Questions

Q1.

Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .

Forcing a system into oscillation may result in resonance. For resonance to occur the oscillating system must be driven at its

☒ **A** natural frequency.

☒ **B** normal frequency.

☒ **C** optimum frequency.

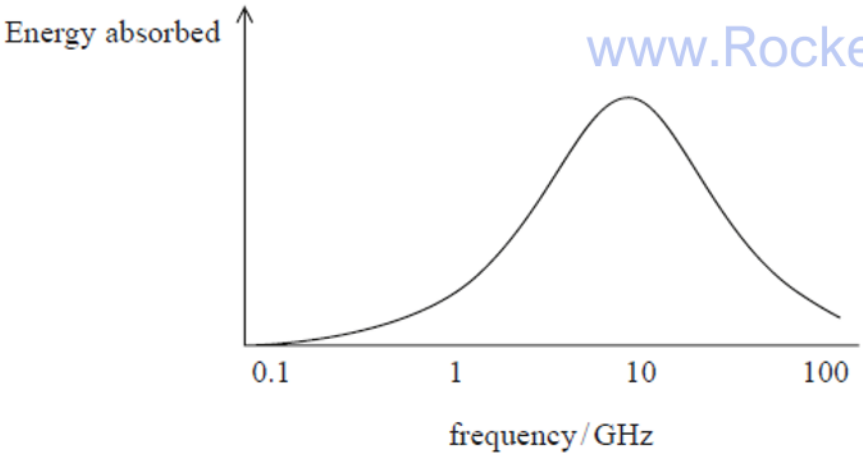
☒ **D** damping frequency.

(Total for question = 1 mark)

Q2.

Microwave ovens use microwave radiation at a frequency of 2.45 GHz to cook food. The absorption of microwave energy by water in the food causes a heating effect.

(a) The graph shows how the energy absorbed by a water molecule depends on the frequency of the radiation.



A website suggests that water molecules absorb energy because the microwaves produced by

the oven cause the water molecules to resonate.

Comment on this suggestion.

(2)

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(b) The microwave radiation causes the water molecules to rotate.

(i) Explain how this cooks the food.

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(ii) Suggest why the transfer of energy from the microwaves may be less efficient for ice than for liquid water.

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(c) 325 g of water at 25.0 °C is heated at full power in a microwave oven. After 225 s the temperature of the water is 85.0 °C.

power of microwave oven = 650 W
specific heat capacity of water = 4190 J kg^{-1} K^{-1}

(i) The manufacturer claims that the microwave oven has an efficiency of 90%.

Assess the validity of this claim.

(3)

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(ii) The 325 g of hot water at 85.0 °C is poured into a polystyrene beaker containing 62.5 g of ice at 0.0 °C.

Calculate the final temperature of the mixture of water and melted ice.

latent heat of fusion of ice = 3.33×10^5 J kg^{-1}

(4)

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Final temperature of mixture = ...

(Total for question = 14 marks)

Q3.

Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .

A simple pendulum takes 1.00 s to swing from one extreme position to the other.

Which of the following expressions gives the length of the pendulum?

☒ **A** $\frac{(1.00)^2 \times 9.81}{4\pi^2}$

☒ **B** $\frac{(2.00)^2 \times 9.81}{4\pi^2}$

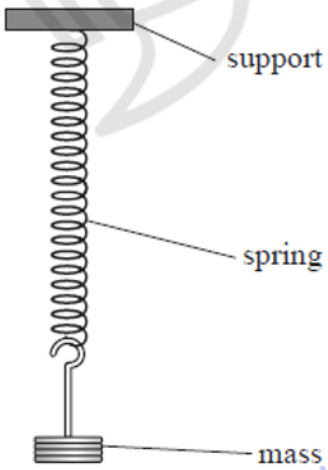
☒ **C** $\frac{4\pi^2}{(1.00)^2 \times 9.81}$

☒ **D** $\frac{4\pi^2}{(2.00)^2 \times 9.81}$

(Total for question = 1 mark)

Q4.

A mass of 250 g is hung from a spring as shown. The spring extends by 16.5 cm when the mass is added to the spring.



The mass is then displaced a further 3.5 cm vertically downwards and released.
The mass oscillates with simple harmonic motion.

(a) State the conditions for a mass to undergo simple harmonic motion.

(2)

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(b) Calculate the maximum kinetic energy of the oscillating mass.

(5)

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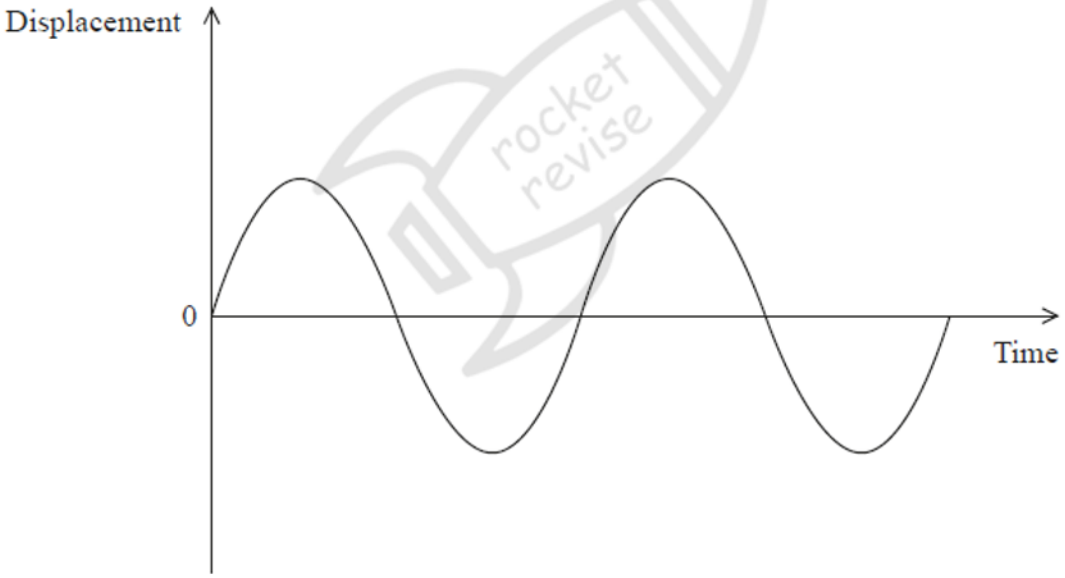
Maximum kinetic energy = ...

