current to pass easily. Things that don't allow current to pass easily , like glass, rubber, and plastic, are called ________________________.	11-6 The measurement of how easily current flows through a conductor is called _________________, measured in _____________________, and represented by _____________.
11-7 How much current is carried by a conductor that has a resistance of 20. Ω when there is a potential difference of 200.V ?	11-8 Generally, resistance decreases when a conductor's length________________________, diameter ___________________, and temperature _________________________. The term used to describe the material's inherent conductivity is ____________________.
11-9 What is the resistance of a 3.50 m length of aluminum wire that has a diameter of 4.0 x 10^{-3}m and is at 20^{o}C?	11-10 Sketch a series circuit that has two resistors of 50.Ω and 70.Ω and a battery of 12V, along with a switch.
11-11 In 11-10, what is the total resistance?	11-12 In 11-10, what is the total current?
11-13 In 11-10, what is the voltage across the 50.Ω resistor?	11-14 Sketch a parallel circuit with the same components as in 11-10.

11-15

In 11-14, what is the total resistance?

11-16

In 11-14, what is the total amperage?

11-17

In 11-14, what is the current through the 50Ω resistor?

11-18

In parallel circuits, the total resistance is always ___________than the smallest resistor.

11-19

The unit of electrical power is the ___________, symbolized by ___________. To find the power, multiply the ____________ times the _____________.

11-20

If a hair dryer is rated at 120V and 10a, what is its power usage?

11-21

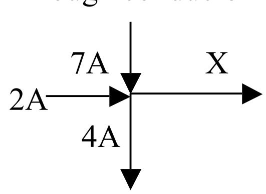
The power used through time is found by multiplying the ________ times the ___________. The unit is the ________________. This is the electrical energy.

11-22

If a 600.W amplifier is used for 20.s, what's the electrical energy used?

11-23

What is the current through conductor X?



11-24

If three lightbulbs are hooked in series to a battery, the brightness of each is ________ compared to the brightness of one lightbulb hooked up to the same battery.

12-1

If a material has electrons that are aligned with each other, that material is ___________________.
It will have two poles called ____________ and __________________.
A magnetic field surrounds any ____________ ___________________ in ___________________.

12-2

Two like poles of magnets will _____________, while two unlike poles will ________________.
Since the North end of a magnet points towards Earth's North Pole, Earth's North Pole must really be a ________________ magnetic pole.

12-3

The ___________ _____________ of a magnetic field is measured by the force it exerts on a current in the field. The lines of magnetic fields are known as ____________ lines.

12-4

Magnetic field lines by convention go from the __________ pole to the __________ pole.

12-5

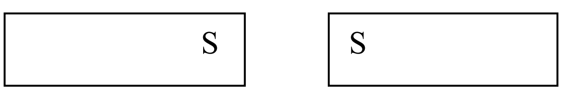
Sketch the magnetic field lines:

12-6

Sketch the magnetic field lines:

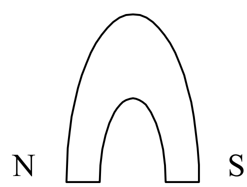
12-7

Sketch the magnetic field lines:



12-8

Sketch the magnetic field lines:



12-9

When a conductor cuts magnetic field lines, a __________ _____________ is generated in the conductor. If the conductor is part of a complete circuit, a ____________will be induced.

12-10

The greater the number of field lines a conductor cuts, the ___________ will be the voltage produced.

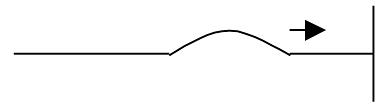
13-1

A vibratory disturbance that moves through a material (medium) or empty space is called a _____________. Give four examples:

13-2

A single vibration is a ____________________.

Sketch its reflection when it hits a barrier:



13-3

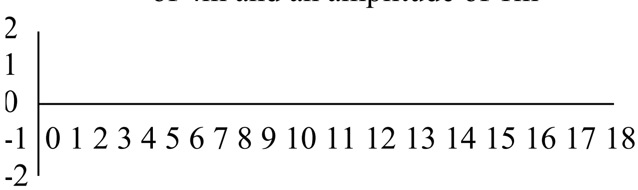
What is a longitudinal wave and what are two examples?

