Name: _____ Date: _____ Period _____

Physics Final Study Guide—Spring Semester

1. Fill in the table

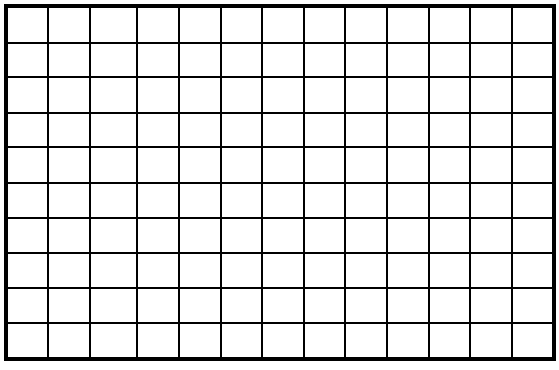
	Symbol	Description (more info is better!)	Unit
Mass of First Planet	m_1		
Mass of Second Planet			
Force of Gravity			
Gravitational Constant			
Gravitational Strength			
Orbital Period Planet A			
Orbital Period Planet B			
Orbital Radius Planet A			
Orbital Radius Planet B			
Charge One			
Charge Two			
Distance between Charges			
Coulomb's Constant			
Electrical Force			
Electrical Energy			
Wave			
Period			
Amplitude			
Frequency			
Wave Speed			
Transverse Wave			
Longitudinal Wave			

Gravitation:

2. Sketch a graph of Force vs. Distance.

   a. What is the relationship between force and distance?

   b. Write the relationship equation.



3. Based on the TedED gravitation video, what would happen to two teenagers who were placed away from everything, which way would they move? Why?

Name: _____ Date: _____ Period _____

4. Venus and Mercury are 5.03 x10^{10} m apart. If Venus' mass is 4.87 x 10^{24} kg and Mercury's mass is 3.3 x 10^{23} kg, what is the gravitational force between them?

5. If the force between two identical masses is 130N when the distance between them is 3m, what is the mass of these objects?

6. Neptune has a mass of 1.024x 10^{26} kg. If a 50.0-kg mass weighs 434.5 N on Neptune, calculate Neptune's radius.

7. Mars is 1.54 AU from the sun. How long does it take Mars to revolve around the sun? (Hint: You know Earth's data)

8. It takes Pluto 247.7 Earth years to complete a revolution. How far is Pluto from the sun? (Hint: You know Earth's data)

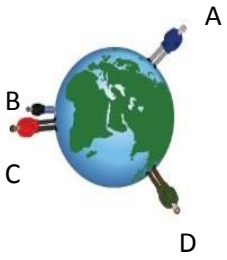
9. It takes Jupiter 11.862 Earth years to complete a revolution around the sun. How far is Jupiter to the sun?

Name: _____ Date: _____ Period _____

10. The people on the picture below are all located at the same distance from the center of the Earth. Yes some of the people are standing on water because they are beast like that. The child is exactly half the mass compared to the adults. All of the adults have identical mass.
    a. What is the gravitational force experienced by each of these people?

    b. How does the gravitational force compare from the child and the adults?

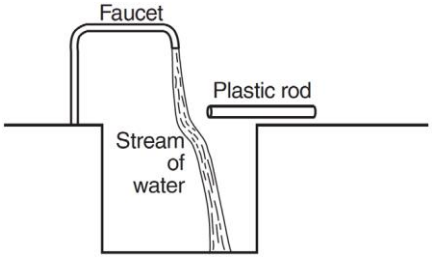
    c. Rank the force of gravity of the adults and the child.



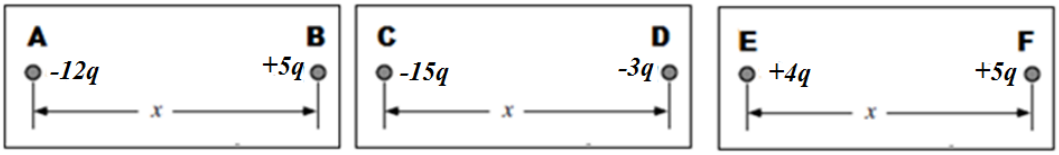
Electrostatics and Magnetism:

11. A dry plastic rod is rubbed with wool cloth and then held near a thin stream of water from a faucet. The path of the stream of water is changed, as represented in the diagram below. Which force in this situation is the strongest force?
    a. friction
    b. magnetic
    c. electrostatic
    d. gravitational

    Explain your reasoning.



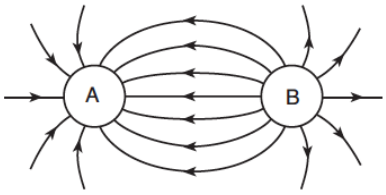
12. Rank the force of the following situations from most attractive to most repulsive.