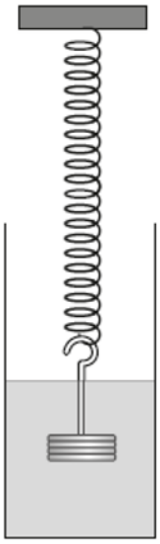
(c) The graph shows how the displacement of the oscillating mass varies over two cycles.



Add to the graph to show how the kinetic energy of the mass varies over the same time interval.

(2)

(d) The mass is submerged in water as shown.



The mass is set into oscillation as before.

Explain how the water would affect the amplitude of oscillation of the mass.

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(Total for question = 12 marks)

Q5.

Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .

A student hangs a mass from the end of a spring and sets the mass into vertical oscillation. The period of oscillation of the mass is *T*.

The student then hangs the same mass from a second spring, with a spring constant four times that of the first spring.

What is the period of oscillation of the mass on the second spring?

☒ **A** $T/4$

☒ **B** $T/2$

☒ **C** $2T$

☒ **D** $4T$

(Total for question = 1 mark)

Q6.

The photograph shows a bee in flight.

(Source: Image Broker/ardea.com)

The movement of a bee's wings can be modelled as simple harmonic motion.

(a) State what is meant by simple harmonic motion.

(2)

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(b) A bee's wings are oscillating with a frequency of 240 Hz. The wing tips have a maximum speed of 2.25 m s^{-1}.

(i) Show that the amplitude of the motion of the wing tip is about 1.5 mm.

(3)

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(ii) Calculate the maximum acceleration of the wing tip.

(2)

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Maximum acceleration of wing tip = ...

(c) Where the wings join the body of the bee, there is a region of elastic material.
The vibrating wing muscles set the elastic material into resonance.

(i) State what is meant by an elastic material.

(1)

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(ii) Explain what is meant by resonance.

(3)

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(iii) The bee's wings oscillate at a frequency of 240 Hz, but the muscles only oscillate at a frequency of 60 Hz.

Suggest how impulses applied at 60 Hz can maintain an oscillation at 240 Hz.

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(Total for question = 13 marks)

Q7.

The SI system of units was established in 1960. There are seven base units in the SI system, including the metre which is the base unit of length.

(a) Give the SI base units of energy.

(1)

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(b) In the 17th century, Huygens suggested that the unit of length should be defined by the length of a 'seconds pendulum'.

This is a simple pendulum that takes exactly 1 second to swing from one extreme position to the other.

(i) Calculate the length of a simple pendulum that swings from one extreme position to the other in 1.00 s.

(2)

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Length = ...

(ii) Suggest a disadvantage of basing the metre on the length of a 'seconds pendulum'.

(1)

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(Total for question = 4 marks)

Q8.

A car is driven along an uneven road. This forces the car into vertical oscillations. Over time, the energy of oscillation of the car increases by a factor of 4.

The amplitude of oscillation increases by a factor of

☒ **A** $\frac{1}{4}$

☒ **B** $\frac{1}{2}$

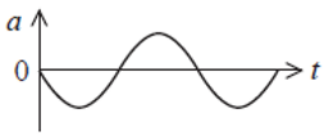
☒ **C** 2

☒ **D** 4

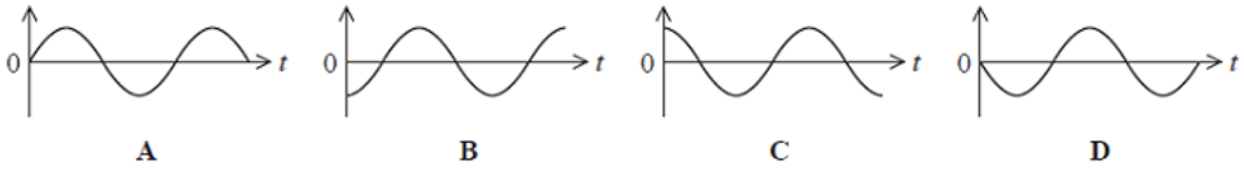
(Total for question = 1 mark)

Q9.

The graph shows how the acceleration *a* varies with time *t* for an object performing simple harmonic motion.



Four graphs of a quantity plotted against *t* are shown below. The scale on the *x*-axis is the same for each graph.



A B C D

Which graph shows how the displacement of the object varies with t ?

☒ **A**

☒ **B**

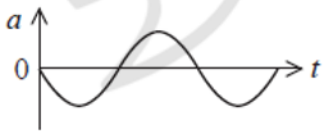
☒ **C**

☒ **D**

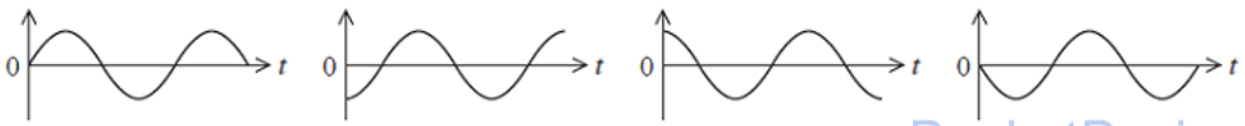
(Total for question = 1 mark)

Q10.

The graph shows how the acceleration a varies with time t for an object performing simple harmonic motion.



Four graphs of a quantity plotted against t are shown below. The scale on the x-axis is the same for each graph.



A B C D

Which graph shows how the velocity of the object varies with t ?

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for question = 1 mark)

Q11.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

An object oscillates with simple harmonic motion. The period of oscillation is 0.55 s and the amplitude is 0.25 m.

Which of the following shows a correct calculation of the maximum velocity of the object?

☒ **A** $2\pi \times 0.55 \times 0.25$

☒ **B** $\frac{2\pi}{0.55} \times 0.25$

☒ **C** $(2\pi \times 0.55)^2 \times 0.25$

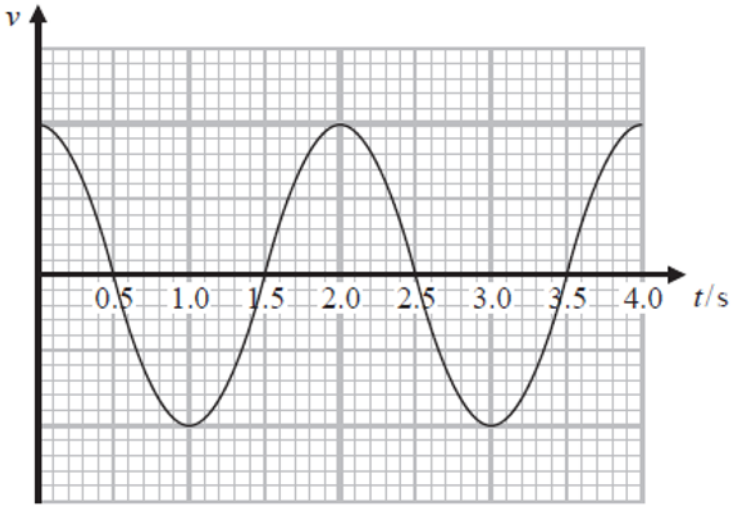
☒ **D** $\left(\frac{2\pi}{0.55}\right)^2 \times 0.25$

(Total for question = 1 mark)

Q12.