13-4

What is a transverse wave and what are two examples?

13-5

Sketch three cycles of a wave that has a wavelength of 4m and an amplitude of 1m



13-6

If the wave in 13-5 is moving at 8 m/s, what is its frequency?

13-7

The units for frequency are ___________ and _________. The time it takes for one wave cycle to go by is called the ______________, which has as its unit, the __________.

13-8

What is the period of a wave that has a frequency of 100. cps?

13-9

The "top" of the wave is called the ___________, and the "bottom" is called the ____________.

13-10

If the frequency of a wave is 43 Hz and its wavelength is 5.4 m, what is its speed?

13-11

Frequency is symbolized by _______.
Wavelength is symbolized by ____________.
If the speed stays the same, as the wavelength increases, the frequency must _____________.

13-12

All points on a wave that are in phase make up a wave ______________.
Waves transfer ________________, not matter.

13-13

If a wave-making object is moving away from an observer, the perceived frequency is __________ than it really is. This is called the
______________ ________________.

13-14

Because the light from stars is shifted toward the _______ end of the spectrum, we know that the stars are moving ________________ us.

13-15

When two waves are in phase, their combined amplitude will be ____________ than each one singly. This is called ________________ Interference.

13-16

When two waves are out of phase, their combined amplitude will be _____________ than each singly. This is called ________________interference.

13-17

__________ form at points of maximum destructive interference, where the waves are an__________ number of half-wavelengths apart, and _____________ form at points of maximum constructive interference, where the waves are an __________ number of half-wavelengths apart.

13-18

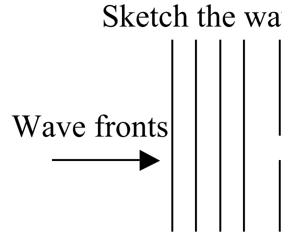
When two waves of the same amplitude and frequency travel in opposite directions (often from a wave reflecting back on itself), a ___________ __________ is formed. This is also known as _________________________.
Give three examples:

13-19

When waves bend around corners or propagate behind a slit, this is called _________________.

13-20

Sketch the wave pattern behind the slit:



14-1

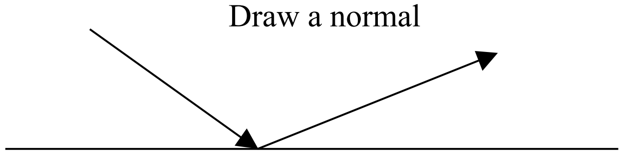
The speed of light in a vacuum is __________________, and is represented by __________.

14-2

What's the frequency of a light beam that has a wavelength of 4.5×10^{-7}m?

14-3

Put an i on the incident ray
Put an r on the reflected ray
Draw a normal



14-4

On 14-3, label the angle of incidence and the angle of reflection.
How do these two angles compare?

14-5

Mirrors show ___________reflection while this paper shows ___________reflection.

Images seen in a mirror are called ____________images.

14-6

When light enters a new medium at an angle, the wave fronts will be bent. This is called ________________________.

14-7

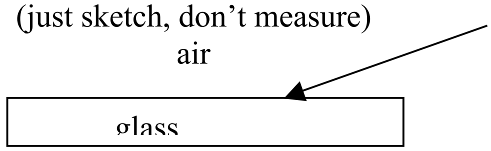
The ratio of the speed of light in a vacuum to the speed of light in a medium is called that medium's ________ __________ of_______________.
It's represented by ______

14-8

When light enters a medium that has a higher index of refraction, it will bend ___________________ the normal. When it enters a medium with a lower index of refraction, it will bend ____________ the normal.

14-9

Show the probable path of the light ray
(just sketch, don't measure)
air



14-10

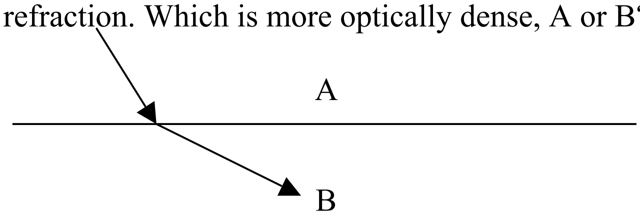
If the speed of light in a certain medium is 2.3×10^{8} m/s, what is that medium's index of refraction?

