

Physics Traditional 2nd Semester Final Exam Review Guide

For FULL credit, answer in YOUR NOTEBOOK!

Electricity & Magnetism

1. Which part of an atom moves when there is a flow of electricity: protons or electrons? **Why?**
2. What is Ohm's law?
3. What does it mean if a resistor is ohmic?
4. How can you use the bands on a resistor to determine its value?
5. What does the fourth band mean?
6. What is a series circuit?
7. What is a parallel circuit?
8. When is the voltage through all items the same as the battery value?
9. When is the current through all items the same as the battery value?
10. When you add items in series, what happens to total resistance?
11. When you add items in parallel what happens to the total resistance?
12. How do you determine the equivalent (total) resistance for items in series?
13. What is the awful equation for total resistance for things in parallel?
14. If you have two 4 ohm resistors in series, what could you replace them with?
15. If you have two 4 ohm resistors in parallel, what could you replace them with?
16. If you have a 9 volt battery with a single 2 ohm resistor in the circuit, what is its current?
17. What are two advantages to a parallel circuit?
18. Give an analogy for a parallel circuit. (bucket brigade or toll booths or flowing water...)
19. Give an analogy for a series circuit.
20. Which variable is another name for electrical friction?
21. Which variable is another name for electrical pressure?
22. Is the energy per charge voltage or current?
23. What are the units for voltage, resistance, and current?
24. What is a potentiometer and what is it commonly used for?
25. What electrical device are defrosters, toasters, and ovens?
26. What is the difference between AC and DC?
27. If a bulb in a circuit is not lit, does that mean no current is flowing?

28. What is the power equation?
29. What is the symbol for a battery? a resistor? a bulb? a switch? a fuse?
30. Draw the schematic for a battery with two bulbs in a parallel circuit.
31. What is an ammeter? a voltmeter? an ohmmeter?
32. How do you put an ammeter in a circuit: series or parallel? Why?
33. How do you put a voltmeter in a circuit, series or parallel? Why?
34. Draw the schematic for two batteries in series connected to a resistor and a bulb in series. Put an ammeter in the circuit and a voltmeter measuring the resistor.
35. What happens to the other bulbs when another bulb is added in parallel?
36. What happens to the other bulbs when another bulb is added in series?
37. What happens to the other bulbs when one bulb burns out in parallel?
38. What happens to the other bulbs when one bulb burns out in series?
39. How did you set the meter dial and plug to measure voltage?
40. How did you set the meter dial and plug to measure current?
41. Is kilowatt-hour a unit of energy or power? Explain how you know.
42. Which has greater voltage provided by their outlets, the US or Europe?
43. What happens to US appliances plugged into European outlets? WHY?
44. What happens to European appliances plugged into American outlets? WHY?
45. The lower threshold for fatal shocks is .07 amps. Why does .01-.02 amps often result in death?
46. What is a short circuit?
47. Why might a 9 volt battery kept in your change pocket heat up?
48. Does voltage cause current or does current cause voltage? How do you know?
49. If you are caught in an open field in an electrical storm, what should you do? Lie down flat? Stand up? Crouch down? Run? Stand still? Wait for a strike and run?
50. Why are modern airplanes more vulnerable to lightning than older ones?
51. Give three methods scientists are using to study lightning.
52. Two 55 ohm resistors are in series with a 110 volt outlet. How much current flows through each one?
53. What happens to the resistance of the human body when it gets sweaty or wet?

54. If the springs on your circuit board each have only a single wire attached to them, is your circuit series or parallel?
55. What is the secret behind the adapter that allows US appliances to be plugged safely into European outlets? What must be inside them and how do they work in the circuit?
56. Why is using a higher wattage of bulb than a lamp is supposed to have not a good idea?
57. How does a fuse protect a circuit?
58. A particular lamp has .5 amps through it when connected to a 120 volt source and .2 amps when hooked to a 10 volt source. Is the lamp ohmic? Explain!
59. A charge of 20 C flows through a wire each second. What is the current?
60. An electron takes a complete loop through a circuit and ends up precisely where it began. What is its energy compared to when it began?
61. What is the fundamental requirement for the creation of magnetism?
62. How is magnetism like electrostatics?
63. How do like poles react? Unlike poles?
64. What parts are needed to create a strong electromagnet?
65. How does a doorbell work?
66. How does a circuit breaker work?
67. How are motors and generators related?
68. What must be true before a chunk of iron is a magnet?
69. How can the earth create magnets naturally?
70. How can you weaken a permanent magnet?
71. How can you weaken an electromagnet?
72. What is an advantage to an electromagnet?
73. What is an advantage to a permanent magnet?
74. Why did the lightbulb light up on the Thomson coil?
75. Why did the aluminum ring levitate on the Thomson coil?
76. Why did the cut aluminum ring NOT levitate?
77. What do the magnetic field lines around a horseshoe magnet look like?
78. How are magnetic field lines like parallels on the earth?
79. How are magnetic field lines like meridians (longitude lines) on the earth?
80. How do mag-lev trains work?
81. What is the world's smallest magnet?
82. Why isn't cloth magnetic?

