



OUNDLE

School

EXAMINATION PAPER
Non Common Entrance 2022

Science

Time allowed: 1 hour

Name: _____

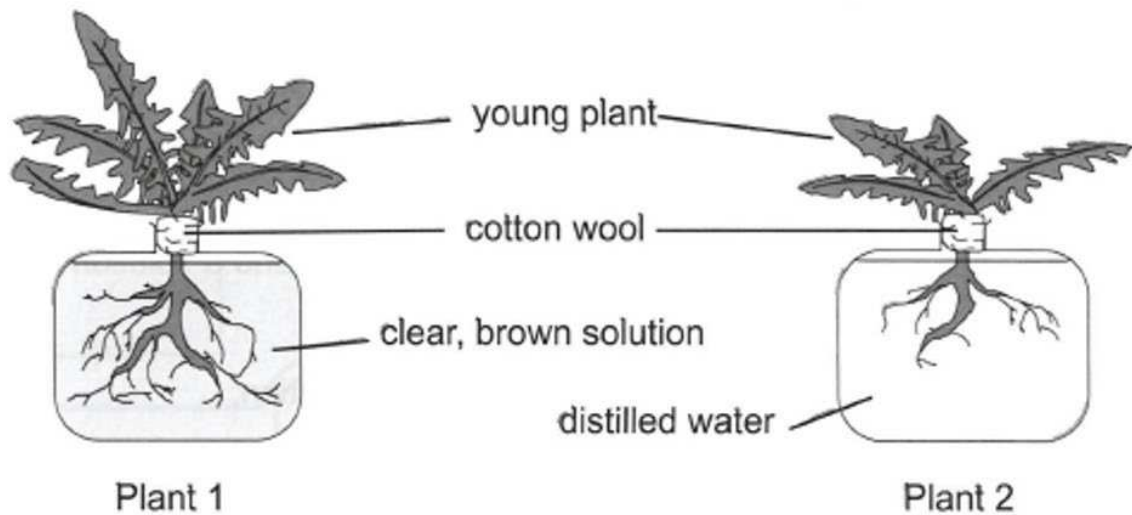
Instructions

- Write your name clearly in the space above.
- Answer in the space on this paper.
- Calculators are allowed.
- Answer ALL the questions in all sections. Each section carries the same number of marks.
- You are expected to write clearly and accurately throughout each of your answers. You should leave some time towards the end of the examination to check your work carefully.
- The maximum number of marks for this paper is 60.

Biology Section

1. Plants need to take in water from the soil.

Dr Gabion decides to do an experiment to find out if there is anything else in the soil which plants use for growth.



Dr Gabion made the clear, brown solution for Plant 1 by mixing up soil and water, and then separating the soil particles out to leave the clear, brown solution.

- a. What method could Dr Gabion use to separate the soil particles from the brown solution?

..... [1]

- b. Why did Dr Gabion grow one plant in distilled water?

..... [1]

- c. What types of substances are in the clear, brown solution that the plant uses for growth?

..... [1]

- d. Explain how roots are adapted to take in water.

.....

..... [1]

Dr Gabion carried out another experiment with three similar plants.

The solutions in each container were the same. He put all the plants in a sunny place. The pictures show the results of the experiment.



Plant 3

The container holds the clear, brown solution. The container and leaves are wrapped in black plastic.



Plant 4

The container holds the clear, brown solution. The leaves are wrapped in black plastic.



Plant 5

The container holds the clear, brown solution. The container is wrapped in black plastic.

e. Explain why Plant 5 was the only one that grew well.

.....
..... [1]

[Total: 5]

2. Draw lines to match the parts of the body with the function that they carry out in human digestion.

Small intestine	absorbs the water from the food waste.
Stomach	absorbs nutrients into the bloodstream.
Teeth	churns up food and mixes it with acid and enzymes.
Large intestine	moves food to the next part of the digestive system by peristalsis.
Gullet	stores waste water.
	grind up food and mix it with saliva.

