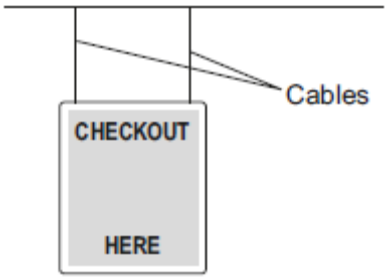
Name of the Student:_____
Max. Marks : 16 Marks **Time : 16 Minutes**

Q1.

A sign hangs from the ceiling using two cables, as shown in **Figure 1**.

Figure 1



(a) On **Figure 1**, mark the centre of mass of the sign using an X.

(1)

(b) Use the correct answer from the box to complete the sentence.

concentrated	**greatest**	**pivoted**

The centre of mass of an object is the point where the mass appears

to be _____ .

(1)

(c) A breeze made the sign swing forwards and backwards like a pendulum.
The frequency of oscillations of the sign was 2 hertz.

Calculate the periodic time for the sign.

_____

_____

_____

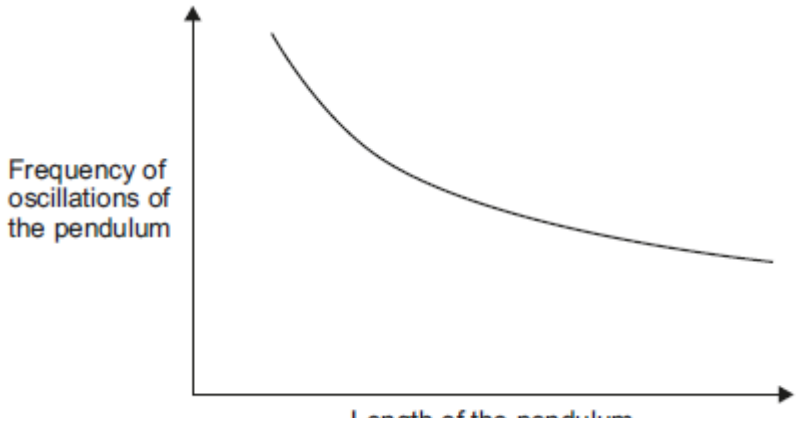
Periodic time = _____ seconds

(2)

(d) **Figure 2** is a sketch graph showing how the frequency of the oscillations of a pendulum changes as the length of the pendulum is increased.

Figure 2

Downloaded from www.merit-minds.com



Give **one** way the sign could be made to swing with a lower frequency.

Use **only** the information in the sketch graph.

_____

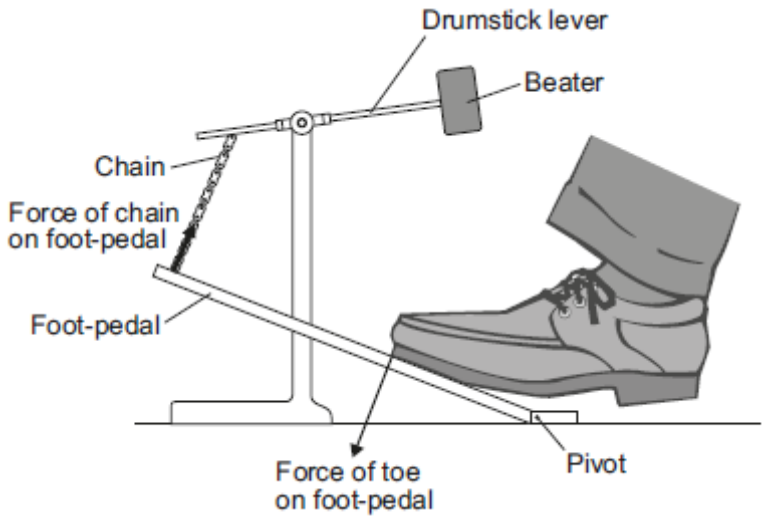
_____

(1)

(Total 5 marks)

Q2.

