OUNDLE
School

EXAMINATION PAPER
Non Common Entrance 2022

Science

Time allowed: 1 hour

Name: _____

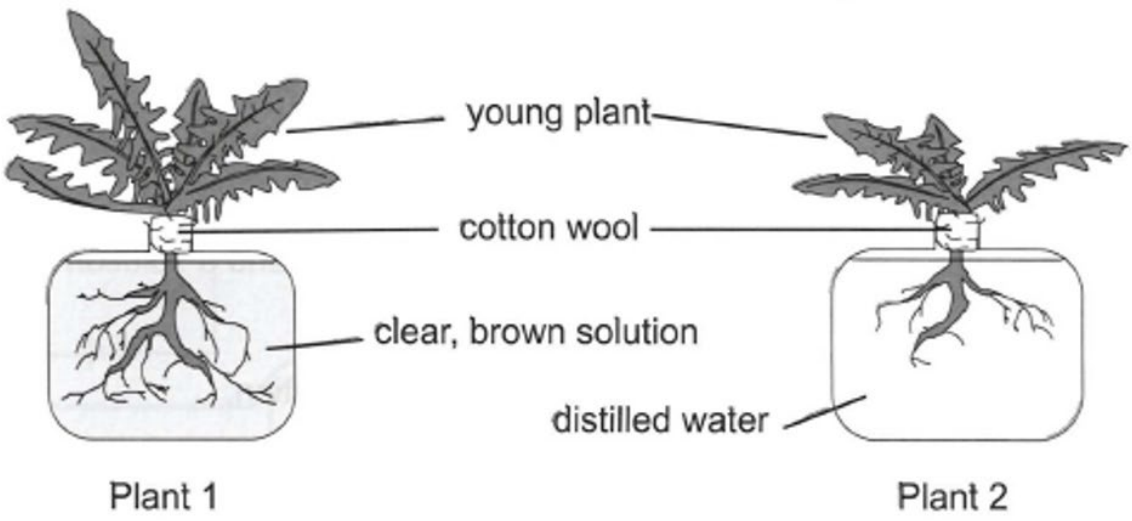
Instructions

- 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.

   .....

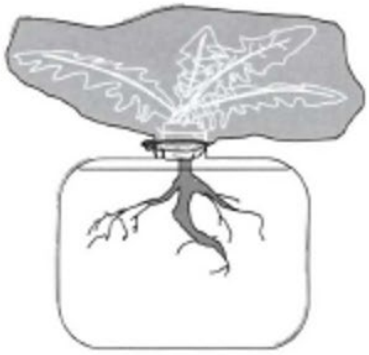
   ..... [1]

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.

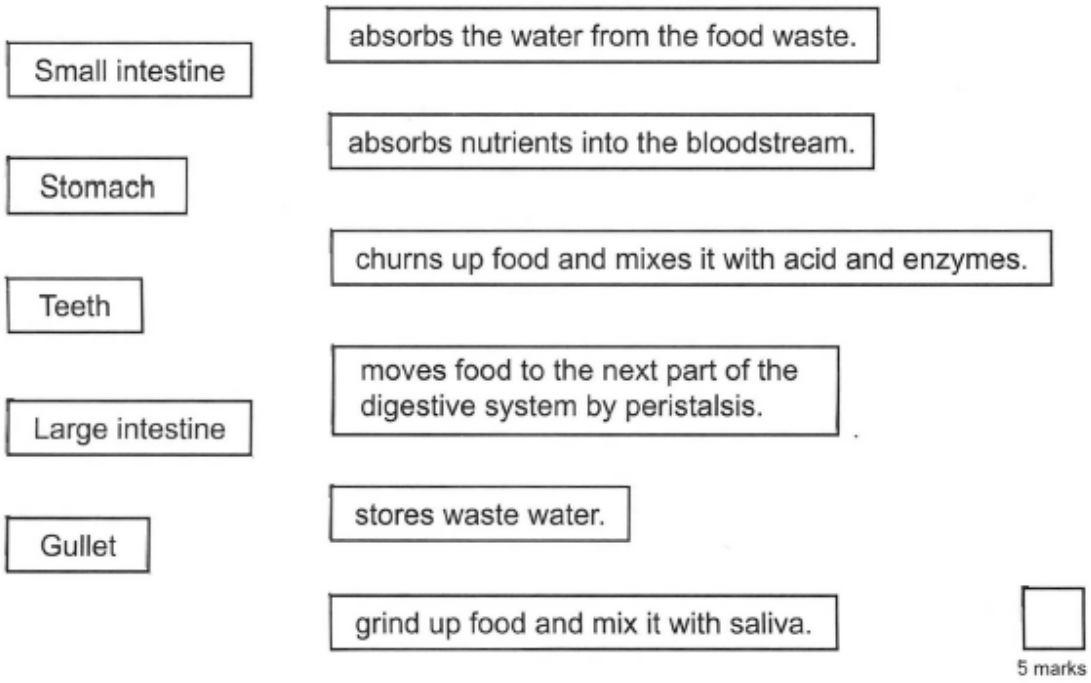
e. Explain why Plant 5 was the only one that grew well.