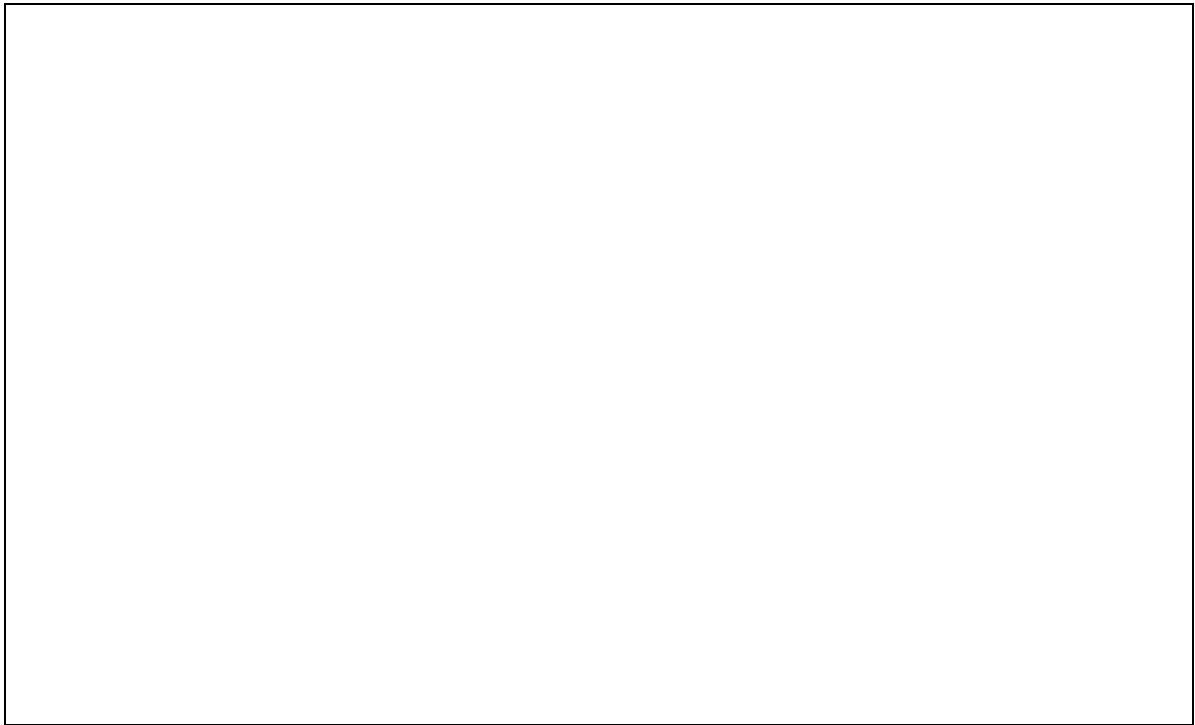
5 marks

[Total: 5]

3. Read the following description of a garden ecosystem.

The 'cabbage white' butterfly feeds on brassica plants. It shares this food source with slugs and snails, but the slugs and snails will also eat lettuce. Small birds like blue tits and thrushes eat the butterflies, slugs and snails. Cats eat the blue tits and the thrushes.

a. Draw out the food web in the space provided



b. A gardener uses slug pellets to kill slugs and snails to stop them eating his plants. Describe and explain the effect you would expect this to have on the number of blue tits in the garden.

.....

.....

.....

