C individual physics task:

Edited at 8am 3 April 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. m4 = s mod 4. m3 = s mod 3.

Mechanics:

Projectile:

1. Find locations from which you can hit the roof of the net of soccer goal. The roof is 3 – 1/T meters wide. Initial velocity is T m/s.

Collisions:

2. Calculate the final speed after absolutely inelastic collision of two balls of masses L kg and T kg, moving with velocities s m/s and k m/s respectively.

3. Solve the collision problem for u1 = k, u2 = k/2, m1 = k, m2 = 2k.

Pulley:

4. Find the acceleration of a simple pulley for two masses: L kg and T kg.

Inclined plane:

5. Find acceleration of a mass at the inclined plane with A = T degrees and the friction coefficient μ = 1/T.

Center of mass:

6. Find the center of mass of k equal masses k meters apart located on a straight line.

Statics:

7. Find the hangover for the s blocks in the blocks stacking problem.

Oscillations:

8. Find the displacement of a harmonic oscillator after s seconds with amplitude k, frequency k and initial phase k/2.

9. Solve the string oscillatory equation for v = T. Find the displacement after s seconds at m meters.

Thermodynamics:

10. The thermal expansion rate α is 1/k. The temperature change is T degrees.

a. Find the extension of m meters rod due to the temperature change.

b. Find the approximate volume change of m meters cubed cube due to the temperature change.

11. There are two bodies in a thermodynamically isolated system: C1 m1 T1 and C2 m2 T2. Find the resulting temperature T. m1 = k, m2 = 2k. C1 = k/11, C2 = k/222, T1 = k/111, T2 = k/22

12. Estimate the distances between the atoms of element number T in the periodic table of elements.

Creativity questions:

Music:

13. What is your favorite music? Why? How to create the best music?

https://www.youtube.com/watch?v=tj4LHB93O6o

https://www.youtube.com/watch?v=DUmq1cpcglQ

http://www.youtube.com/watch?v=tRokS74dbuA

https://www.youtube.com/watch?v=0sB3Fjw3Uvc

https://www.youtube.com/watch?v=oN86d0CdgHQ

https://www.youtube.com/watch?v=N6voHeEa3ig

https://www.youtube.com/watch?v=5O88XmgHhrU

https://www.youtube.com/watch?v=PWgvGjAhvIw

https://www.youtube.com/watch?v=DzwkcbTQ7ZE

Country:

14. What is the best country for you? Why?

Government:

15. What is the best government for you? Why?

Elections:

16. Predict April 2017 Jakarta governor elections results.

https://en.wikipedia.org/wiki/Jakarta\_gubernatorial\_election,\_2017

Games:

17. Join Dota2 gaming competition.

http://www.dota2.com/international/overview/

Project:

18. Improve your project.

Write the proposal.

Prepare to present your project to a native English speaking doctor of science.

Deadline: 8 April 2017 Saturday.