2 individual physics task:

Edited at 4pm 24.4.2017.

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.

m2 = s mod 2.

Oscillations:

m7 = 0: 1. Explain oscillations.

Waves:

m7 = 1: 2. A 100 W lamp emits electromagnetic radiation in all directions. Assuming a lamp to be a point source, calculate the intensity of the radiation:

a. at distance of 1.0 m from the lamp.

b. at distance of 2.0 m from the lamp.

m7 = 2: 3. Waves from a source have an amplitude of 5 cm and an intensity of 400 Wm-2.

a. The amplitude of the waves is increased to 10 cm. What is their intensity now?

b. The intensity of the waves is decreased to 100 Wm-2. What is their amplitude?

m7 = 3: 4. Red light of wavelength 700 nm in a vacuum travels into glass, where its speed decreases to 2×108ms-1. Determine:

a. the frequency of the light in vacuum

b. its frequency and wavelength in glass.

m7 = 4: 5. An astronomer observes light from a distant star. A particular line in its spectrum has a wavelength of 550 nm. When measures in the laboratory, the same spectral line has a wavelength of 535 nm. Determine:

a. the change in the wavelength of the spectral line

b. the speed of the star

c. the direction of the movement of the star (towards or away from the observer).

m7 = 5: 6. Describe how the fans in a stadium must move in order to produce a longitudinal stadium wave.

m7 = 6: 7. A science fiction film depicts inhabitants of one spaceship (in outer space) hearing the sound of a nearby spaceship as it zooms past at high speeds. Critique the physics of this film.

m7 = 0: 8. The sonar device on a fishing boat uses underwater sound to locate fish. Would you expect sonar to be a longitudinal or a transverse wave?

m7 = 1: 9. Give superposition of the waves.

m7 = 2: 10. What is diffraction?

m7 = 3: 11. Give the solution for the stationary waves.

m7 = 4: 12. Explain the similarities and the differences of mechanical and electromagnetic waves.

m7 = 5: 13. What is Doppler Effect?

m7 = 6: 14. Does the frequency of the wave change as it goes from one medium to another? Why?

15. Find the wavelength for v = k m/s and f = T Hz.

Maxwell Equations:

16. Solve the simplified Maxwell Equations for c = 300000000-s. Find the intensity of electric field after s seconds at m meters.

Coulomb Law:

17. Find the force between two charges of L and T Coulombs for the distance apart of m meters.

Deadline: 30.4.2017 Sunday.