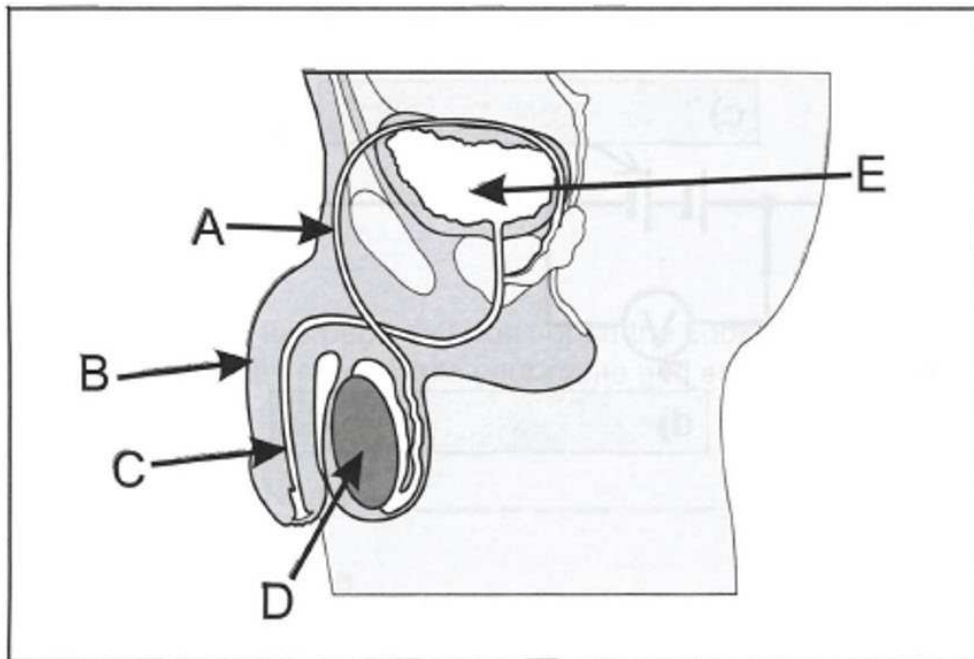
..... [2]

[Total: 5]

4. The diagram below shows the male reproductive system.

a. Choose from the words in the box below to name each part of the male reproductive system labelled in the diagram.

sperm tube urethra bladder testis penis



A:

B:

C:

D:

E: [4]

b. Name the sex cell produced by the male reproductive system.

..... [1]

[Total: 5]

Chemistry Section

1. Atoms join to other **atoms** to form **molecules**. The diagrams shown in the table represent **molecules** with the following chemical formulae.



and



Fill in the right hand column of the table, putting the correct chemical formula with each diagram.









Key	 oxygen atom	 hydrogen atom
	 nitrogen atom	 carbon atom

diagram of molecule	chemical formula
	
	
	
	

[Total: 4]

2. Use the Periodic Table below to help you answer the questions.

Relative atomic mass																1	Atomic number (Proton number)																2
																1																	2
7 Li Lithium	9 Be Beryllium															11 B Boron	12 C Carbon	14 N Nitrogen	16 O Oxygen	19 F Fluorine	20 Ne Neon												
23 Na Sodium	24 Mg Magnesium															27 Al Aluminium	28 Si Silicon	31 P Phosphorus	32 S Sulphur	35.5 Cl Chlorine	40 Ar Argon												
39 K Potassium	40 Ca Calcium	45 Sc Scandium	48 Ti Titanium	51 V Vanadium	52 Cr Chromium	55 Mn Manganese	56 Fe Iron	59 Co Cobalt	59 Ni Nickel	64 Cu Copper	65 Zn Zinc	70 Ga Gallium	73 Ge Germanium	75 As Arsenic	79 Se Selenium	80 Br Bromine	84 Kr Krypton																
85 Rb Rubidium	88 Sr Strontium	89 Y Yttrium	91 Zr Zirconium	93 Nb Niobium	96 Mo Molybdenum	99 Tc Technetium	101 Ru Ruthenium	103 Rh Rhodium	106 Pd Palladium	108 Ag Silver	112 Cd Cadmium	115 In Indium	119 Sn Tin	122 Sb Antimony	128 Te Tellurium	127 I Iodine	131 Xe Xenon																
133 Cs Caesium	137 Ba Barium	139 La Lanthanum	178 Hf Hafnium	181 Ta Tantalum	184 W Tungsten	186 Re Rhenium	190 Os Osmium	192 Ir Iridium	195 Pt Platinum	197 Au Gold	201 Hg Mercury	204 Tl Thallium	207 Pb Lead	209 Bi Bismuth	Po Polonium	At Astatine	Rn Radon																
87 Fr Francium	226 Ra Radium	227 Ac Actinium																															

a. Which element is in Group 1 Period 3?

