

Name of the Student: \_\_\_\_\_

Max. Marks : 25 Marks

Time : 25 Minutes

**Q1.**

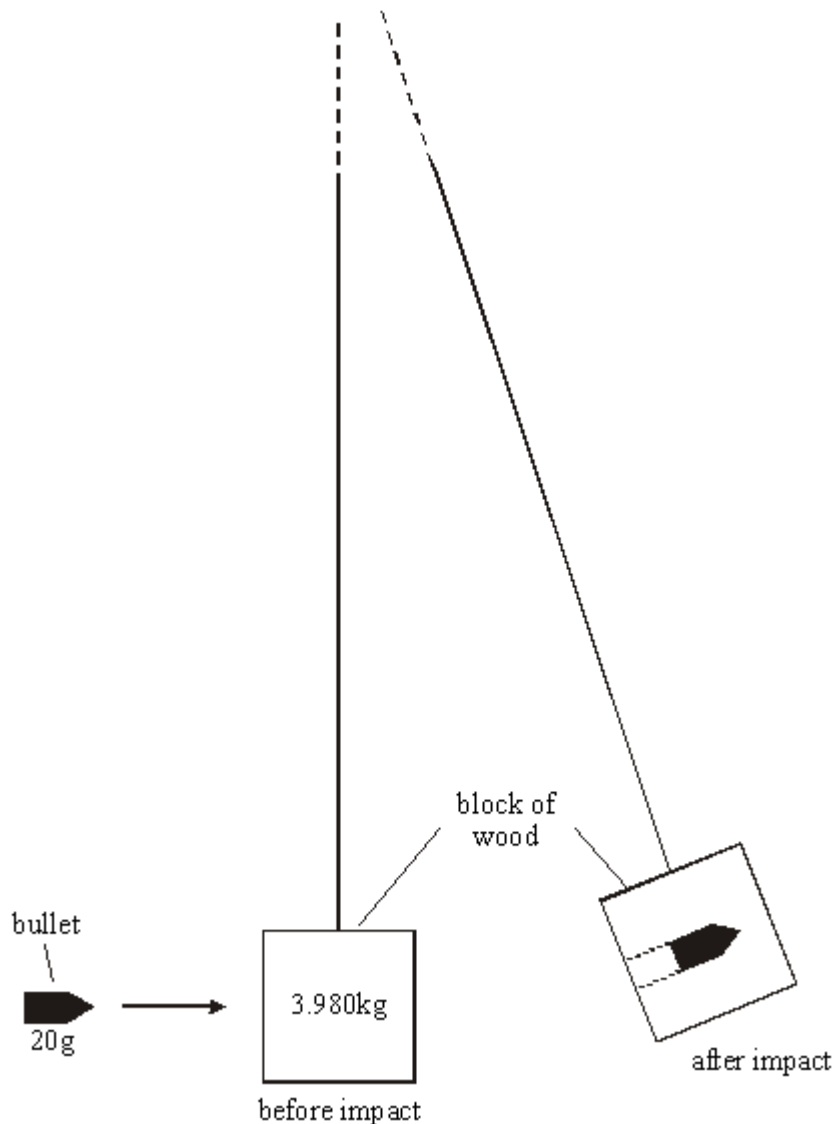
- (a) When an object is moving it is said to have momentum.  
Define momentum.

---

---

(1)

- (b) The diagram below shows one way of measuring the velocity of a bullet.



A bullet is fired into a block of wood suspended by a long thread.

The bullet stops in the wooden block.  
The impact of the bullet makes the block swing.  
The velocity of the wooden block can be calculated from the distance it swings.

In one such experiment the block of wood and bullet had a velocity of 2 m/s **immediately after** impact. The mass of the bullet was 20 g and the mass of the wooden block 3.980 kg.

- (i) Calculate the combined mass of the block of wood and bullet.

\_\_\_\_\_ Mass \_\_\_\_\_

(1)

- (ii) Calculate the momentum of the block of wood and bullet **immediately after** impact.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Momentum \_\_\_\_\_

(3)

- (iii) State the momentum of the bullet **immediately before** impact.

\_\_\_\_\_

(1)

- (iv) Calculate the velocity of the bullet **before** impact.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Velocity \_\_\_\_\_ m/s

(3)

- (v) Calculate the kinetic energy of the block of wood and bullet **immediately after** impact.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Kinetic energy \_\_\_\_\_ J

(3)

- (vi) The kinetic energy of the bullet before the impact was 1600 joules. This is much greater than the kinetic energy of the bullet and block just after the impact. What has happened to the rest of the energy?

\_\_\_\_\_  
\_\_\_\_\_

**Q2.**

Use of renewable sources of energy is expected to increase. The table shows the comparative costs of producing 1 kWh of electricity from different energy sources.

Types of energy sources used in the UK	Cost of producing 1 kWh of electrical energy
Fossil fuels(non-renewable)	Coal 1.0 p
	Gas 1.4 p
	Oil 1.5 p
Nuclearfuels (non-renewable)	Nuclear 0.9 p
Renewable	Hydroelectric 0.2 p
	Wind 0.9 p
Installation and decommissioning costs are notincluded	

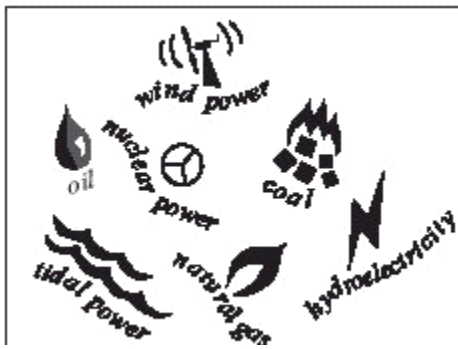
At present about 2% of electricity generated in the UK uses renewable energy sources. Consider the three types of energy sources in the table and give **one** advantage and **one** disadvantage for each (other than installation and decommissioning costs).

Advantage	Disadvantage
Using fossil fuels _____ _____ _____	Using fossil fuels _____ _____ _____
Using nuclear fuels _____ _____ _____	Using nuclear fuels _____ _____ _____
Using renewable sources _____ _____ _____	Using renewable sources _____ _____ _____

(Total 6 marks)

**Q3.**

Different energy sources are shown in the box.



An 'Eco-home' is one which is friendly to the environment. Imagine you are designing an 'Eco-home' which can use any of the energy sources above to generate electricity

- (a) Choose **one** non-renewable energy source from the box above that could provide the electricity supply to your 'Eco-home', but which would be **unsuitable**.

Write the energy source in the table and explain, as fully as you can, why it is **unsuitable** for an 'Eco-home'.

Non-renewable energy source	Unsuitable for an 'Eco-home' because
<hr/> <hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

(2)

- (b) Choose **two** suitable renewable energy sources from the box opposite that could provide an electricity supply to your 'Eco-home'.

Write the two energy sources in the table and describe, in as much detail as you can, the undesirable environmental effects of using these.

Renewable energy source	Undesirable environmental effects
<b>1</b> <hr/> <hr/>	<hr/> <hr/> <hr/>

	<hr/> <hr/> <hr/> <hr/>
<b>2</b> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

(4)  
(Total 6 marks)