

## Get it solved 2019!

### Physics. Grades 8-9

#### Demo Version

**Problem 1.** The bicycle rider accelerates on a straight road from the state of rest up to a speed of 14.4 km/h with an acceleration of  $0.5 \text{ m/s}^2$ . How many meters will the rider drive during the acceleration?

**Problem 2.** Two hours after the experiment, the lab technician noticed that he had forgotten to turn off the electric hot plate. During that time, the electric hot plate released 7.92 MJ of heat. Determine the voltage of the source connected to the hot plate if it produced electric current of 5A. Consider the heat loss in the connecting wires negligibly small. Give your answer in the form of a whole number of volts.

**Problem 3.** In the underwater part of the ocean liner, at a depth of  $H = 5\text{m}$ , there was a breach of  $40 \text{ cm}^2$  in the hull. Assess the minimum force required to hold the plate patch used to cover the hole from the inside. Neglect the salinity of seawater (water density  $\rho = 1000 \text{ kg/m}^3$ ). Free-fall acceleration  $g = 10 \text{ m/s}^2$ . Give the answer in [N] accurate to the nearest whole.

**Problem 4.** Ghost hunters rush to a call at a maximum speed of  $v = 90 \text{ km/h}$  at an address 110 km from their headquarters. The motor develops a power  $P = 30 \text{ kW}$  with the efficiency of  $\eta = 30\%$ . Estimate how many liters of gasoline a ghost hunter's car will spend during this trip. Density of gasoline  $\rho = 700 \text{ kg/m}^3$ , specific heat of gasoline combustion  $q = 46 \text{ MJ/kg}$ . Give your answer accurate to a tenth.

**Problem 5.** The theoretician Bug runs southward along the gallery with the speed of  $v_B = 2.5 \text{ m/s}$  chasing a mirror moving in the same direction as Bug with the speed  $v_m = 2.0 \text{ m/s}$ , the plane of the mirror remaining perpendicular to the speed of the mirror. In which direction and at what speed does the Bug's image move if viewed from the reference frame associated with the gallery? Give the answer in [m/s] accurate to the nearest tenth.