..... [1]

b. Which element is the Noble gas in Period 4?

..... [1]

c. Which typical non-metal element is yellow, dull and brittle?

..... [1]

d. Mendeleev ordered the elements by increasing?

..... [1]

e. Carbon burns in oxygen to form carbon dioxide. What would the pH of the solution be if the gas is passed through water?

..... [1]

[Total: 5]

3. The drawing below shows a gemstone set in a gold ring.



Gemstones called rubies are made from an aluminium compound with the formula Al_2O_3 . The chemical symbol for aluminium is Al.

a. Give the name of the **element** that is combined with aluminium in this compound.

..... [1]

b. Suggest the **name** of the compound with the formula Al_2O_3 .

..... [1]

c. How many **atoms** are there in the formula Al_2O_3

..... [1]

d. The gemstone in the drawing is set into a gold ring. Gold is an element that is found in rocks.

Gold is never found combined with other elements. Part of the reactivity series of metals is shown below.

more reactive	aluminium
	zinc
	lead
less reactive	copper

i. Where should gold be placed in this reactivity series?

..... [1]

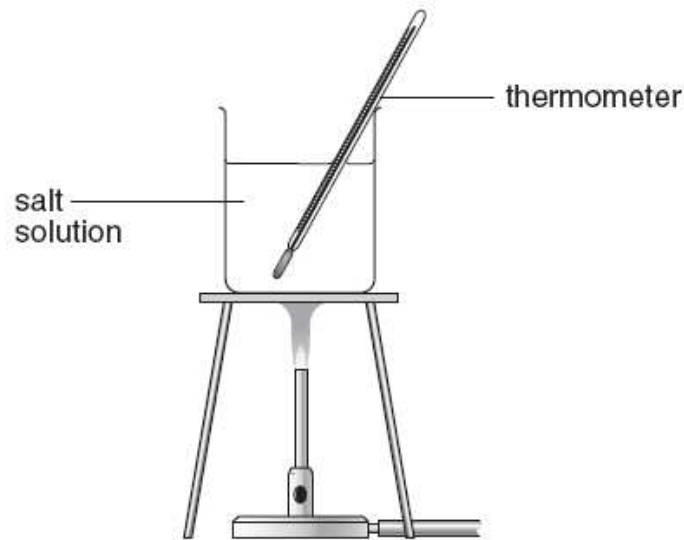
ii. The more reactive metals react with acids. Complete the word equation for the reaction of zinc with hydrochloric acid.

zinc + hydrochloric acid \rightarrow + [2]

[Total: 6]

4. Neera and Tom dissolved different masses of salt in 500 cm³ of water.

They measured the temperature at which each salt solution boiled using the apparatus below.



a. They wrote down some variables that might affect the investigation.

- A Temperature of the laboratory
- B Starting temperature of the water
- C Volume of water
- D Mass of salt in water
- E Boiling point of salt solution
- F Type of salt solution

i. Which variable, A-F, is the independent variable in the investigation?

..... [1]