A student set up a simple pendulum. The student used a velocity sensor connected to a data logger to record the velocity of the pendulum bob.

(a) The graph shows how the velocity of the bob varied with time.



(i) Add a line to the graph to show how the displacement of the bob varied with time during the same time interval.

(2)

(ii) Determine the length of the simple pendulum.

(3)

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Length of simple pendulum = ...

(b) In some experiments, it is an advantage to use a data logger rather than other measuring instruments.

Describe when the use of a data logger is an advantage.

(2)

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(Total for question = 7 marks)

Q13.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

When a train travels across a railway bridge, the bridge may be forced into resonant oscillation.

Which of the following happens **only** when resonance occurs?

☐ **A** Damping reduces the amplitude of oscillation.

☐ **B** Energy is transferred from the train to the bridge.

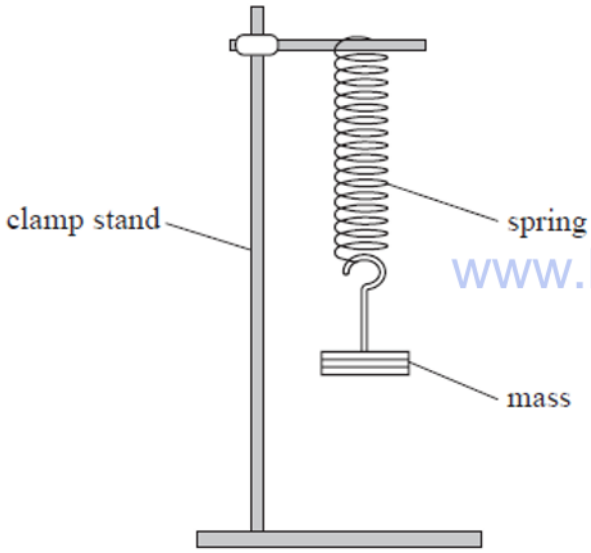
☐ **C** Resistive forces dissipate energy from the train.

☐ **D** The amplitude of oscillation is unusually large.

(Total for question = 1 mark)

Q14.

A student suspended a spring from a rigid support. She stretched the spring by hanging a mass from the free end of the spring as shown.



She set the mass into vertical oscillations by displacing it a small distance from its equilibrium position. The spring obeys Hooke's law.

(a) Explain why the mass moves with simple harmonic motion.

(2)

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(b) When the mass on the end of the spring was 0.200 kg, the extension of the spring was 7.50 cm when the mass was in equilibrium.

(i) Show that the stiffness k of the spring is about 26 N m^{-1}.

(2)

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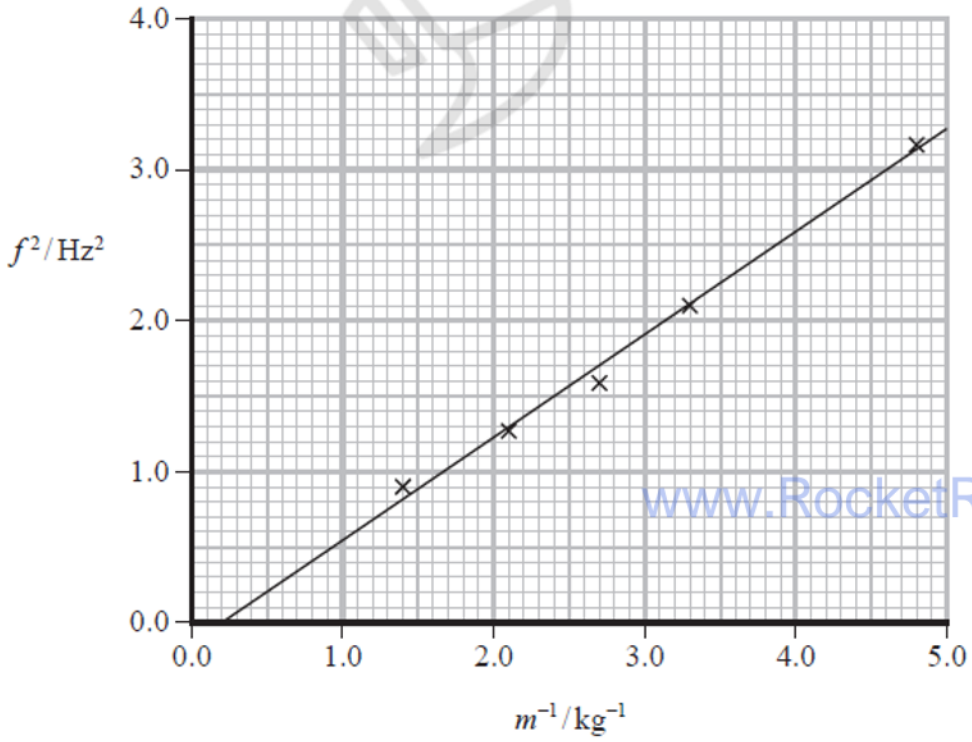
(ii) The student used a stopwatch to determine the frequency of oscillation f of the mass m.

She repeated this procedure for four more values of m and obtained the following graph.



The student used the graph to determine a value for k.

Deduce whether the graph gives a value of k consistent with the value in (i).

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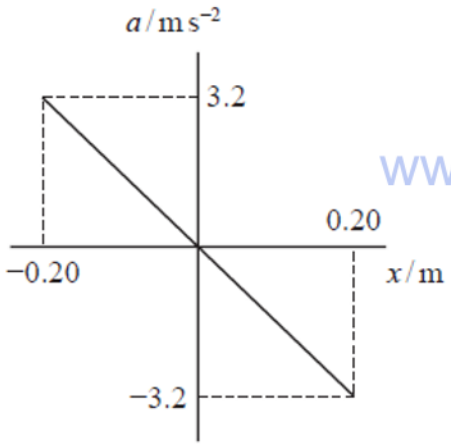
(Total for question = 10 marks)

Q15.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A mass oscillates with simple harmonic motion. The graph shows how the acceleration a of the mass depends upon displacement x from the equilibrium position.



