AP Physics Jeopardy Q&A
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Note: Question/answers in italics are Daily Doubles. They are on the same topic as the category they are found in.

Game 1

Newtonian Mechanics

1) The equation defining gravitational potential energy
    a. What is $\Delta U_g = mgh$
2) The SI unit that tension is measured in
    a. What is the Newton
3) Equation describing the force of gravity between two objects
    a. What is $F_g = - G m_1 m_2 / r^2$
4) The two definitions of impulse
    a. What are $F\Delta t$ and Δp
5) The equation for the period of a pendulum
    a. What is $T_p = 2 \pi \sqrt{l/g}$

Fluids & Thermal

1) The ideal gas law in terms of the number of moles of a substance
    a. What is $P V = n R T$
2) The definition of an isobaric process
    a. What is a process carried out at constant pressure
3) The equation for linear thermal expansion
    a. What is $\Delta l = \alpha l_0 \Delta T$
4) The effect on sea level if the (floating) Arctic ice melts
    a. What is no change
5) The equation for the efficiency of a Carnot engine
    a. What is $e_c = (T_h - T_C)/T_H$

Waves, Optics, Atomic, & Nuclear

1) The relationship between wave speed, frequency, and wavelength
    a. What is $v = f \lambda$
2) The relationship between angle of incidence and angle of refraction
    a. What is $n_1 \sin \theta_1 = n_2 \sin \theta_2$
3) The mass of a photon
    a. What is zero
4) The charge of an alpha particle
    a. What is 2+

5) The initial number of radioactive particles if 1,000 remain after 3 half lives
    a. What is 8,000

Electricity & Magnetism

1) The relationship between voltage, current, and resistance
    a. What is $V = I R$
2) An explanation of what current is
    a. What is the flow of electric charge
3) The relationship between total capacitance and capacitors in parallel
    a. What is C_p = sum of all C_i
4) The SI unit for electromotive force
    a. What is the volt
5) The equation defining magnetic flux
    a. What is $\varphi_m = B A \cos \theta$

Special Surprise

1) What vectors are (two answers)
    a. What is (1) disance + direction (2) your friends
2) *The type of problem in which energy is not conserved*
    a. *What is nuclear physics (nuclear radiation, fission, fusion)*
3) An explanation of the right hand rule for linear current
    a. What is thumb = force, hand/index finger = current/velocity, fingers/middle finger = magnetic field
4) The speed of a ball dropped from rest after 10 seconds
    a. What is 98 m/s
5) An explanation of the critical angle
    a. What is the angle beyond which total internal reflection occurs

Game 2

Newtonian Mechanics

1) Equation describing the force on a spring
    a. What is $F = -kx$
2) The difference between weight and mass
    a. What is acceleration due to gravity
3) The SI unit that torque is measured in
    a. What is the Newton-Meter
4) The final horizontal acceleration of a baseball thrown at Fenway Park at a 45 degree angle at 10 meters per second.
    a. What is zero
5) The relationship between normal force and weight
    a. What is the sine of the angle between the slope and the horizontal

Fluids & Thermal

1) The equation defining pressure
    a. What is force per unit area
2) A technique for determining the density of a solid
    a. Whats is mass/volume, finding mass with a mass balance and volume with displacement
3) The equation for buoyant force
    a. What is $F_{buoy} = \rho V g$
4) The SI units of heat
    a. What is the Joule
5) The effect an open refrigerator has on room temperature
    a. What is increasing it

Waves, Optics, Atomic, & Nuclear

6) The definition of refractive index
    a. What is the c / v
7) 3 pi radians expressed in degrees
    a. What is 540 degrees
8) The relationship between focal length and radius of curvature
    a. What is R = 2f
9) The wavelength of an electron
    a. What is $\lambda = h / p$
10) The equation for magnification given image and object locations
    a. What is $M = - s_i / s_o$

Electricity & Magnetism

1) The relationship between total resistance and resistors in series
    a. What is R_s = sum of all R_i
2) The total resistance of this network of resistors (see picture)
    a. 1.5Ω
3) The SI unit for impedance
    a. What is the ohm
4) An equation defining electric power
    a. What is P = I V
5) The equation for force on a moving charge in a magnetic field
    a. What is $F_B = q v B \sin \theta$