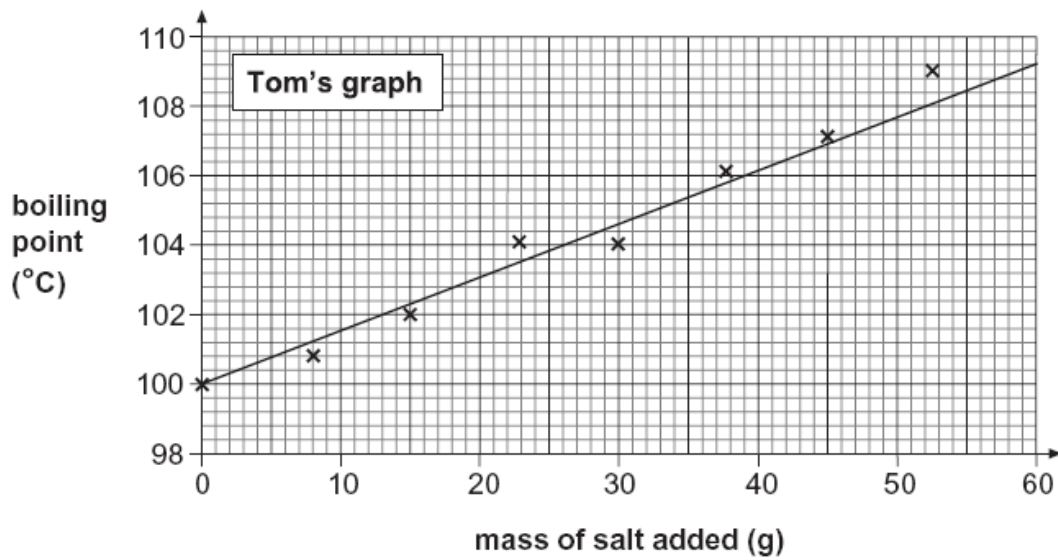
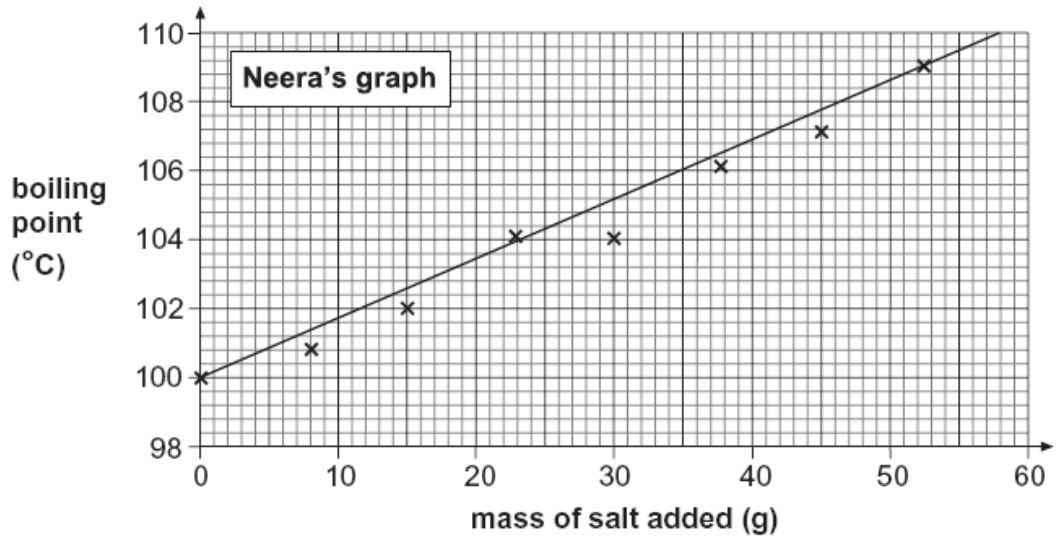
ii. Which variable, A-F, is the dependent variable in their investigation?

..... [1]

iii. Which variable above would affect the experiment **the least**?

..... [1]

Neera and Tom plotted their results and drew the graphs shown below.



b. How can you tell from the graphs that Neera and Tom started with pure water?

