4 individual physics task:

Edited at 4pm 20.6.2017.

s is your student number. k = s mod 10000. T = s mod 100. m = s mod 35. a = s mod 25.

L = s mod 10. . e = s mod 8. m7 = s mod 7. m6 = s mod 6. m5 = s mod 5. m4 = s mod 4. m3 = s mod 3.

m2 = s mod 2.

Circuits:

1. Find the electrical current i in the circuit for R = T, L = 1/k, C = 1/s, ω = k, and εm = T.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/2054\_ch21a.pdf

Classical optics:

2. A spy satellite camera can recognize T cm objects from the altitude of s meters. If diffraction was the only limitation (the wave length Lambda = 0.1k nanometers), determine what diameter lens the camera has.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/satellite4spying.txt

Scattering:

3.

m4 = 0: What visible light is the fastest? Why?

m4 = 1: What visible light is the most noticeable? Why?

m4 = 2: What visible light has the most energy? Why?

m4 = 3: What visible light is the most absorbed? Why?

Classical electrodynamics:

4. Find the frequency and the period of the harmonic oscillator. L = k μH and C = T μF.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/rlc4circuit4natural4frequency4period.txt

Spectroscopy:

5. Suppose a star has a surface temperature of 4k degrees. What are the wavelength and the color this star appears?

http://physics16.weebly.com/uploads/5/9/8/5/59854633/color4black4body.txt

Quantum physics:

6. Find energy and momentum of photon of s Hz frequency.

7. Calculate the energy and momentum of a photon for Lambda = 0.05k nanometers.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/energy4photon.txt

8. Determine the wavelength of an electron that has been accelerated through the potential difference of T Volts.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/wavelength4electron.txt

9. Calculate the wavelength of k grams desk moving T centimeters per second.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/waves4matter.txt

10. What is the matter wave length of T gram book?

11. Find the energy level and angular momentum for hydrogen according to the Bohr Model.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/bohr.txt

Relativity theory, annihilation and nuclear physics:

12. Calculate the Schwarzschild radius for the k grams desk.

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13. Find the annihilation energy of k grams of matter.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/energy4binding.txt

14. Calculate the remaining mass (it is NOT 0) of the decaying substance after k seconds if the decay ratio is T and initial mass is s. Calculate the half-life.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/code4nuclear4decay4half4life.txt

Particle physics:

15. Perform correlation and regression analyses of the periodic table for T+2 elements and for m7 + 3 elementary particles.

http://physics16.weebly.com/uploads/5/9/8/5/59854633/correlations4periodic4table.xlsx

http://physics16.weebly.com/uploads/5/9/8/5/59854633/regression4periodic4table.txt

http://physics16.weebly.com/uploads/5/9/8/5/59854633/evergy4lifetime.xlsx

http://physics16.weebly.com/uploads/5/9/8/5/59854633/regression4elementary4particles4energies4life4times.txt

Elementary particles:

m3 = 0: 16. What particles mediate electromagnetic interaction?

A. electrons

B. protons

C. positrons

D. photons

m3 = 1: 17. What particles mediate strong interaction?

A. neutrons

B. gluons

C. photons

D. protons

m3 = 2: 18. How many times is Electromagnetic Force weaker than the Strong Force?

A. 137

B. 758

C. 3592

D. 126434

19. Thermodynamics:

m4 = 0: Write Ideal Gas equation.

m4 = 1: Give isothermal process equation.

m4 = 2: Give isobaric process equation.

m4 = 3: Give isochoric process equation.

20. Optics:

m5 = 0: Explain plane mirror.

m5 = 1: Explain convex mirror.

m5 = 2: Explain concave mirror.

m5 = 3: Explain converging lens.

m5 = 4: Explain diverging lens.

21. Maxwell equations:

m2 = 0: Explain Maxwell equations.

m2 = 1: Give the solution to the simplified Maxwell equations.

Project:

22. Develop your project into a research paper.

Deadline: 30.6.2017.