

Answer on Question #58414 - Physics – Mechanics

A particle is performing linear SHM at a point A on its path its potential energy is three times its kinetic energy. At another point B on its path its kinetic energy is three times its potential energy. Find the ratio of its potential energy at A to its potential energy at B.

Solution.

Let T is a kinetic energy and U is a potential energy. According to energy conservation law the whole of energy W is constant and consists of kinetic and potential ones ($W = U + T$). So on the one hand:

$$U_A = 3T_A \text{ - at point A}$$

$$T_B = 3U_B \text{ - at point B}$$

And on another hand:

$$W = U_A + T_A$$

$$W = U_B + T_B$$

$$U_A + T_A = U_B + T_B$$

Let's use first equations

$$U_A + \frac{1}{3}U_A = U_B + 3U_B$$

$$\frac{4}{3}U_A = 4U_B$$

$$\frac{U_A}{U_B} = 3$$

Answer: 3.