S.G. Physics Homework 1 **After Activity 8** **Transport Unit**

Name _____ **Class** _____ **Date Due** _____

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1. Which word means "the number of metres per second travelled" by an object?

(1)

2. In an experiment two pupils have to measure the average speed of a car as it passes along in front of the school. Describe how they should do this.
Your answer must include:

   i) measurements taken,
   ii) apparatus used,
   iii) how average speed is calculated.

(3)

3. A train travels from Edinburgh to Dunfermline. The driver sees the speedometer is reading 120 km/hr at some parts of the journey. He calculates the average speed for the whole journey to be 50 km/hr. Explain how it is that the average speed is so much less than the speeds the driver noticed.

(3)

4. Identify in which of the following situations the average speed and the instantaneous speed are different from each other. Identify them by ticking the box if they are different.

- ☐ A car travelling at a constant speed on a motorway.
- ☐ A sledge speeding up as it goes down a slope.
- ☐ A cyclist travelling equal distances every second.
- ☐ A rocket during launch.
- ☐ A passenger in a car which is braking.
- ☐ An athlete during a 100m sprint.

(3)

5. A boy walks 400 metres in 200 seconds.
What is his average speed?

(2)

The boys runs for some of the distance but still takes the same time. How will this affect his average speed for the whole journey? Explain your answer.

(2)

6. How long would it take a car travelling at 30 ms^{-1} to travel 900m?

(2)

7. How far will a jet travel in 2 minutes if it flies at 400 ms^{-1} ?

(2)

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S.G. Physics Homework 2 **After Activity 13** **Transport Unit**

Name _____ **Class** _____ **Date Due** _____

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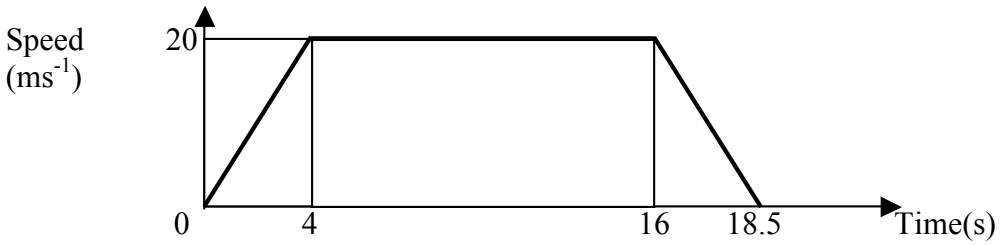
1. a) A vehicle's movement can be described by the following graph,



What is:

i) the vehicle's acceleration in the first 4 seconds?

(2)

ii) the distance travelled during this acceleration?

(2)

iii) the vehicle doing during the next 12 seconds?

(1)

iv) the distance travelled during this time?

(1)

v) the deceleration of the vehicle during the last two and a half seconds?

(2)

vi) the distance travelled during this deceleration?

(1)

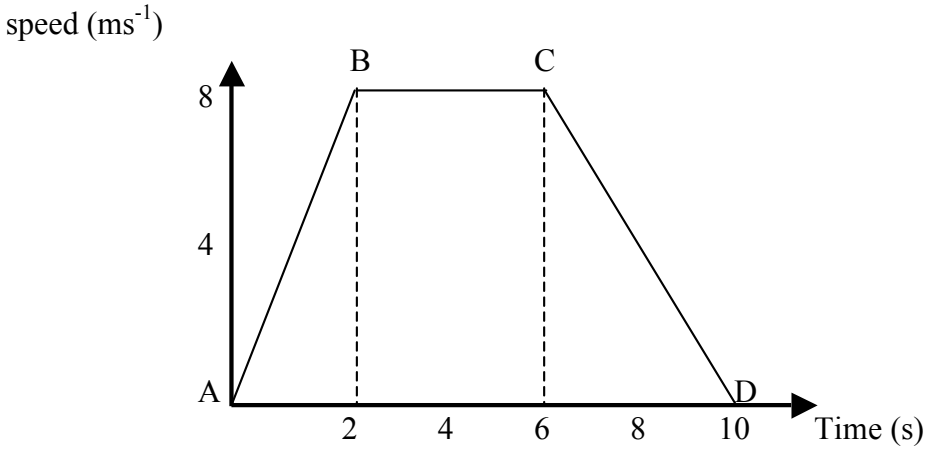
vii) the total distance travelled by the vehicle?