    Explain your reasoning.

13. The diagram below represents the electric field surrounding two charged spheres, A and B. What is the sign of the charge of each sphere?

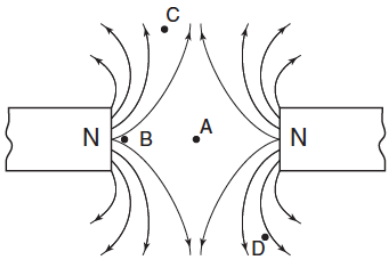
    a. Sphere A is positive and sphere B is negative
    b. Sphere A is negative and sphere B is positive
    c. Both spheres are positive Both spheres are negative



    Explain your reasoning.

Name: _____ Date: _____ Period _____

14. The diagram below shows the lines of magnetic force between two north magnetic poles. At which point is the magnetic field strength greatest?
    a. A
    b. B
    c. C
    d. D

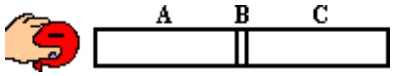


Explain your reasoning.

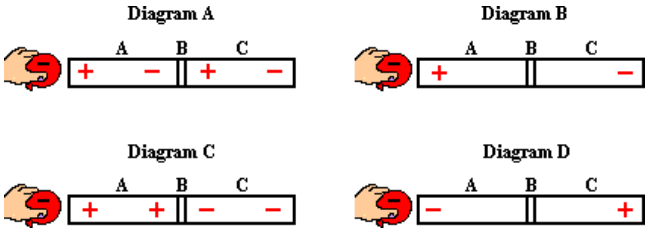
15. The diagram below shows the magnetic field lines between two magnetic poles, A and B. Which statement describes the polarity of magnetic poles A and B?
    a. A is a north pole and B is a south pole.
    b. A is a south pole and B is a north pole.
    c. Both A and B are north poles.
    d. Both A and B are south poles.

Explain your reasoning.

16. A negatively charged balloon is brought near the three objects shown below. Object A is a conductor. B represents the two objects are touching. Object C is a conductor. Which of the following diagrams accurately shows the arrangement of charge on Objects A and C?



Explain your reasoning.

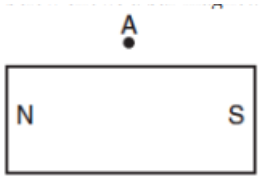


17. Since more magnetic field lines cross the area that is near the pole of a magnet, what does this indicate about the magnetic field strength in that location?
    a. It is stronger
    b. It is weaker.
    c. It is entering the magnet.
    d. It is leaving the magnet.

Explain your reasoning.

Name: _____ Date: _____ Period _____

18. The diagram below shows a bar magnet. What is the direction of a compass needle placed at point A?
    a. Up
    b. Down
    c. right
    d. Left



Explain your reasoning.

19. The blue box has a charge of +0.000440 C and is attracting the red box that has a charge of 0.0033 C. If the attracting force is 626 Newtons. How far apart are the two objects?

20. Two coins lie 1.5 meters apart on a table. They carry identical electric charges. Determine what would happen to the force if….
    a. Distance is doubled?
    b. Distance is halved?
    c. Distance is tripled?
    d. Distance is quadrupled?

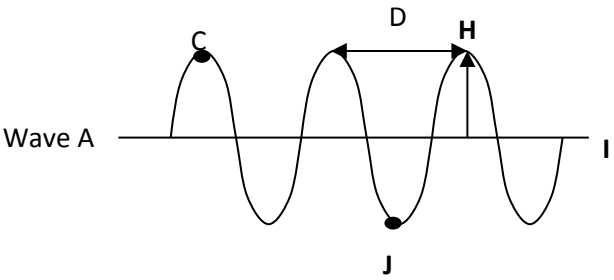
21. A positive test charge of 8.0 C is placed in an electric field. It experiences a force of 4.0 N. What is the intensity (strength) of the electric field?

22. A negative charge of 2.0×10^{-8} C experiences a force of 6.0×10^{-1} N in an electric field. What is the intensity of the electric field?

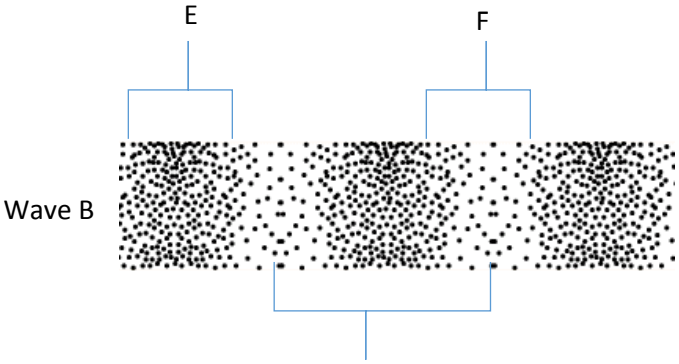
23. A positive test charge of 5C is in an electric field which exerts a force of 5N on it. What is the intensity of the electric field?

