4(a) Distinguish between frequency and angular frequency for a body undergoing simple harmonic motion. [2]

(b) One end of a spring that has a spring constant of 109 N m^{-1} is attached to a fixed point. A mass of 4.0 kg is attached to the other end of the spring and gently lowered until equilibrium is reached. The spring has then stretched elastically by a distance of 0.36 m.

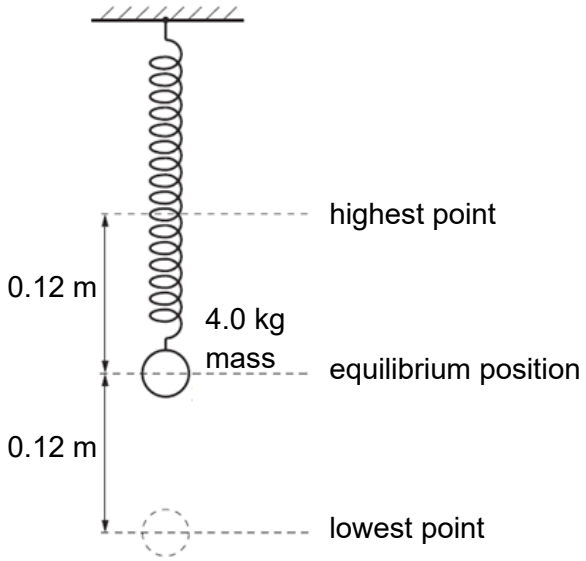

Fig. 4.1

The mass on the spring is now set into simple harmonic motion of amplitude 0.12 m.

(i) By considering the forces acting on the mass, calculate the resultant force acting on the mass when it is at the highest point of oscillation. [2]

(ii) Hence calculate the angular frequency of the oscillation. [2]

(iii) Fig. 4.2 is a table of the energies of the simple harmonic motion. Complete the table. [3]

	Kinetic Energy / J	Gravitational Potential Energy / J	Elastic Potential Energy /J	Total Energy / J
highest point				
equilibrium position				0
lowest point				

Fig. 4.2