

7 The energy of oscillations – Part 2 — Answers

Answers

Work through these after you have tried the questions yourself.

2.1 (a) at the middle (equilibrium position). \ (b) at the ends (maximum displacement).

2.2 at the middle (equilibrium position), where the speed is greatest.

2.3 $E = \frac{1}{2}kA^2 = \frac{1}{2} \times 300 \times 0.20^2 = 6.0 \text{ J}$.

2.4 $v_{\max} = A\sqrt{\frac{k}{m}} = 0.15 \times \sqrt{\frac{80}{0.20}} = 0.15 \times 20 = 3.0 \text{ m/s}$.

2.5 four times larger (energy depends on A^2).

2.6 the restoring force is largest at the ends (it grows with displacement), so by $a = F/m$ the acceleration is largest there; the object is momentarily stopped only because it is turning around.