Option B – Guidance for Practical 1

Effect of damping on oscillations

Safety

Although great care has been taken in checking the accuracy of the information provided in this guidance, Cambridge University Press shall not be responsible for any errors, omissions or inaccuracies.

Teachers and technicians should always follow their school and departmental safety policies. You must ensure that you consult your employer's model risk assessments and modify them as appropriate to meet local circumstances before starting any practical work. Risk assessments will depend on your own skills and experience, the skills and experience of your students, and the facilities available to you. Everyone has a responsibility for his or her own safety and for the safety of others. The notes below should not be regarded as a risk assessment.

You should carry out the practical yourself before presenting it to students. Make sure you are comfortable with the procedures, and can anticipate any difficulties your students may encounter.

Guidance

Students will practice time measurements and the theory of SHM will be reinforced through this practical example. They will gain experience in transforming equations in their linear forms.

Apparatus and materials

Each student/group will need:

- stand and clamp
- helical steel spring
- mass hanger (50 g)
- adhesive putty
- circles of five different radii (e.g. 2 cm, 4 cm, 6 cm, 8 cm, 10 cm) from thick cardboard
- stopwatch
- fiducial mark
- ruler

Setting up the practical

The same experiment can be performed using a motion sensor set to record position vs time data. It should be positioned underneath the spring–mass hanger system pointing upwards. This will also allow the students to observe whether the period of the oscillation is affected by damping.

Be aware that motion sensors have a minimum distance within which they cannot measure, so make sure that the system oscillates beyond this distance.

Answers to questions

1 No, energy is dissipated to the surroundings, increasing the temperature of the air.

2 Period remains the same, only amplitude changes.