14-11

If a medium has an index of refraction of 2.4, what will be the angle of refraction from air if the angle of incidence is 25^o ?

14-12

Draw the normal. Label the angles of incidence and refraction. Which is more optically dense, A or B?



14-13

Visible light makes up one part of the

____________________ __________________

14-14

What is the approximate frequency of yellow light?

15-1

List three examples which demonstrate ER (electromagnetic radiation) acting like a wave:

15-2

Name on example which shows ER behaving like a particle:

15-3

Briefly describe the photoelectric effect:

15-4

Quantum theory describes ER in discrete amounts called ____________________. The energy of each photon of light increases with increasing ______________________. The equation used to find this uses Planck's constant, represented by _______ and equal to ______________________.

15-5

At the atomic level, ER and matter both exhibit characteristics of waves and______________.

15-6

When atoms are excited, electrons can jump to higher _____________ ______________ from their ________________ ________________. When they jump back down, ________________ is emitted.

15-7 What is the color of the light emitted from a hydrogen atom when its electron drops from the n=5 to the n=2 level?	15-8 Each element will have certain emissions based on the possible energy level changes of its electrons. This causes each element to have a characteristic emission _________, or ________ _________ _____________.
15-9 The structure of the atom is now known to include protons and neutrons (collectively known as ___________________), which are located in the nucleus. What keeps the protons from pushing each other apart?	15-10 The equivalency of mass and energy was described by Einstein in his equation: $E=mc^2$ What is the energy produced when 2.3 kg of mass is converted to energy?
15-11 What are the four fundamental forces, in order of strength?	15-12 The smallest particle known is the ______________. These are found in six varieties, called ___________ _____________, _________________,___________ _______________, & ________________. Quarks have charges of either __________ or ____________, and so can be combined to make various other particles.
15-13 Since all particles have antiparticles, there are also _______________.	15-14 A baryon is a type of _______________. It is made of three _____________. Give one example of a Lepton: _______________.
PRT-1 *k* represents the spring constant, but also is used to represent the ___________________ ____________ Which is _______________________________.	PRT-2 How fast does sound travel in air? _______________. Expressed in millimeters per second , it's _________________, and expressed in picometers per second, it's ___________________.

PRT-3 What is the mass of one proton? ________________________. What would this be in micrograms? _______________________________	PRT-4 To change gigaseconds into nanoseconds, _______________ by ___________________.
PRT-5 The acceleration due to gravity on Earth is: ___________________.	PRT-6 The kinetic friction coefficient between rubber on wet asphalt is _________________. This is the same coefficient as the starting friction coefficient between ______________ and ______________.
PRT-7 TV waves have wavelengths of about ______________________	PRT-8 Which has the higher frequency? ultraviolet or infrared?
PRT-9 Corn oil has an index of refraction that is the same as _____________. Which listed material will bend light the most?	PRT-10 In a series circuit, the ____________ stays constant throughout the circuit, whereas in a parallel circuit, the ____________ stays constant.
PRT-11 The electrostatic force on a particle divided by the charge of the particle gives the _________________ ____________________	PRT-12 Which listed conductor has the lowest resistivity?

PRT-13 What is the schematic symbol for a volume control (variable resistor)?	PRT-14 The frequency is inversely proportional to the ____________ of a wave.
PRT-15 The energy of an emitted photon will equal the difference between the __________ level the electron is on and the __________ level.	PRT-16 To find the frequency of an emitted photon of light, multiply the ____________ times _______________________ , and divide by ________________________.
PRT-17 To find the cross-sectional area of a conductor, take the diameter and _________________________ __________________________________.	PRT-18 If you know the initial angle and speed of a kicked soccer ball, you can find the initial vertical component of the speed by _________________ _______________________________________.
PRT-19 What equation would you use if you know the distance an object accelerated and you want to find the final velocity?	PRT-20 The momentum of a system before an event _____________the momentum of a system after the event.
PRT-21 The change in momentum of an object is called the ________________, and can be found by multiplying the applied force times the ________________________.	PRT-22 The total energy of an object equals the sum of its potential energy, kinetic energy, and ___________ _______________________________. (now go back through these 250 cards until you've mastered them!- Best wishes on the Regents!)