Which of the following gives the period of oscillation, in seconds, of the mass?

☒ **A** $2\pi \times \left(\frac{3.2}{0.20}\right)$

☒ **B** $2\pi \times \left(\frac{0.20}{3.2}\right)$

☒ **C** $2\pi \times \sqrt{\left(\frac{3.2}{0.20}\right)}$

☒ **D** $2\pi \times \sqrt{\left(\frac{0.20}{3.2}\right)}$

(Total for question = 1 mark)

Q16.

A mass oscillates with simple harmonic motion with a frequency of 0.5 Hz.
The amplitude of the oscillation is 0.3 m.

Which of the following is an expression for the maximum velocity in m s^{-1} of the mass?

☒ **A** $\left(\frac{2\pi}{0.5}\right) \times 0.3$

☒ **B** $\left(\frac{2\pi}{0.5}\right) \times 0.15$

☒ **C** $2\pi \times 0.5 \times 0.3$

☒ **D** $2\pi \times 0.5 \times 0.15$

(Total for question = 1 mark)

Q17.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The gravitational field strength at the surface of the Moon is one sixth of that at the surface of the Earth. A simple pendulum has a period T at the surface of the Earth.

What would be the time period of the same pendulum at the surface of the Moon?

☒ **A** $\frac{T}{6}$

☒ **B** $\frac{T}{\sqrt{6}}$

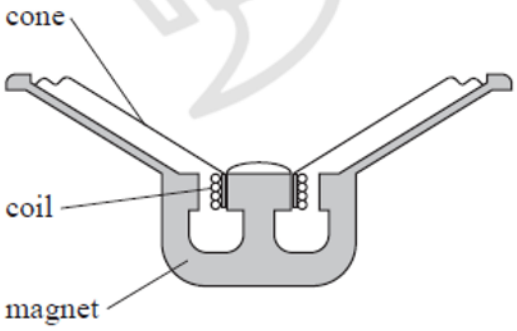
☒ **C** T

☒ **D** $T\sqrt{6}$

(Total for question = 1 mark)

Q18.

A music system has a number of loudspeakers. One loudspeaker produces the low frequency sounds. This loudspeaker consists of a coil connected to a cone. The coil is in a region of magnetic field produced by a permanent magnet, as shown.



(a) Explain how an alternating current in the coil causes the cone to oscillate with the frequency of the alternating current.

(3)

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(b) A signal of constant frequency is applied to the loudspeaker. The coil moves with simple harmonic motion and the loudspeaker emits a sound of frequency 75 Hz.

When the loudspeaker is producing this sound, the coil moves through a maximum distance of 3.5 mm.

(i) Calculate the maximum velocity of the coil.

(3)

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Maximum velocity of the coil = ...

(ii) State the position of the coil when the velocity is a maximum.

(1)

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(c) At a particular frequency, the loudspeaker cone starts to oscillate with a very large amplitude.

Explain why this effect is observed.

(2)

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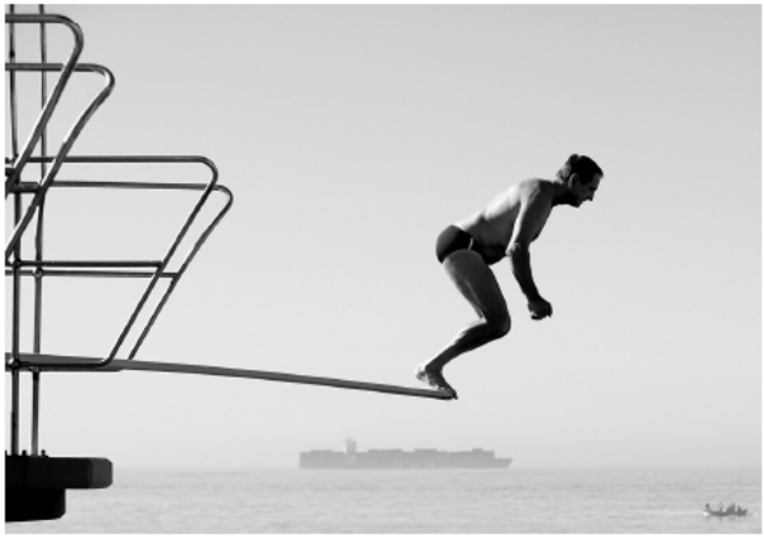
(Total for question = 9 marks)

Q19.

A man is about to dive into the sea from a high diving board. The board is horizontal before he walks to the end of the board.

When the man stands on the end of the board, it bends as shown.



(Source: © Fuse / Getty Images)

(a) By pushing on the board, the man displaces the end of the board a small distance downwards. The man and the board then oscillate with approximate simple harmonic motion.

State the conditions for simple harmonic motion.

(2)

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(b) The man stands at the end of the board. The board is in equilibrium when the end of the board has a vertical displacement of 18 cm.

mass of man = 75 kg

(i) The board obeys Hooke's law as it deforms.

Show that the stiffness of the diving board is about 4000 N m^{-1}.

(2)

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(ii) Calculate the frequency of oscillation of the man on the board. Ignore the mass of the board.

(3)

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Frequency of oscillation = ...

(c) If the amplitude of oscillation is large enough, the man will lose contact with the board at a point above the equilibrium position.

Explain why.

(3)

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(Total for question = 10 marks)

Q20.

* A teacher is teaching her class about the phenomenon of resonance. To do this, she uses a drinking glass to produce sound in two different ways.

When the glass is gently struck, the glass emits sound for a short time.

When a wet finger is slid around the top of the glass, it is possible to produce a loud continuous sound.

Explain these observations.