(1)

viii) the average speed for the whole journey?

(2)

2. The speed time graph for a moving body is shown below.



(a) What is the acceleration over section AB?

(2)

(b) What is the deceleration over section CD?

(2)

(c) What is the total distance travelled?

(2)

(d) What sections of the graph illustrate:

i) Uniform acceleration?

(1)

ii) Constant speed?

(1)

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S.G. Physics Homework 3 **After Activity 18** **Transport Unit**

Name _____ **Class** _____ **Date Due** _____

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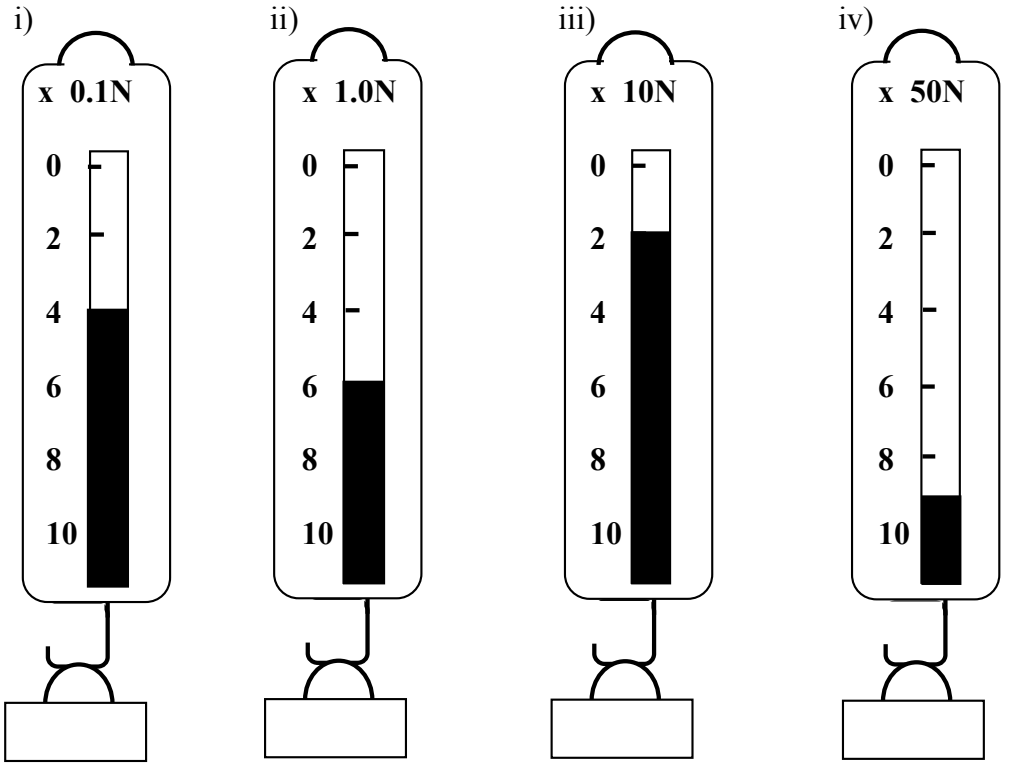
1. State three different effects a force can cause when acting on an object.

(3)

2. What are the readings on each of the Newton balances shown below? (HINT: Look at the scales)



i)_ _ _ _ N ii _ _ _ _ _ N iii) _ _ _ _ _ N iv) _ _ _ _ _ N

(4)

3. What does it mean when a physicist talks about the "Weight" of an object?

(2)

4. A patient is told that her mass is 55kg. Calculate her weight for g=10ms^{-2}.

(2)

5. Write a sentence explaining the meaning of the word " Friction".

(2)

6. A bullet has a mass of 0.025 grammes. How much does it weigh? Assume g=10 ms^{-2}.

(2)

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S.G. Physics Homework 4 **After Activity 24** **Transport Unit**

