

MARKING SCHEME AND MODEL ANSWERS

Chapter 13: Oscillations

Maximum Marks: 40 | Suggested time: 60 minutes

Use after attempting the paper. Accept equivalent correct methods.

Suggested mark allocation:

1 mark: Correct fact, formula, unit or direction.

2 marks: Principle/formula (1); explanation, working or result (1).

3 marks: Relation (1); working/reasoning (1); final result and unit (1).

4 marks: Principle (1); setup/equation (1); working (1); result/interpretation (1).

Mark splits are a guide; award partial credit for valid steps.

Q1 - 1 mark

Time for one cycle.

Q2 - 1 mark

$f=1/T$.

Q3 - 1 mark

$F=-kx$.

Q4 - 1 mark

At equilibrium.

Q5 - 1 mark

At extreme displacement.

Q6 - 1 mark

$\sqrt{k/m}$.

Q7 - 1 mark

$2\pi\sqrt{l/g}$.

Q8 - 1 mark

kA^2 .

Q9 - 2 marks

2 Hz.

Q10 - 2 marks

0.314 s.

Q11 - 2 marks

$a=-\omega^2x$.

Q12 - 2 marks

2.

Q13 - 2 marks

Zero.

Q14 - 2 marks

Small angular displacement.

Q15 - 3 marks

$\omega=20$ rad/s; T approx 0.314 s.

Q16 - 3 marks

0.4 m/s and 1.6 m/s².

Q17 - 3 marks

approx 2.01 s.

Q18 - 3 marks

K max/U min at equilibrium; U max/K zero at extremes; total energy constant without damping.

Q19 - 4 marks

$E=1$ J; $U=.25$ J.

Q20 - 4 marks

Damping transfers mechanical energy into heat/sound and reduces amplitude.