4 individual in physics:

Edited at 5pm 21.12.2016.

s is your student number. k = s mod 10000. T = s mod 100.

Classical electromagnetism:

1. Find V1 for the transformer if V2 = T volts, N1 = k and N2 = s.

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

2. T kilowatts of electric power is sent to a town from a power plant. The transmission lines have the total resistance of 0.1T Ohms. Calculate the power loss if the power is transmitted at:

(a) 0.03k Volts (b) n Volts

http://physics16.weebly.com/uploads/5/9/8/5/59854633/losses4transmitting4power.txt

3. A circular coil of wire has a diameter of 0.002k cm and contains 10 loops. The current in each loop is 3A, and the coil is placed into 2TESLA external magnetic field. Determine the maximum and minimum torque exerted on the coil by the field.

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

Circuits:

4. Calculate the series and the parallel circuits with e.m.f. of T Volts and the resistors L+1, 2 and 3 ohms respectively.

http://physics18.weebly.com/uploads/5/9/8/5/59854633/series\_parallel\_circuits.txt

5. 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:

6. A man 0.25k mm tall stands in front of a vertical plane mirror. His eyes are 10 cm bellow the top of his head. What are the sizes and the best location of the smallest possible mirror so that he can see his entire body?

http://physics16.weebly.com/uploads/5/9/8/5/59854633/height4mirror.txt

7. For convex mirror with a radius of curvature of 0.002k meters, determine the location of the image and its magnification for an object 0.0012k meters from the mirror.

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

8. A spy satellite camera can recognize T cm objects from the altitude of n 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

Quantum physics:

9. Suppose a star has a surface temperature of 4k degrees. What color would this star appear?

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

10. Calculate the energy of a photon for Lambda = 0.05k nanometers.

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

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

https://en.wikipedia.org/wiki/Hydrogen\_atom

http://physics15.weebly.com/uploads/3/0/2/7/30272185/summary781giancoliphysics6th0807.pdf

12. 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

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

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

14. Find momentum of photon with the wave length of T nanometers.

Nuclear physics:

15. Calculate the mass of the decaying substance after k years 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

Relativity:

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

http://physics16.weebly.com/uploads/5/9/8/5/59854633/radius4schwarzschild.txt

17. Calculate the annihilation energy of k grams of matter.

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

Zimmermann:

18. Solve Zimmermann Polygonal Areas problem.

http://azspcs.com/Contest/PolygonalAreas

Submit as many different areas solutions as possible in the form (1,2), (2,6), (3,4), (4,5), (6,3), (5,1) going clockwise or anti-clockwise along the border of the polygon for 11, 17, 23, 29, 37, 47, 59, 71, 83, 97, 113, 131, 149, 167, 191, 223, 257, 293, 331, 373, 419, 467, 521. For each problem we need maximum and minimum areas polygons. Do it only if you like it.

http://discrete4math.weebly.com/uploads/2/5/3/9/25393482/11polygonal11areas11zimmermann11.txt

19. Access quantum computer.

http://www.research.ibm.com/quantum/

20. Develop your project into a research paper.

Deadline: 31.12.2016.