

Answer on Question #64120, Physics / Mechanics | Relativity

A mass of 0.55kg is oscillating on the end of a vertical spring. What is the displacement of the mass when it's upward acceleration is 11.90 m/s²? k=140N/m.

Solution:

Mechanical model: mass m on a spring characterized by a spring constant k .

Elastic restoring force $F = -kx$ is balanced according to Newton's second law

$$F = ma$$

$$m\ddot{x} = -kx$$

From equation of motion we have,

$$x = -\frac{ma}{k} = -\frac{(0.55)(11.90)}{140} = -0.047 \text{ m}$$

Answer: 0.047 m

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