.....
 [1]

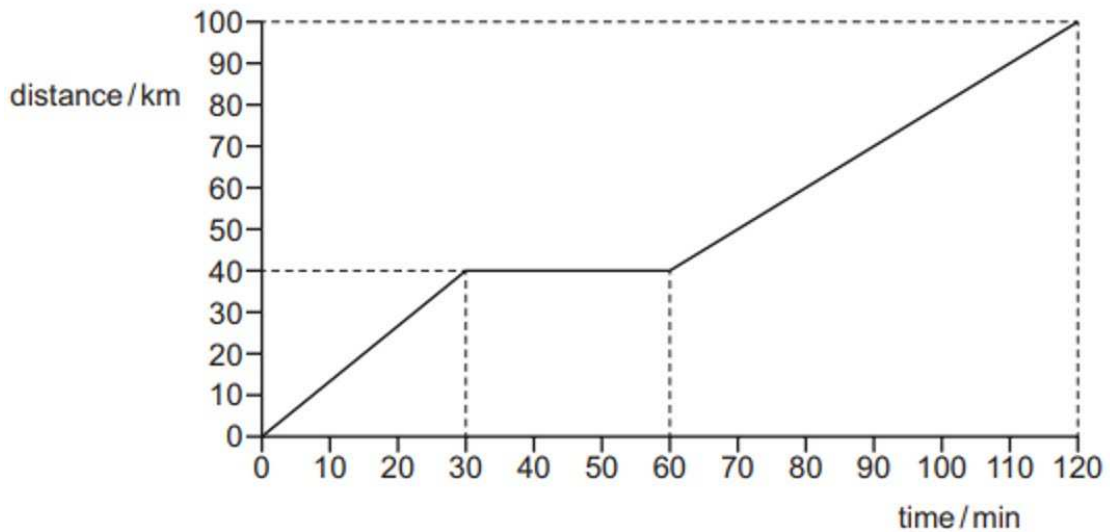
c. Why is Tom's line of best fit better than Neera's line of best fit?

.....
 [1]

[Total: 5]

Physics Section

1. The distance-time graph for a motorway journey is shown.

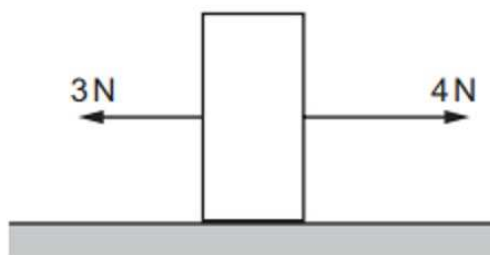


What is the average speed for the journey?

- a. 50 km/h
 - b. 67 km/h
 - c. 70 km/h
 - d. 83 km/h
2. On Mars, the acceleration of free fall g is 3.7 m/s^2 . What is the weight of a 2.0 kg mass on Mars?