A drum is hit by a beater attached to a drumstick lever. The drumstick lever is attached to a foot-pedal by a chain, as shown below.



(a) State how the size of the force of the chain on the foot-pedal compares with the size of the force of the toe on the foot-pedal.

_____

_____

(1)

(b) The foot-pedal is pushed halfway down and held stationary.

The force of the toe and the force of the chain each create a moment which acts on the foot-pedal.

Compare the size and direction of the moments of the toe and the chain.

Downloaded from www.merit-minds.com

Tick (✔) **one** box.

Size	Direction	Tick (✔)
The moments are equal	same	
The moments are equal	opposite	
The moment of the force of the toe is greater	same	

(1)

(c) How can the drummer create a greater moment about the pivot without increasing the force he applies?

_____

_____

(1)

(Total 3 marks)

Q3.

(a) When a force is applied to a spring, the spring extends by 0.12 m.
The spring has a spring constant of 25 N/m.

Calculate the force applied to the spring.

_____

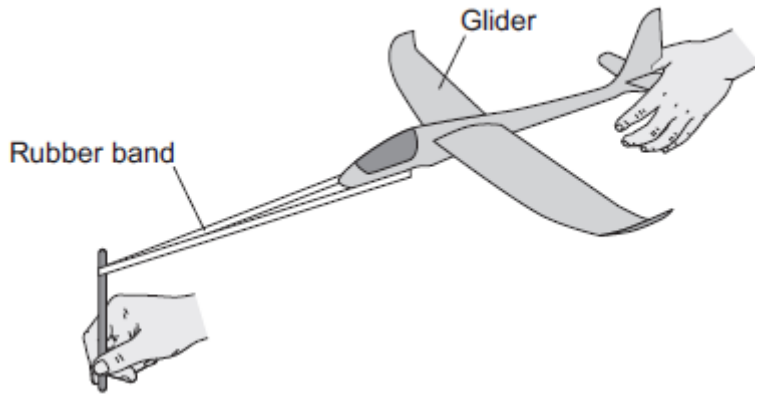
_____

Force = _____ N

(2)

(b) **Figure 1** shows a toy glider. To launch the glider into the air, the rubber band and glider are pulled back and then the glider is released.

Figure 1



(i) Use the correct answers from the box to complete the sentence.