.....

..... [1]

[Total: 5]

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



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.

.....

.....

.....

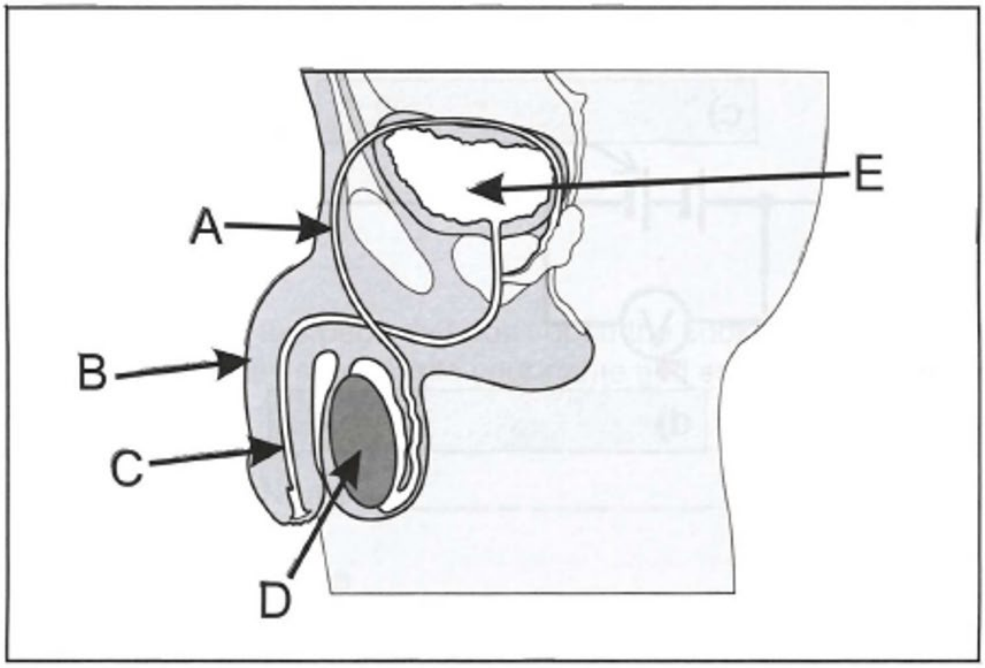
..... [2]

[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.

   CO H_2 H_2O and NH_3.

   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.