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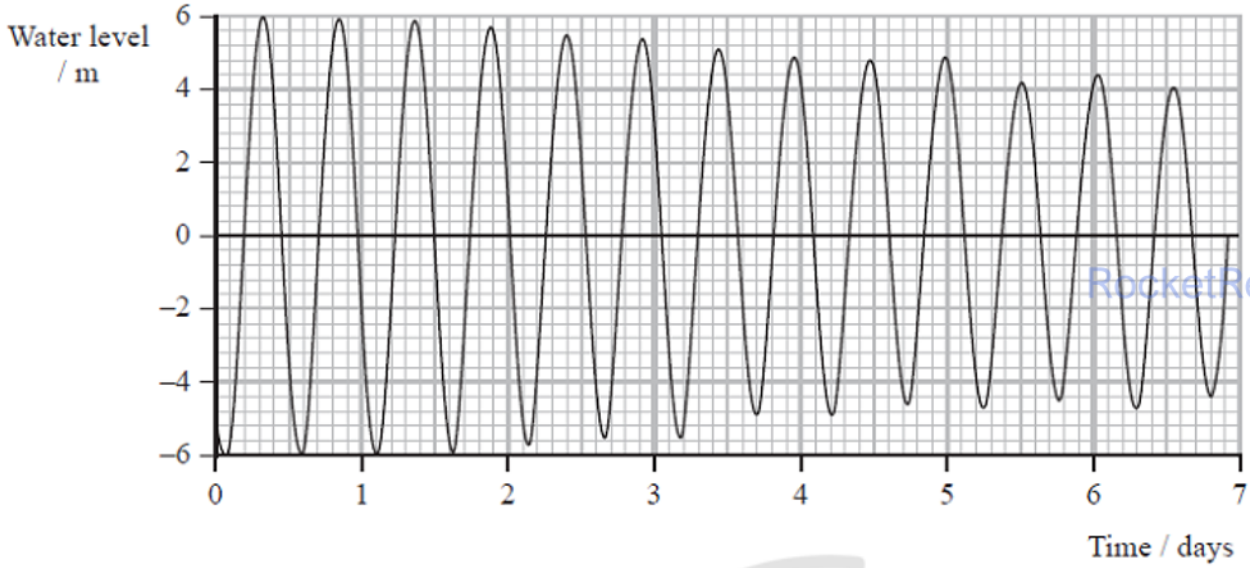
(Total for question = 6 marks)

Q21.

Due to the gravitational attraction of the Moon, the water level of the oceans rises and falls producing tides.

The Bay of Fundy in Canada has one of the highest tides in the world.

The graph shows how the water level in one location in the Bay of Fundy varied with time over a 7-day period.



(a) Determine the period T of the water level, in hours.

(3)

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T = ... hours

(b) Due to the shape of the Bay of Fundy, the natural period of oscillation of water in the bay is between 12 and 13 hours.

Explain why unusually high tides are observed in the bay.

(3)

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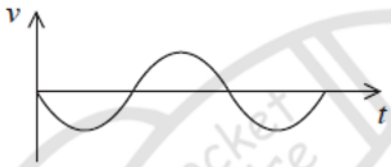
(Total for question = 6 marks)

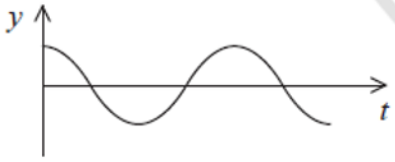
Q22.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

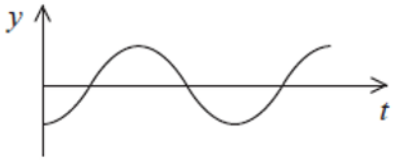
A mass oscillates with simple harmonic motion. The graph shows how the velocity v varies with time t for the mass.



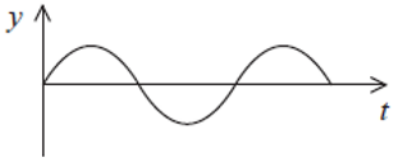
Which graph shows how the displacement y from the equilibrium position varies with t over the same time interval?



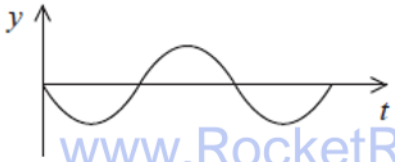
A



B



C



D

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for question = 1 mark)

Q23.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A mass is hung from a spring and set into vertical oscillation. The mass is then changed so that the frequency of oscillation doubles. The amplitude of the oscillation is unchanged.

Which of the following quantities is also doubled?

☒ **A** the maximum acceleration of the mass

☒ **B** the maximum kinetic energy of the mass

☒ **C** the maximum velocity of the mass

☒ **D** the period of the oscillation

(Total for question = 1 mark)

Q24.

Select one answer from A to D and put a cross in the box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

In the Pantheon in Paris there is a pendulum that takes 8.25 s to swing from one extreme position to the other.

Which of the following expressions gives the length of the pendulum?

☒ **A** $\frac{4\pi^2}{(8.25)^2 \times 9.81}$

☒ **B** $\frac{4\pi^2}{(16.5)^2 \times 9.81}$

☒ **C** $\frac{(8.25)^2 \times 9.81}{4\pi^2}$

☒ **D** $\frac{(16.5)^2 \times 9.81}{4\pi^2}$

(Total for question = 1 mark)

Q25.

Select one answer from A to D and put a cross in the box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A mass oscillates with simple harmonic motion about a fixed point O.

Which of the following statements about the motion of the mass is correct?

☒ **A** Its velocity is always towards O.

☒ **B** Its acceleration is always towards O.

☒ **C** Its acceleration is directly proportional to its velocity.

☒ **D** Its acceleration and its velocity are always in opposite directions.

(Total for question = 1 mark)

Q26.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The suspension system of a car was tested by forcing the car into vertical oscillations.

The forcing frequency was gradually increased and corresponding amplitudes of oscillation were measured.

There was a maximum amplitude of oscillation A_0 at a particular frequency f_0.

Which row of the table shows how A_0 and f_0 change as the damping in the suspension system is reduced?

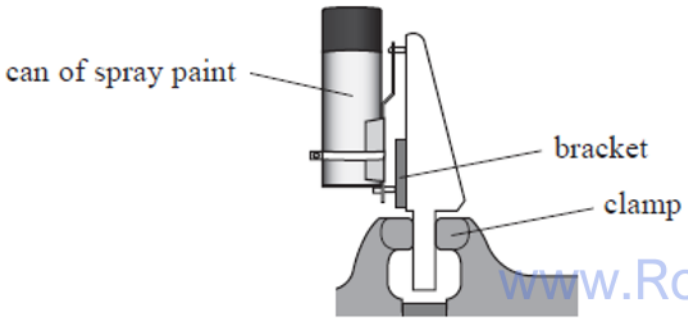
	A_0	f_0
☒ **A**	decreases	decreases
☒ **B**	decreases	increases
☒ **C**	increases	decreases
☒ **D**	increases	increases

(Total for question = 1 mark)

Q27.

A can of spray paint needs to be shaken before being used.

The diagram shows a machine designed to shake a can of spray paint.



The bracket oscillates vertically with simple harmonic motion.

(a) State the conditions necessary for an object to move with simple harmonic motion.