Special Surprise

6) The definition of an adiabatic process
    b. What is a process carried out at constant heat (no heat transfer)
7) The equation for change in velocity at constant acceleration over a period of time

   b. $\Delta v = a\ t$
8) The magnitude of the electric field halfway between two equally charge particles
   a. What is zero
9) The difference between a sine wave and a cosine wave in radians
   a. What is pi/2
10) *The two equations needed to find the object's wavelength just before hitting the ground, given the object's mass and the height of the cliff it's dropped from rest off of*
   a. What are $(v_f)^2 = 2a\Delta t$ *and* $\lambda = h/mv$

Extra Questions

1) Definition of average power
   a. What is $P = W/\Delta t$
2) The two types of energy of an oscilating spring
   c. What are kinetic and elastic potential
3) The SI unit that translational kinetic energy is measured in
   a. What is the Joule
4) The definition of an elastic collision
   a. What is a collision kinetic energy is conserved
5) The type of energy generated by applied frictional force
   a. What is heat
6) Equation describing the gravitational potential energy between two objects
   d. What is $U_g = - G\ m_1\ m_2 / r$
7) The SI unit that the spring constant is measured in
   e. What is Newtons per Meter or Kilograms per Second Squared
8) The SI unit that acceleration is measured in
   f. What is Meters per Second Squared
9) The SI unit that momentum is measured in
   g. What is Newton-Seconds
10) If a planet's mass doubles, the mass of a person on the surface changes by this factor
   h. What is one (no change in mass)
11) The acceleration of a ball dropped from rest after 10 seconds
   a. What is 9.8 m/s^2
12) The effect of an incompressible liquid as the cross-sectional area of the pipe it's travelling through shrinks.
   a. What is it speeds up
13) The ideal gas law in terms of the number of molecules of a substance
   a. What is $P\ V = N\ k_B\ T$
14) The definition of an isothermal process
   a. What is a process carried out at constant temperature
15) The equation for rate of heat conduction through a material
   a. What is $H = k\ A\ \Delta T / L$
16) Continuity equation, constant density
   a. What is $A_1\ v_1 = A_2\ v_2$
17) The equation for object and image distance and focal length

a. What is $1/s_i + 1/s_o = 1/f$

18) The speed of light in glass compared to the speed of light in air
   a. What is slower
19) 270 degrees expressed in radians
   a. What is 3 pi / 2
20) The equation for magnification given image and object heights
   a. What is $M = h_i / h_o$
21) The energy of a photon
   a. What is $E = hf$ or $E = pc$
22) The harmonic with wavelength three times longer than the third harmonic
   a. What is the first (fundamental) harmonic
23) An example of a longitudinal wave
   a. What is sound
24) The material in which sound travels the slowest
   a. What is a vacuum
25) The mass of an electron
   a. What is 9.1×10^{-31} kg
26) The change in wavelength after doubling the intensity of a light source
   a. What is zero
27) The initial number of radioactive particles if 1,000 remain after 3 half lives
   a. What is 8,000
28) In a 2-slit diffraction experiment, the wave amplitude at the center of the screen
   a. What is zero
29) An explanation of what mass defect is
   a. What is the difference in mass between nucleons before and after nucleus fission
30) The equation giving change in energy upon nuclear fusion
   a. What is $\Delta E = - \Delta m c^2$
31) An explanation of what the work function is
   a. What is the amount of energy needed to pull an electron away from a nucleus it orbits
32) The relationship between voltage, current, and impedance
   b. What is $V = I Z$
33) The relationship between total capacitance and capacitors in series
   a. What is $1/R\_s$ = sum of all $1/C_i$
34) An explanation of what a solenoid is
   a. What is a metal coil
35) The relationship between total resistance and resistors in parallel
   a. What is $1/R_p$ = sum of all $1/R_i$
36) If the length of a resistor doubles, its resistivity changes by this amount
   a. What is zero (no change)
37) An explanation of what resistance is
   a. What is an object's tendency to slow flowing electric charge by dissipating it into heat
38) The SI unit for resistance
   a. What is ohm

39) The SI unit for power
    a. What is the watt
40) The SI unit for capacitance
    a. What is the farad
41) The direction of the electric field halfway between two oppositely charge particles
    a. What is towards the negatively charged particle