chemical	elastic potential	kinetic	thermal

When the glider is released, the _____ energy

Downloaded from www.merit-minds.com

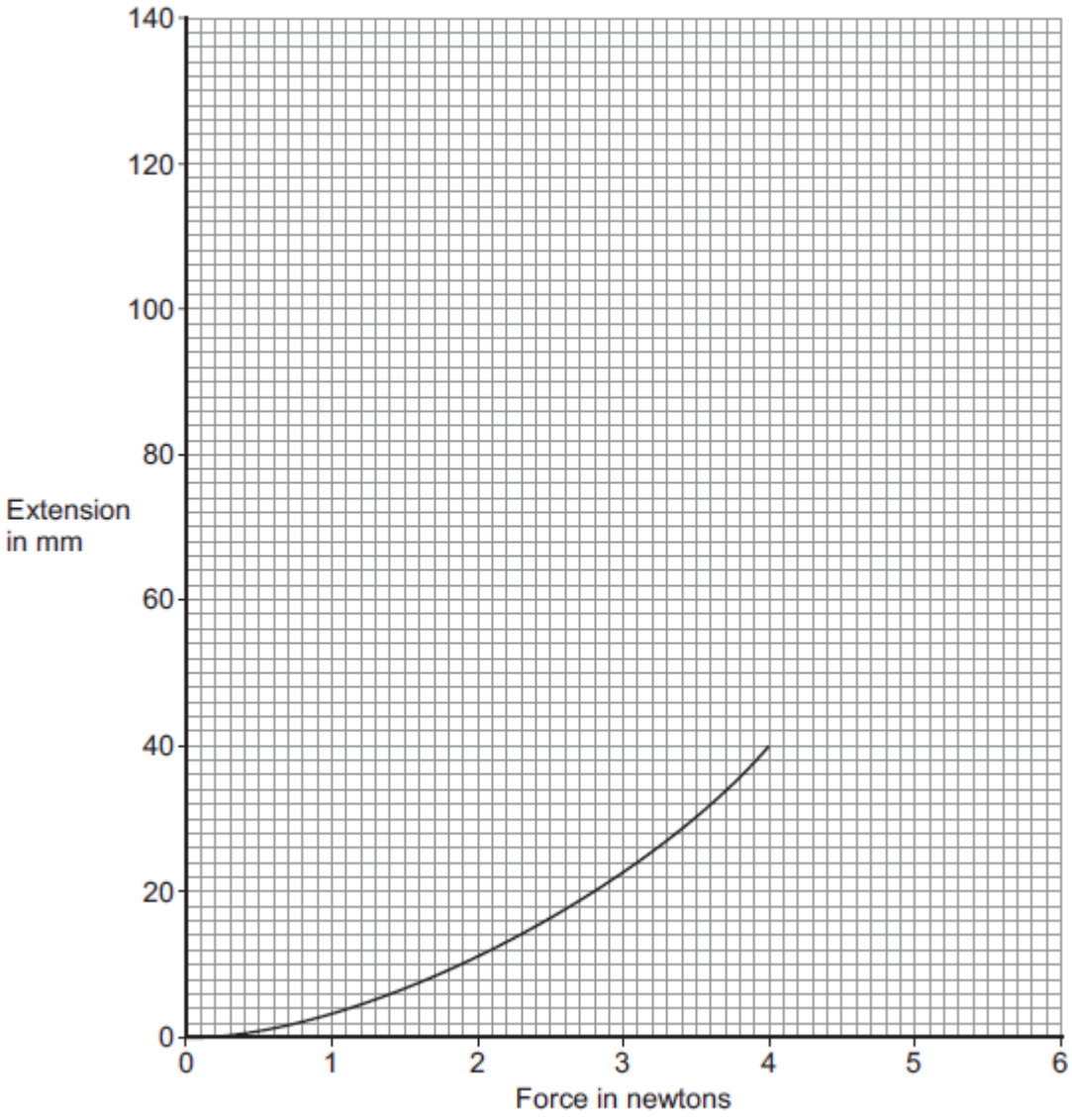
stored in the rubber band decreases and the glider gains

_____ energy.

(2)

(ii) **Figure 2** shows how the extension of the rubber band varies with the force applied to the rubber band.

Figure 2



What can you conclude, from **Figure 2**, would happen to the extension of the rubber band if the force applied to the rubber band was increased to 6 N?

The rubber band does **not** break.

_____

_____

_____

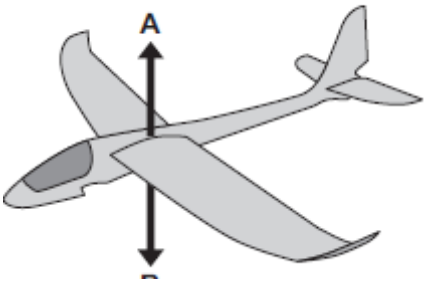
_____

(2)

(c) **Figure 3** shows the vertical forces, **A** and **B**, acting on the glider when it is flying.

Downloaded from www.merit-minds.com

Figure 3



(i) What name is given to the force labelled **B**?

Draw a ring around the correct answer.

drag **friction** **weight**

(1)

(ii) Which **one** of the following describes the downward speed of the glider when force **B** is greater than force **A**?

Tick (✓) **one** box.

Downward speed increases ☐

Downward speed is constant ☐

Downward speed decreases ☐

(1)

(Total 8 marks)

Downloaded from www.merit-minds.com