83. How can you use a magnet to create a current?
84. What is the orientation of the earth's magnetic field, and how do we know?
85. Why do current carrying wires push or pull each other?
86. What common materials can be made into a permanent magnet?
87. What common materials can be made into an electromagnet?
88. If three ring magnets are levitating on a graduated cylinder and the top of the top magnet is a north pole, what is the bottom of the bottom magnet?
89. How are electricity and magnetism related to each other?
90. Which device begins with mechanical energy and ends with electrical energy?
91. If magnets are attracted to the earth's magnetic poles, why don't we see magnets flying through the air to land in northern Canada and the southern Pacific Ocean?
92. What can magnetic forces do that gravity cannot?
93. Where might electromagnets be required? Permanent magnets?
94. Are magnetic fields three-dimensional? How do you know?
95. What is a domain?
96. Why aren't American nickels magnetic?
97. Why do some vending machines have magnets in them?
98. Why do farmers feed magnets to their cows?
99. If a magnet is cut in half, what happens to the pieces?
100. Why was AC a requirement for the Thomson coil when we lit the lightbulb, made the coil dance, and levitated the ring?

Physics Traditional Fourth Quarter Review Guide

*Turn in your work on separate pages stapled to this packet on Final Exam day for a bonus on your exam.

1. What are the two main types of waves?
2. Which type is sound? Light?
3. Which type of wave cannot travel through outer space?
4. Two types of earthquake waves are P (pressure) waves and S (shearing) waves. Which type of wave is each earthquake wave?
5. What are some examples of forms of light?
6. Are radio waves light or sound?
7. Which term refers to the time for the creation of one wave?
8. Which term refers to how often the waves occur per second?
9. Which term refers to the length of one wave?
10. Which term refers to the maximum movement of a particle away from the zero line?
11. When you speak in a Mickey Mouse voice, which property of a wave have you altered?
12. What determines how quickly a wave can move through a medium?
13. Would sound travel faster in air or water? Steel or wood? What about in a vacuum or in air?
14. How are the period and frequency of a wave related?
15. What determines the frequency of a wave?
16. What is an object's natural frequency?
17. How do you know which of two tuning forks will have the higher pitch?
18. What determines the wavelength of a wave?
19. What is the wave equation?
20. What travels with a wave: energy or particles?
21. If you show a brighter light of the same frequency as before, what wave property have you increased?
22. If a train blowing its whistle is approaching you at constant speed, what happens to the frequency you hear?
23. If a train blowing its whistle is accelerating towards you, what happens to the frequency you hear?
24. How can you use wave concepts to determine how far away a storm is?
25. What equation would help you determine from your echo time how deep a well is?
26. Is a light year a distance or a time? What equation would you use it with?
27. In harmonics, when an instrument has a reed or requires reflection at one end and is open to the air at the other, what is the simplest part of a wave which will fit?
28. How would you calculate that instrument's fundamental frequency (first harmonic)?
29. What is constructive interference?
30. What is destructive interference?
31. What happens when two frequencies which are similar but not identical are heard at the same time?
32. What happens if a vibrating object is in contact with another object of different natural frequency?
33. What is sympathetic vibration?
34. What are examples of sympathetic vibration in the 'real' world?
35. What is resonance?
36. What are some examples of resonance?
37. What is the difference between intensity and relative intensity?
38. Which one has units of decibels?
39. If a sound goes up by 10 decibels, how does the energy change? What about the loudness?

40. If you move a light source twice as far away, how does the intensity at a particular location change?
41. What are the three types of cones in the human eye?
42. What are the three secondary colors for mixing lights?
43. When an actor wearing a magenta costume steps under cyan lighting, what color does the costume appear?
44. When a yellow spotlight is shone through a magenta stained glass window, what light is allowed through?
45. When cyan and yellow paints are mixed, what color is the result? What about if you mix blue and red?
46. When a banana looks yellow, what colors of light does it reflect? Absorb? Transmit?
47. How do polarized lenses work?
48. Why are sunglasses polarized vertically?
49. What are the three special rays for a mirror ray diagram?
50. What is the focal point of a mirror?
51. What is d_i ? d_o ?
52. What is a virtual image?
53. Which mirrors can form virtual images?
54. What is a real image?
55. Which mirrors can form real images?
56. Which mirrors can form smaller virtual images?
57. Which mirrors can form enlarged virtual images?
58. Which mirrors have negative focal points?
59. What is the connection between the center of the mirror and the focal point?
60. Which image distances are negative?
61. Which mirror forms the same types of images as a diverging lens?
62. Which mirror forms the same types of images as a converging lens?
63. Which lens is fat in the middle and skinny on the edges?
64. How is the center ray for a lens different from a center ray for a mirror?
65. What sort of image is created when an object is placed closer than the focal point in front of a converging lens?
66. What sort of image is created when an object is placed farther than the focal point in front of a converging lens?
67. What sort of image is created when an object is placed exactly at the focal point of a converging lens?
68. What is Snell's Law?
69. What is the index of refraction?
70. Does a ray bend towards the normal when entering a denser material or a sparser one?
71. What is the critical angle of a material?
72. What happens to a ray sent out of a dense material at an angle smaller than the critical angle?
73. What happens to a ray sent out of a dense material at an angle larger than the critical angle?
74. How do you calculate the critical angle?
75. What is total internal reflection?