(2)

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(b) When the bracket is oscillating, the distance between the highest and lowest positions of the bracket is 8.0 cm. The bracket completes 270 oscillations per minute.

(i) Sketch a graph on the axes below to show how the velocity v of the bracket depends upon time t. Your graph should include velocity and time values.

(6)

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(ii) Determine the maximum acceleration of the bracket.

(2)

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Maximum acceleration of bracket = ...

(iii) Suggest why the particles of paint in the can will experience a maximum acceleration that is different from the answer to (ii).

(1)

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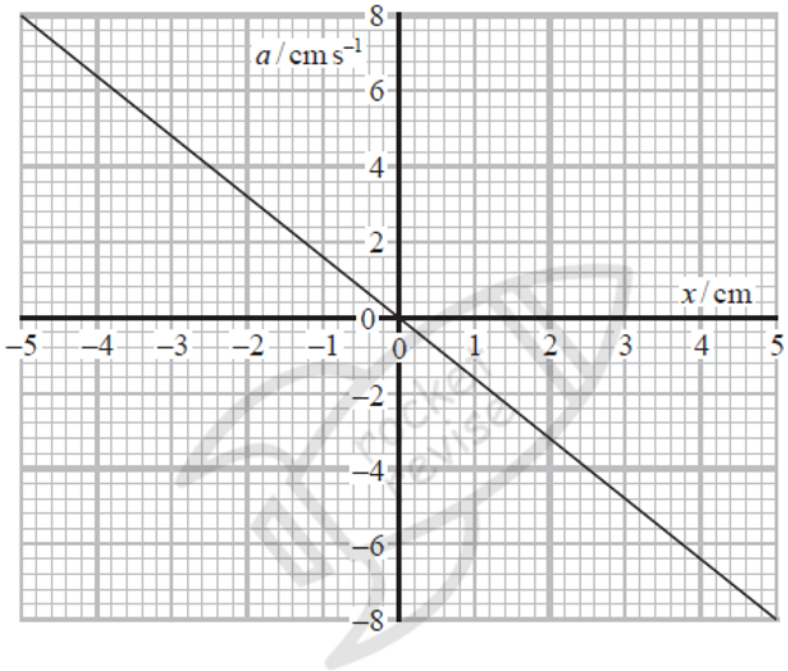
(Total for question = 11 marks)

Q28.

A mass is hung from a spring and set into vertical oscillation by displacing the mass 5 cm from its equilibrium position.

The graph shows how the acceleration *a* of the mass depends upon the displacement *x* of the mass from its equilibrium position.



Sketch a graph on the axes below to show how *x* depends upon time *t*.

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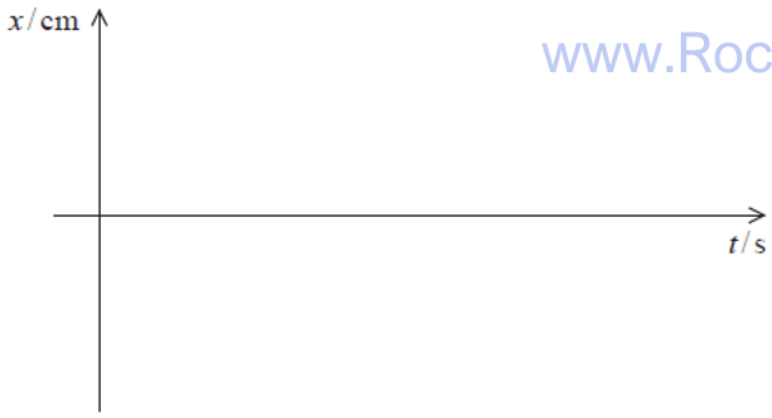


(Total for question = 4 marks)

Q29.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A 'seconds' pendulum has a period of 2 seconds.

Which of the following gives the length of the pendulum in metres?

☒ **A** $\frac{\pi^2}{4 \times 9.81}$

☒ **B** $\frac{4 \times 9.81}{\pi^2}$

☒ **C** $\frac{9.81}{\pi^2}$

☒ **D** $\frac{9.81}{4\pi^2}$

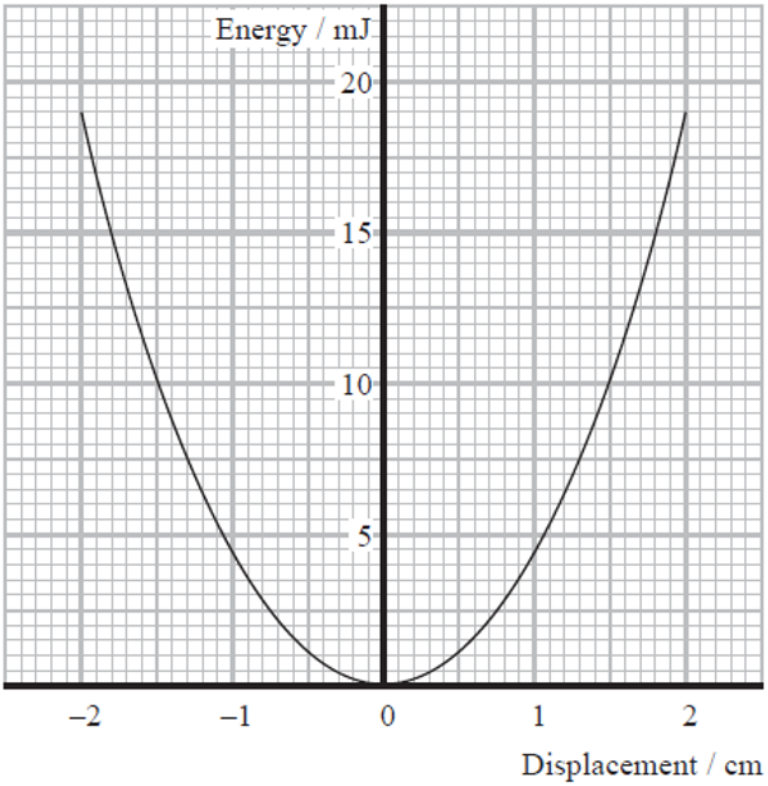
(Total for question = 1 mark)

Q30.

A 150 g mass is hung from a vertical spring.

The mass is displaced from its equilibrium position and oscillates vertically with simple harmonic motion.

The graph shows how the elastic potential energy varies with displacement of the mass from the equilibrium position.



(a) Add a line to the graph to show how the total energy of the mass-spring system varies with displacement.