Name: _____ Date: _____ Period _____

Anatomy of Waves:



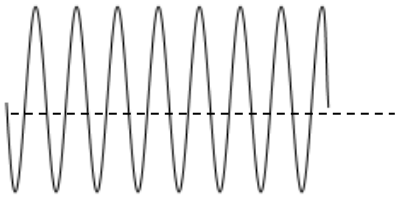
24. _____Transverse Wave
25. _____Longitudinal Wave



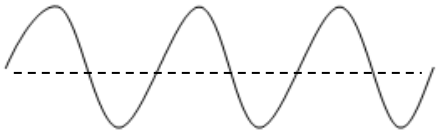
26. _____ Wavelength
27. _____Trough
28. _____ Equilibrium
29. _____Amplitude
30. _____Crest
31. _____ Compression
32. _____ Rarefaction

Loudness of Sound

Wave A



Wave B



33. Which one will sound quieter? _____ Why?

34. Which one will sound louder? _____ Why?

35. Provide an 3 real life examples of the following:

Constructive Interference	Destructive Interference

Name: _____ Date: _____ Period _____

Wave Calculations

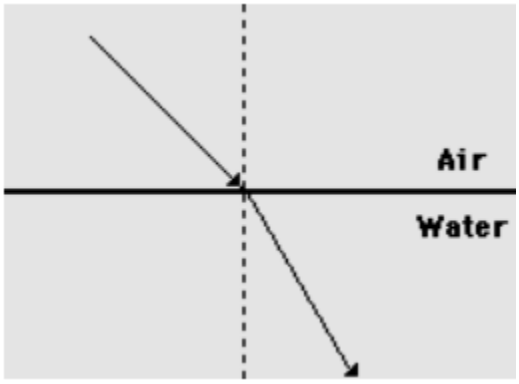
36. Sound travels at 340 m/s when it is room temperature. If the E key of a piano is 329Hz, what is the wavelength of the sound produced at room temperature?

37. Crickets produce more chirping sounds when it is warmer. If they produce a sound with a period of 0.16 seconds, what is the speed of sound if the wavelength is 60 meters?

Refraction

The diagram below shows the path of a light ray as it travels through air, across the air-water boundary, and through the water. Use the diagram to answer the following questions

38. On the diagram, label ...
    a. the air-water boundary with a B
    b. the normal line with an N
    c. the incident ray with an I
    d. the refracted ray with an R
    e. the angle of incidence with a θi
    f. the angle of refraction with a θr



39. How many media are there in this diagram? _____
    Name them.

40. What is meant by the term "medium" in this context?

41. Place a noticeable dot at the location where refraction of light takes place.

42. Looking at the image, which has a higher index of refraction (air or water)? How do you know this?

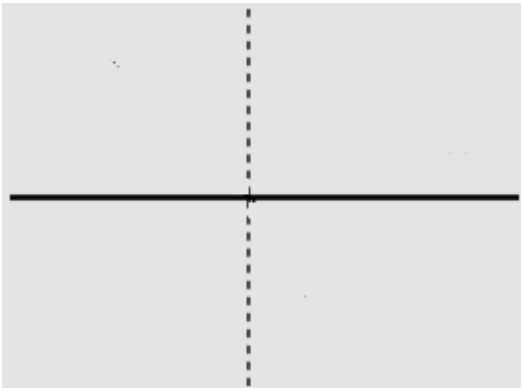
Name: _____ Date: _____ Period _____

Use index of refraction chart to answer the following questions.