																4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	99 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															

Relative atomic — 1 H Hydrogen 1

Atomic number (Proton

1 2 3 4 5 6

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]

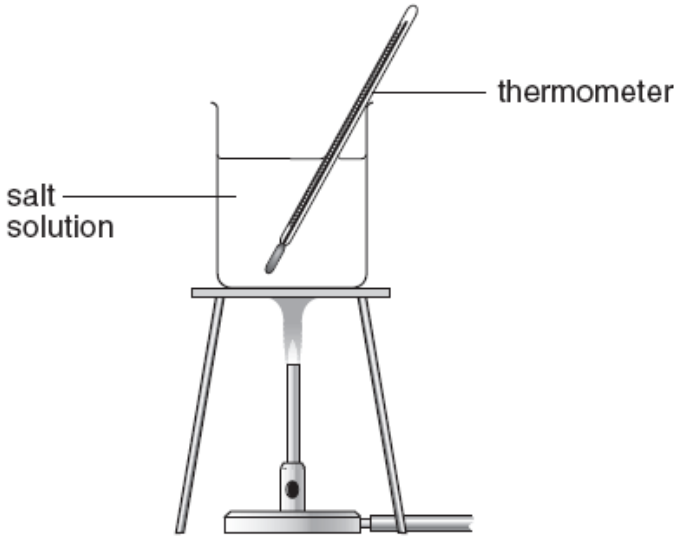
ii. The more reactive metals react with acids. Complete the word equation for the reaction of zinc with hydrochloric acid.

zinc + hydrochloric acid → ..... + ... [2]

[Total: 6]

4. Neera and Tom dissolved different masses of salt in 500 cm^3 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]

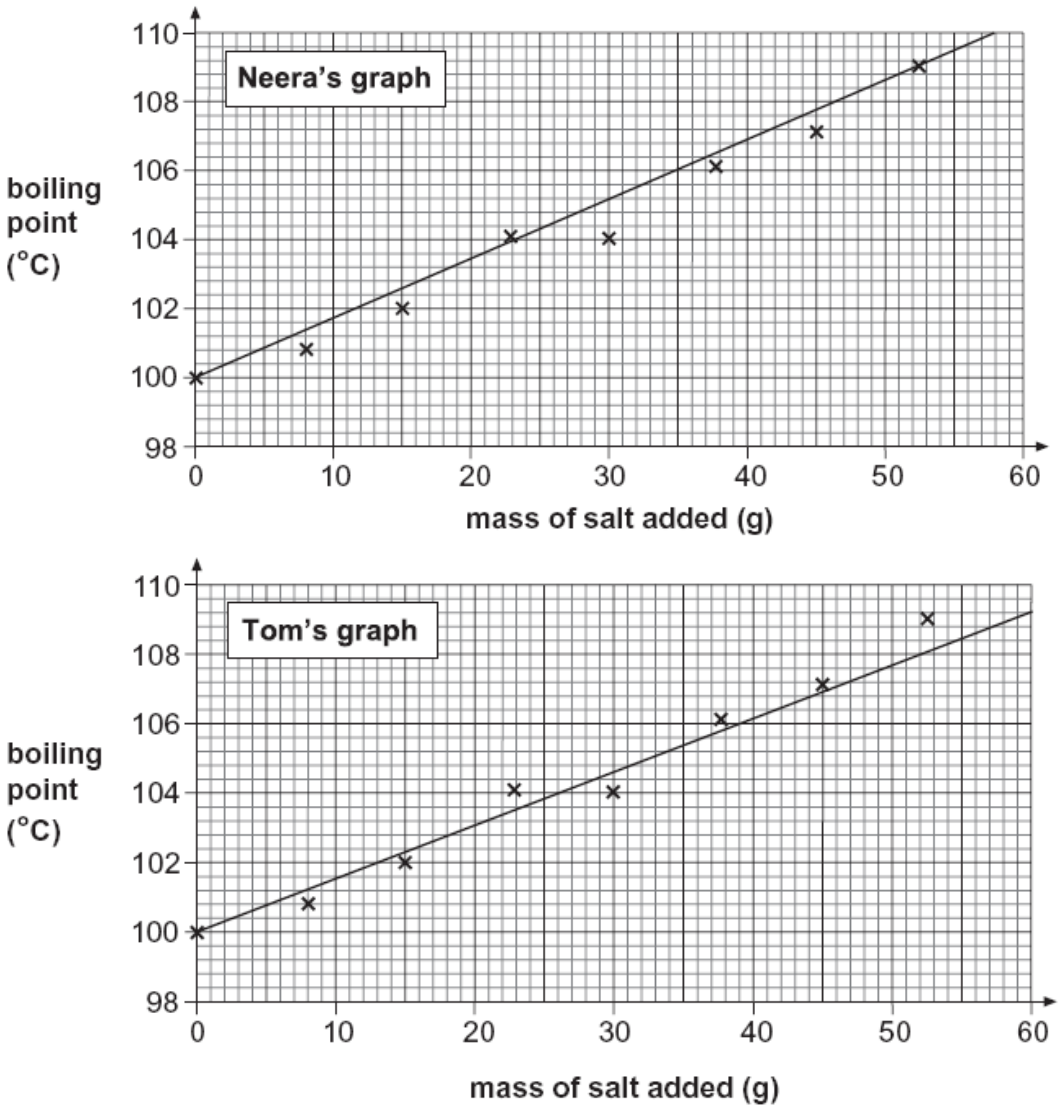
ii. Which variable, A-F, is the dependent variable in their investigation?