(1)

(b) Determine the speed of the mass when its displacement from the equilibrium position is 1.0 cm.

(4)

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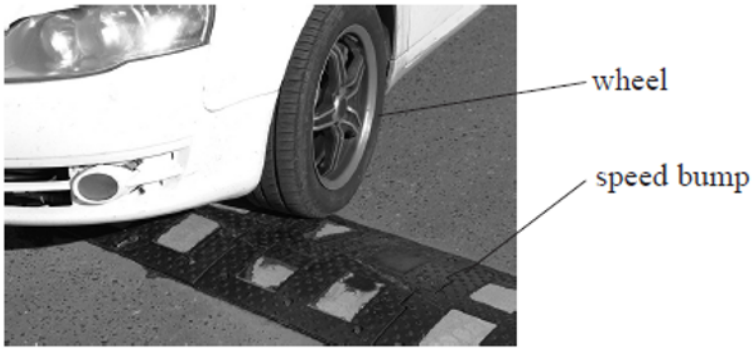
Speed of mass = ...

(Total for question = 5 marks)

Q31.

The suspension system of a car is a set of springs that allows the body of the car to move vertically up and down relative to the wheels.

A car is driven along a long straight road that has a series of 'speed bumps'. Speed bumps are raised parts in a road, as shown.



(Source: © Sergey Makarenko/Alamy Stock Photo)

At a particular speed of the car resonance occurs. The amplitude of vibration of the car body on the suspension system becomes much larger.

(a) Explain why the amplitude of vibration increases at a particular speed.

(2)

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(b) When a person of mass 65 kg steps into the car, the vertical height of the car above the road decreases by 2.5 cm.

Resonance occurs when the speed bumps are spaced 25 m apart.

Calculate the speed the car is driven along the road. You should consider the car as a mass-spring system.

mass of empty car = 1300 kg

(5)

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Speed of car = ...

(c) Explain how damping reduces the large amplitude of vibration of the car on its suspension.

(2)

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(Total for question = 9 marks)

Q32.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A mass suspended from a spring is oscillating vertically. The oscillations are damped.

Which of the following statements is correct?

☒ **A** The damping force is always in the opposite direction to the acceleration.

☒ **B** The damping force is always in the opposite direction to the velocity.

☒ **C** The damping force is always in the same direction as the acceleration.

☒ **D** The damping force is always in the same direction as the velocity.

(Total for question = 1 mark)

Q33.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Buildings in earthquake zones often have a structure that includes ductile materials. These materials help to damp oscillations of the building during an earthquake.

Which of the following describes a ductile material?

☒ **A** A material that behaves elastically under tension.

☒ **B** A material that has a large plastic deformation before it breaks.

☒ **C** A material that has a large value of breaking stress.

☒ **D** A material that has a large value of the Young modulus.

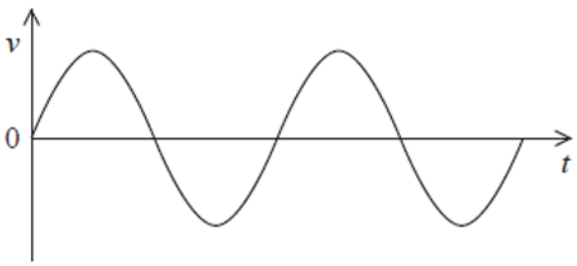
(Total for question = 1 mark)

Q34.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A particle is undergoing simple harmonic motion.

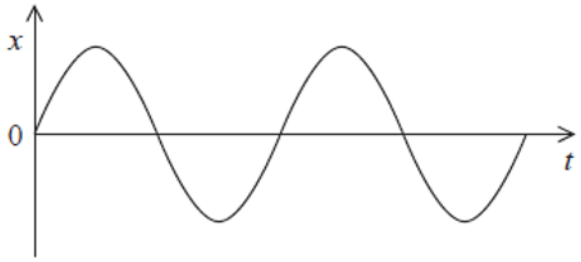
The graph shows how the velocity v varies with time t for the particle.



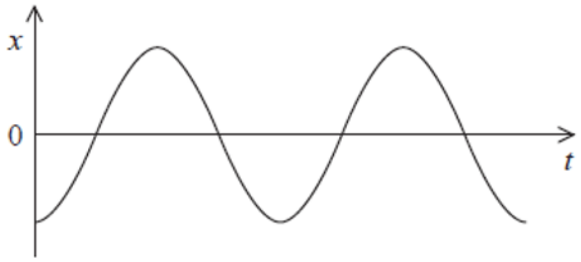
Which of the following graphs shows how the displacement x varies with t during the same time

interval?

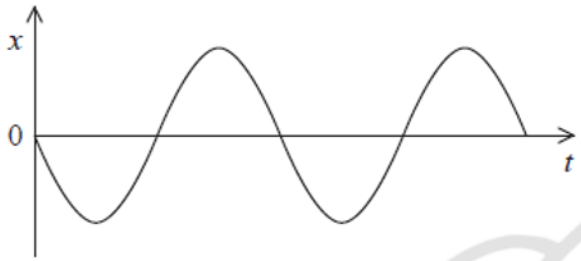
☒ **A**



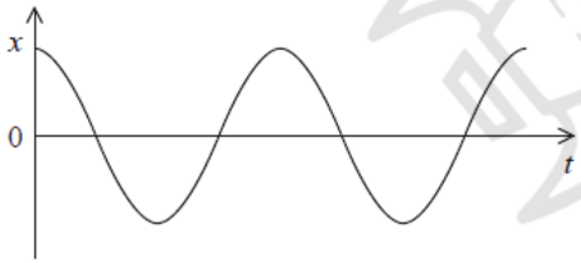
☒ **B**



☒ **C**



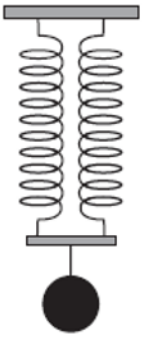
☒ **D**



(Total for question = 1 mark)

Q35.

A student hangs a mass of 0.22 kg from two identical springs as shown.



She displaces the mass vertically and the mass oscillates with simple harmonic motion.

(a) The student measures the time t for the mass to complete 30 oscillations. She repeats this measurement.

Her measurements are given in the table.

t_1 / s	t_2 / s
13.65	13.70

The springs are taken from a box labelled $k = 21$ N m^{-1}.

Deduce whether the value of k stated on the label is correct.