- a. 0.54 N
- b. 1.9 N
- c. 7.4 N
- d. 20 N

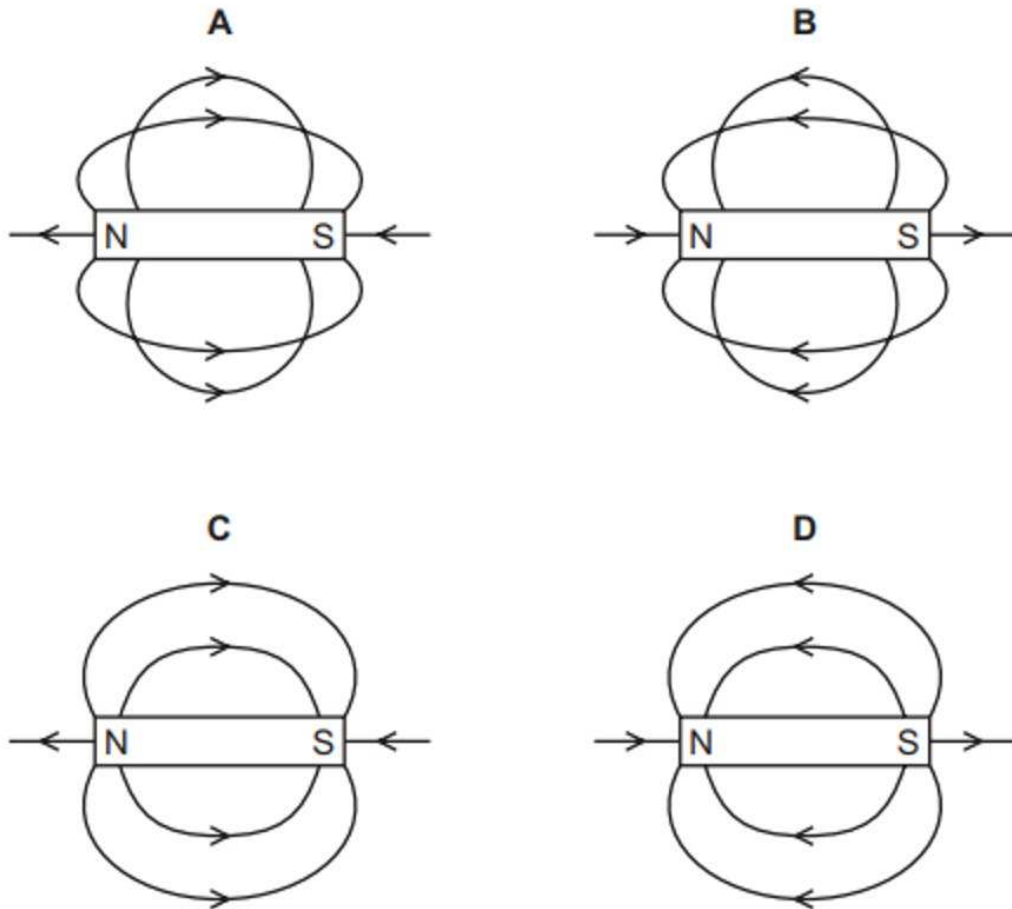
3. The diagram shows a solid object on a flat surface, with two forces acting on the object.



What is the resultant force on the object?

- a. 1 N to the left
- b. 1 N to the right
- c. 7 N to the left
- d. 7 N to the right

4. Which diagram shows the pattern and direction of the magnetic field lines around a bar magnet?



5. A book has a mass of 400g.

The surface of the book in contact with a table has dimensions 0.10m x 0.20m.

The gravitational field strength is 10 N/kg.

What is the pressure exerted on the table by the book?