..... [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 Nera and Tom started with pure water?

.....

..... [1]

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

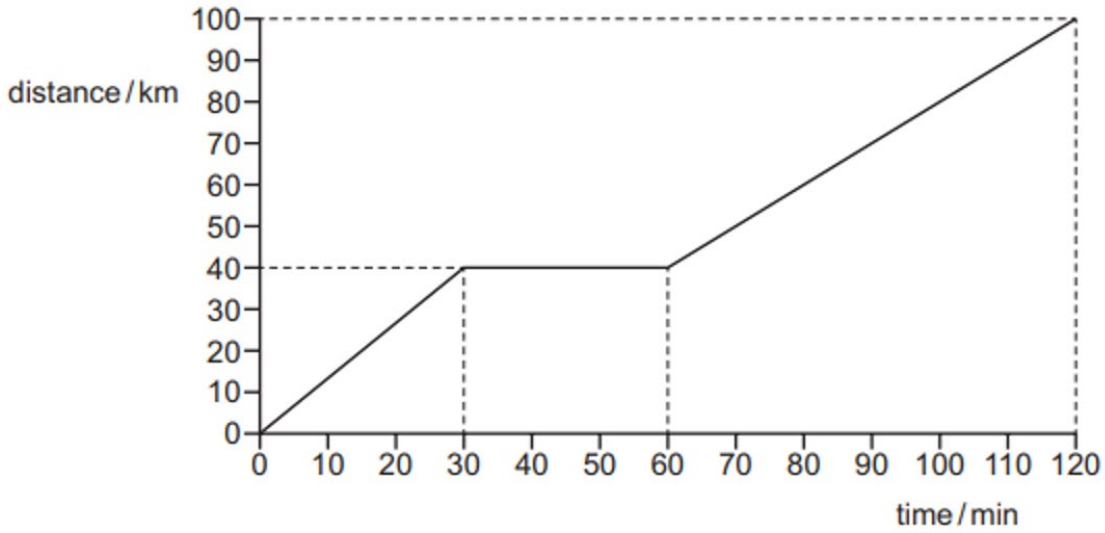
.....

..... [1]

[Total: 5]

Physics Section

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



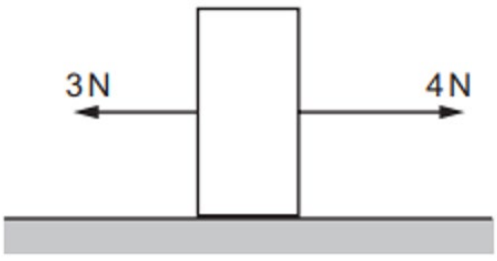
What is the average speed for the journey?

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 2.0kg mass on Mars?