Name _____ **Class** _____ **Date Due** _____

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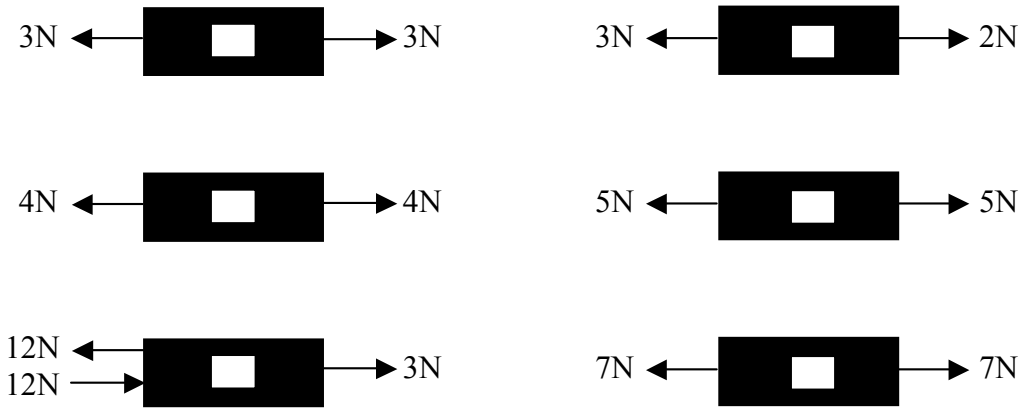
1. What happens when equal forces of the same size but opposite direction act on the same object?

(1)

2. i) In which of the following situations are the forces balanced? (Tick the boxes)



(3)

ii) For each of the following, draw another force which will leave the object with balanced forces acting (HINT: ensure objects have a resultant force of ON).

a) 4N ←

b) 9N →

c) 5N → 11N

(2)

3. Complete the following sentences correctly using the wordbank at the end:

"When balanced forces or _____ forces act on an object, its speed _____ _____."

"Seat belts are used in cars so that if the car stops suddenly the passenger experiences a _____ which acts in the _____ direction in order to prevent _____."

"The acceleration of an object _____ if the resultant force is doubled."

"The acceleration of an object _____ if the object's mass is doubled and the resultant force remains unchanged".

(2)

WORDBANK: Injury, Doubles, Halves, Constant, Equal, Remains, Opposite, Force

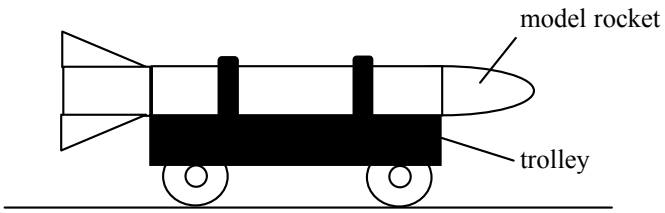
4. A boy shoots a stone from a catapult. The stretched elastic exerts a force on the stone. If the boy uses a larger stone but stretches the elastic by the same amount, how does the force and acceleration on the stone compare?

(2)

5. A car of mass 1000kg accelerates from $5ms^{-1}$ to $17ms^{-1}$ in 3 seconds. Calculate the force required.

(2)

6. A small model rocket is firmly attached to the top of a trolley.



Describe an experiment to work out the accelerating force produced by the rocket motor.

Your description should include:
- i) any apparatus used;
- ii) how you would carry out the experiment;
- iii) what measurements you would make;
- iv) how you would calculate the accelerating force.

(4)

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S.G. Physics Homework 5 **After Activity 35** **Transport Unit**

Name _____ **Class** _____ **Date Due** _____

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1. Describe the main energy changes in the following situations:

   i) a car accelerating along a level road.

   ii) a bus travelling at constant speed along a level road.

   iii) a lorry braking to a halt on a level road.

   iv) a freewheeling cyclist accelerating down a slope.

(4)

2. How much work is done when a gardener uses a force of 150N to move a lawn mower a distance of 50m?

(2)

3. If a labourer can provide 1800 joules of work in 3 seconds what is his power output?

(2)

4. A box with a mass of 15kg is to be lifted to a height of 2m.

   i) How much does the box weigh?

(2)

   ii) Calculate the minimum force required to lift the box off the ground.

(1)

   iii) What type of energy has the box gained?

(1)

   iv) Calculate the amount of energy the box has gained.

(1)

5. What is the average friction force if a box with 50000 joules of kinetic energy slides to a halt in 25m?

(2)

6. State whether the following are true or false:

Work Done is a measure of the amount of energy changed _____

When an object falls kinetic energy changes to potential energy _____

The greater the speed of a car, the greater its kinetic energy _____

The greater the mass of a moving object, the less its kinetic energy _____

(2)

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