(4)

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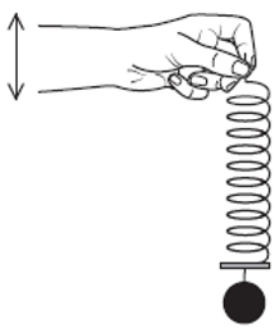
(b) The student attaches the mass to one spring and holds the other end. She sets the mass into oscillation by oscillating her hand vertically, as shown.



The student increases the frequency at which she oscillates her hand. She keeps the amplitude of oscillation of her hand constant.

She observes that the amplitude of oscillation of the mass increases to a maximum and then decreases.

(i) Explain this observation.

(3)

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(ii) The student makes the following conclusion:

"As the frequency is increased, the amplitude of the mass increases to a maximum, so energy conservation does not apply to this situation."

Explain whether her conclusion is correct.

(3)

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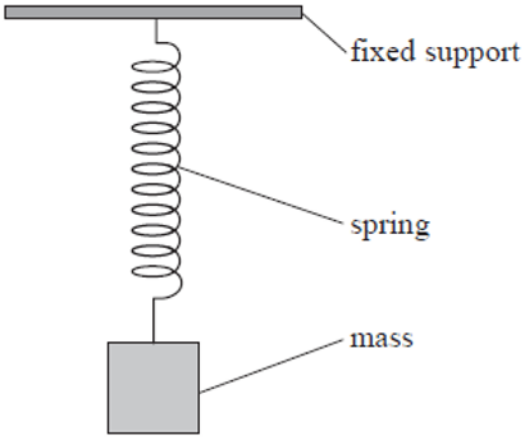
(Total for question = 10 marks)

Q36.

A 150 g mass was hung from a spring as shown. The spring extended by 7.5 cm.



The mass was displaced vertically 3.0 cm from its equilibrium position and then released. The mass oscillated vertically.

(a) Explain why the motion of the mass was simple harmonic motion.

(2)

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(b) Calculate the maximum velocity of the oscillating mass.

(6)

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Maximum velocity of mass = ...

(c) Explain why the maximum velocity of the oscillating mass decreased over time.

(2)

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(Total for question = 10 marks)

Q37.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

A simple pendulum is displaced through a small angle then released. The frequency of oscillation is determined.
The length of the pendulum is then doubled.

By what factor will the frequency of oscillation be multiplied?

☒ **A** $\frac{1}{\sqrt{2}}$

☒ **B** $\frac{1}{2}$

☒ **C** $\sqrt{2}$

☒ **D** 2

(Total for question = 1 mark)

Q38.

Doctors can use ultrasound to monitor the heartbeat of a baby when it is developing inside the mother.

(a) A baby's heart was beating at 142 beats minute^{-1}. The wall of the baby's heart was moving with a maximum
velocity of 22.0 mm s^{-1}.

Calculate the maximum displacement, in mm, of the wall of the baby's heart. Assume that the motion of the wall of the baby's heart is simple harmonic.

(4)

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Maximum displacement of wall of heart = ... mm

(b) The motion of the wall of the baby's heart only approximates to simple harmonic.

State what is meant by simple harmonic motion.

(2)

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(Total for question = 6 marks)

Q39.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

An object oscillates with simple harmonic motion. The period of oscillation is 0.65 s and the amplitude is 0.12 m.

Which of the following expressions gives the maximum velocity of the object?

☒ **A** $2\pi \times 0.65 \times 0.12$

☒ **B** $\frac{2\pi}{0.65} \times 0.12$

☒ **C** $(2\pi \times 0.65)^2 \times 0.12$

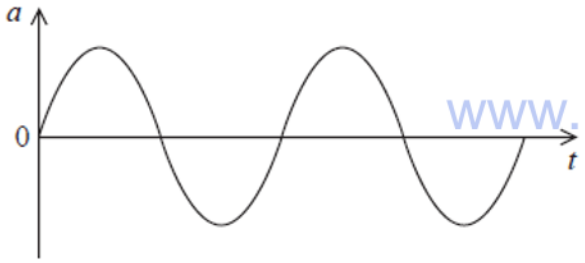
☒ **D** $\left(\frac{2\pi}{0.65}\right)^2 \times 0.12$

(Total for question = 1 mark)

Q40.

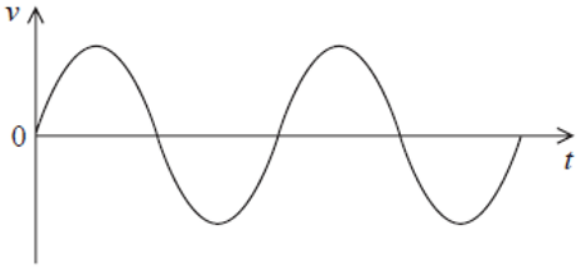
Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The graph shows how the acceleration *a* varies with time *t* for a particle undergoing simple harmonic motion.

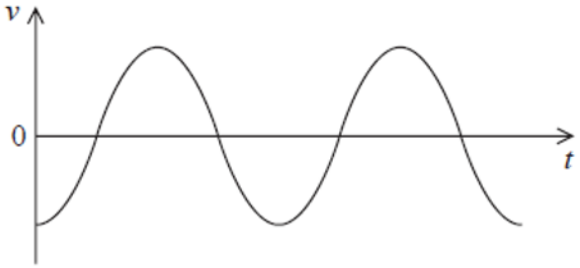


Which of the following graphs shows how the velocity *v* varies with *t* over the same time interval?

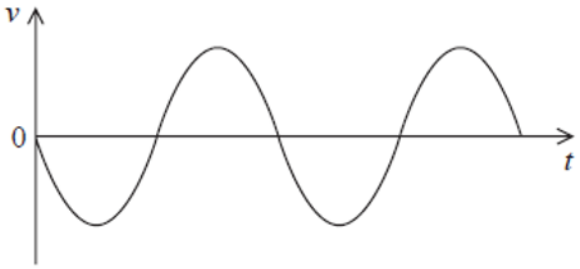
☒ **A**



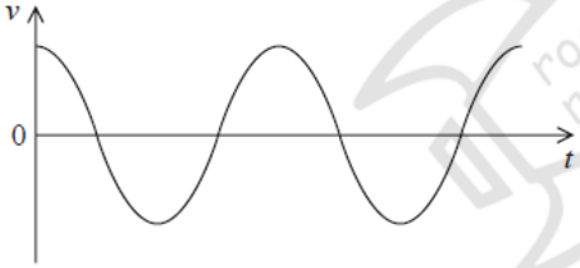
☒ **B**



☒ **C**



☒ **D**



(Total for question = 1 mark)