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

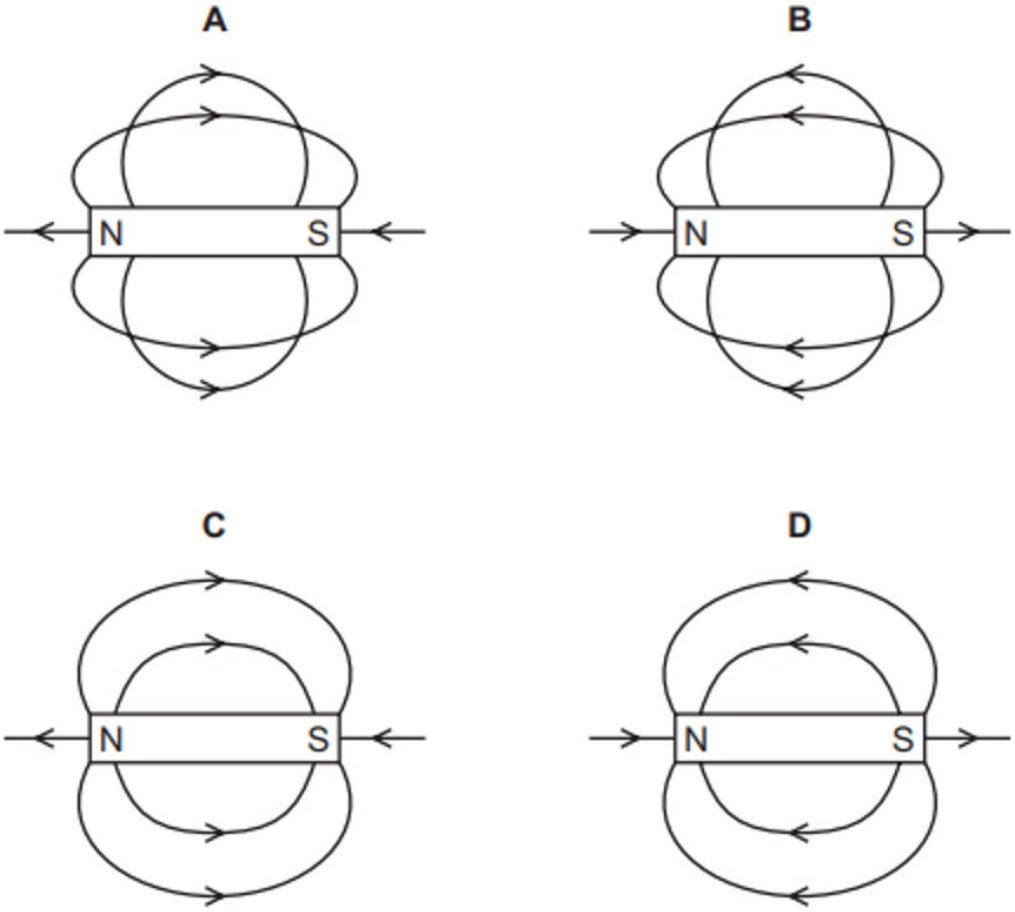
3. The diagram shows a solid object on a flat surface, with two forces acting on the object.



What is the resultant force on the object?

a. 1N to the left
b. 1N to the right
c. 7N to the left
d. 7N 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/m^2
   b. 8.0 N/m^2
   c. 20.0 N/m^2
   d. 200.0 N/m^2