- a. 0.08 N/m²
- b. 8.0 N/m²
- c. 20.0 N/m²
- d. 200.0 N/m²

6. Fig. 6.1 shows a speed–time graph for a car

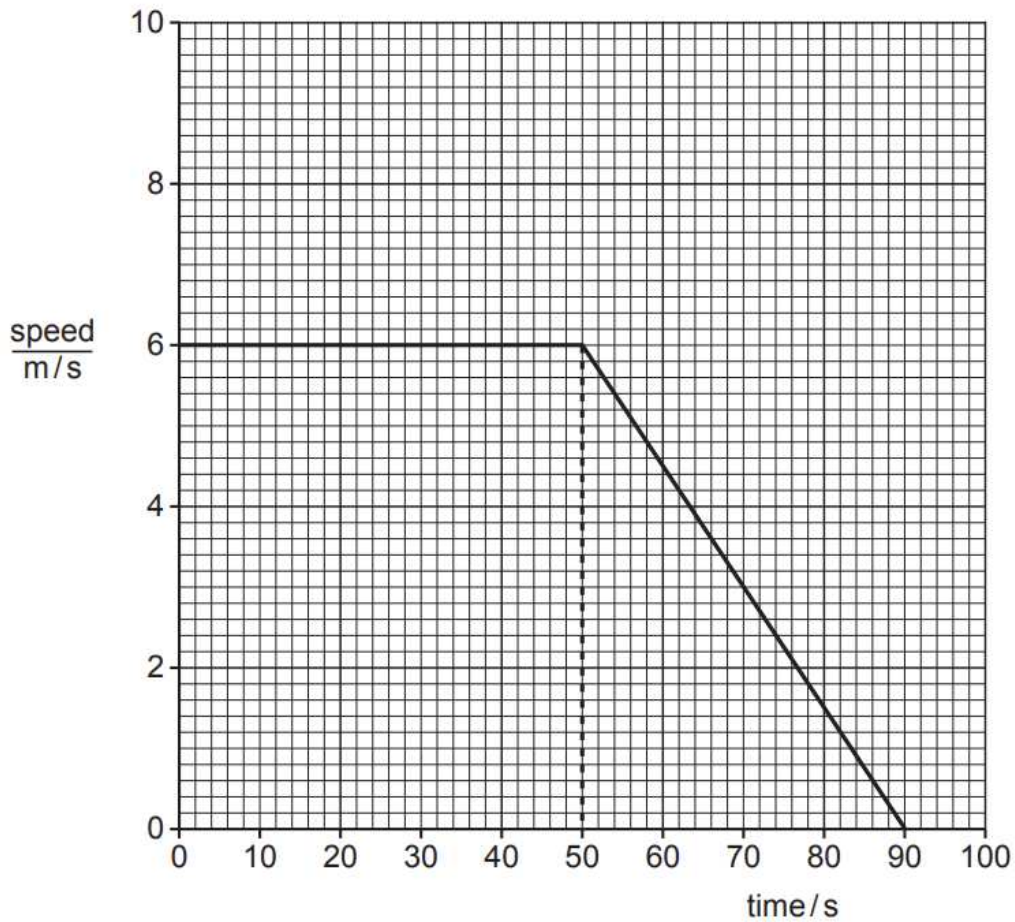


Figure 6.1

(a) Describe the motion of the car from 0 to 50s, as shown in Fig. 6.1.

..... [1]

(b) Describe the motion of the car from 50s to 90s, as shown in Fig. 6.1.

.....
..... [1]

(c) Calculate the distance travelled by the car between 50s and 90s.

distance travelled = m [3]

(d) A motorcycle travels at a constant speed. The motorcycle travels 710m in 87s.
Calculate the speed of the motorcycle and show that it is close to 8m/s.

[3]

[Total: 8]

7. Fig. 7.1 shows two men repairing a weak roof using a crawler-board.

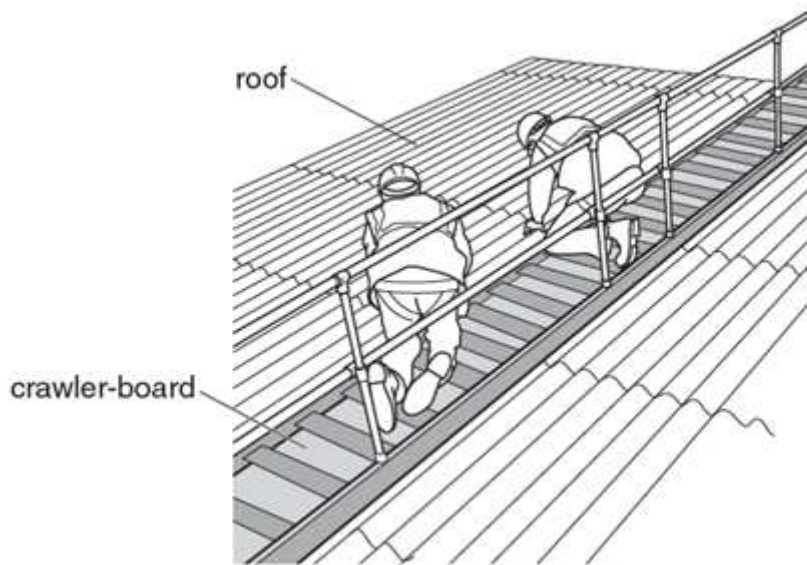


Figure 7.1

a) Explain why use of the crawler-board prevents the men from falling through the roof.

.....

.....

.....

.....[2]

b) The crawler-board has a weight of 400 N. The total weight of the two men is 1600N
The area of the crawler-board in contact with the roof is 0.8 m².

Calculate the pressure on the roof when the men are on the crawler-board.

Include the unit.

pressure =[5]

[Total: 7]