43. In which of the following would light travel the slowest?

44. In which of the following would light travel the fastest?

45. Sketch light moving from water to Lucite. Does it bend to the normal or away from the normal?

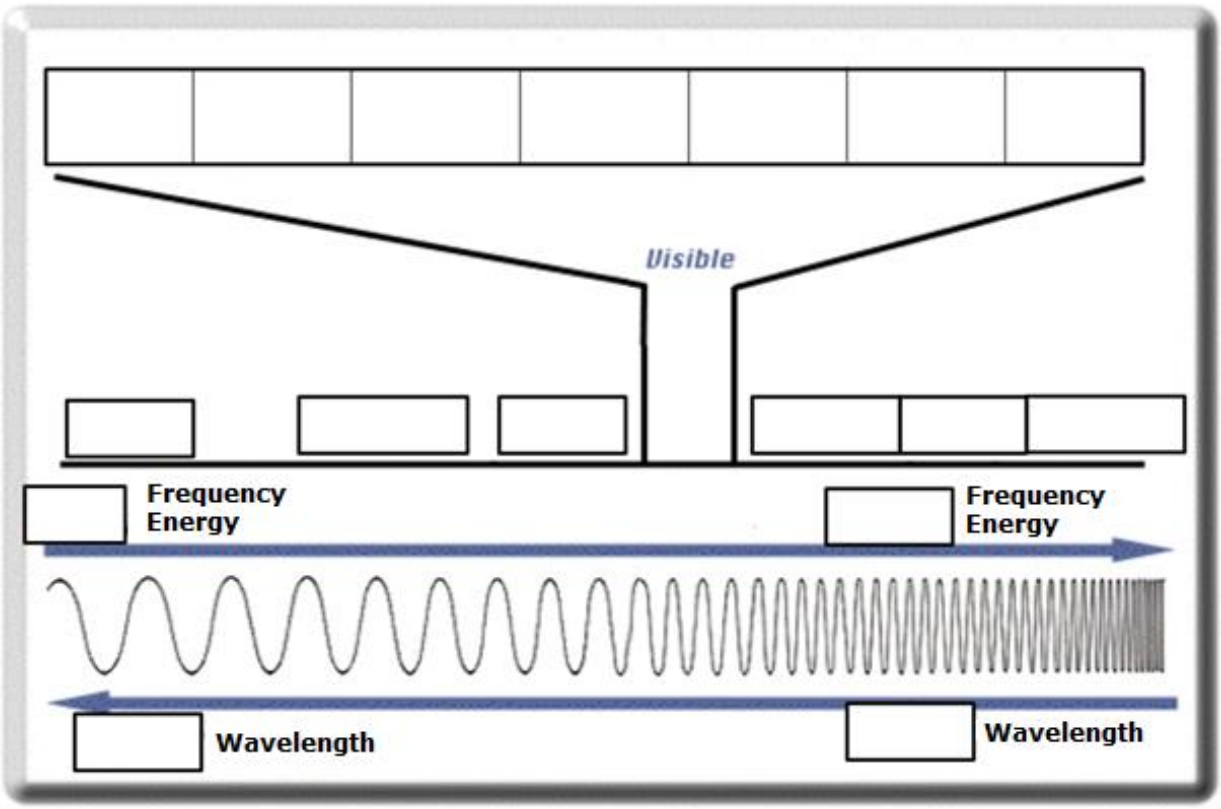


Substance	**Index of Refraction**
Air (vacuum)	1.00
Water	1.33
Alcohol	1.36
Quartz	1.46
Lucite	1.50
Benzene	1.50
Glass – Crown	1.52
Plexiglas	1.55
Glass – Flint	1.61
Diamond	2.42

46. Sketch light moving from Diamond to Benzene. Does it bend to the normal or away from the normal?

Name: _____ Date: _____ Period _____

EM Waves: Fill in the blanks for the EM Spectrum



47. What kind of Electromagnetic wave am I?
    a. My wavelength is **LONGER** than *INFRA-RED* but **SHORTER** than *RADIOWAVE*

    b. My frequency is **HIGHER** than *MICROWAVE* but **LOWER** than *VISIBLE LIGHT*

    c. My wavelength is **SHORTER** than *VISIBLE LIGHT* but **LONGER** than *X-RAYS*

    d. My energy is **LOWER** than a *GAMMA- RAY* but **HIGHER** than *VISIBLE LIGHT* and I am not an X-RAY

48. What is the photoelectric effect?

49. On a track meet, runners are advised to look at the start gun rather than to listen for the shot. Based on what you have learned about sound and light, why is this the advice they are given.

Name: _____ Date: _____ Period _____

2nd Semester Physics Formulas

Gravity

$$F_g = G\frac{m_1 m_2}{d^2} \qquad g = \frac{Gm}{r^2} \qquad G = 6.67 \times 10^{-11}\,{}^{Nm^2}/_{kg^2}$$

$$\left(\frac{T_A}{T_B}\right)^2 = \left(\frac{r_A}{r_B}\right)^3 \qquad (T_A)^2(r_B)^3 = (T_B)^2(r_A)^3$$

Electric and Magnetic Fields

$$k = 9 \times 10^9\,{}^{Nm^2}/_{C^2} \qquad F = \frac{kq_1 q_2}{d^2} \qquad E = \frac{F}{q}$$

Waves

$$f = \frac{\#\ cycles}{time} \qquad f = \frac{1}{T} \qquad v = f\lambda$$

$$T = \frac{time}{\#\ cycles} \qquad T = \frac{1}{f} \qquad v = \frac{\lambda}{T}$$