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

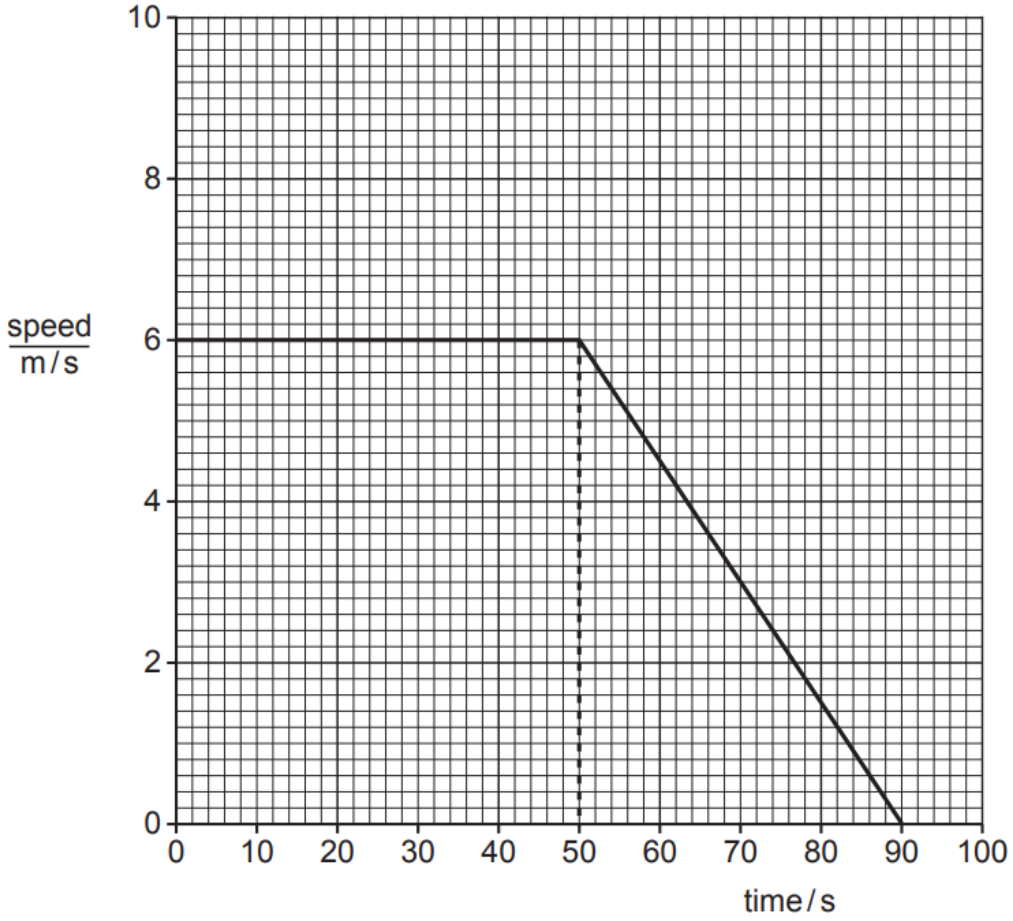


Figure 6.1

(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.

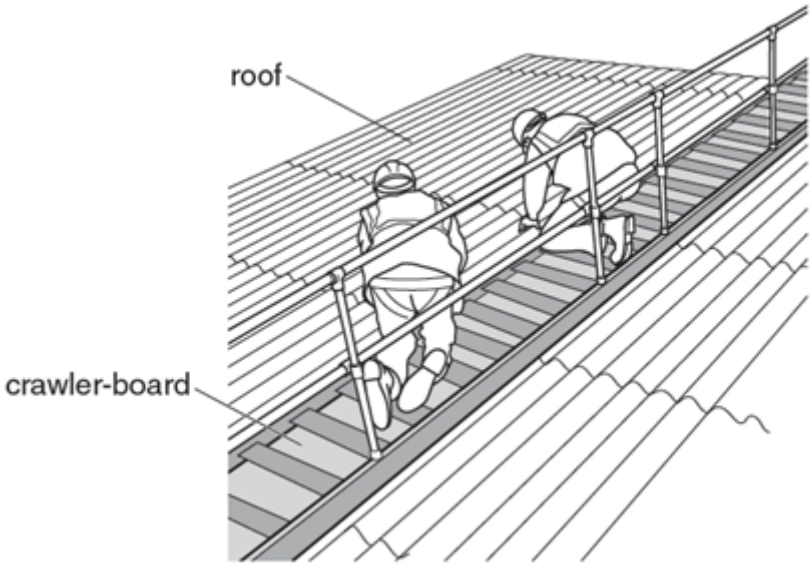


Figure 7.1

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 m^2.

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

Include the unit.

pressure = ...[5]

[Total: 7]