

May 15 Pp. 1.

- i. i. the amount of matter in an object  
ii. the downward force acting on an object

bi.  $m = 450 \text{ g} \div 1000 = 0.45 \text{ kg}$   
 $W = mg = 0.45 \times 10 = 4.5 \text{ N}$

ii. a point close to A.

iii. the centre of gravity

iv.  $p = F/A = 4.5 / 1.4 = 3.2 \text{ Pa}$

v. Max  $p$  on face C since the smaller the area,  $\uparrow p$   
since  $p \propto \frac{1}{A}$  directly A.

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2a.  $t = 4 \text{ s}$

$u = 0$

$v = 8 \text{ m/s}$

$a = ?$

$$a = \frac{v-u}{t} = \frac{8-0}{4} = 2 \text{ m/s}^2$$

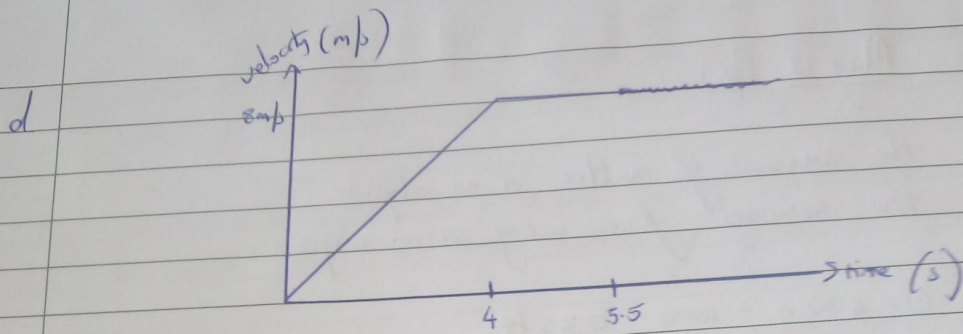
b.  $s = ?$

$$s = ut + \frac{1}{2}at^2 = 0 + \frac{1}{2}(2)(4)^2 = 16 \text{ m}$$

c. speed =  $\frac{s}{t}$

$$t = \frac{12}{8} = 1.5 \text{ s}$$

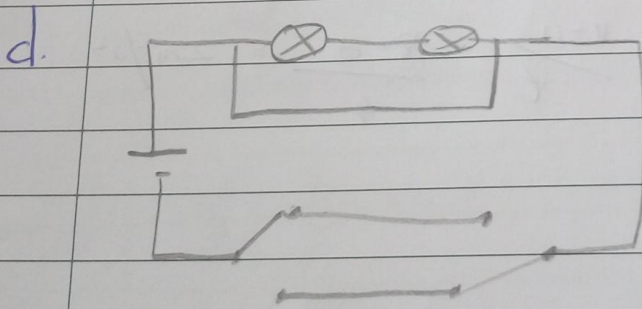
$$8 = \frac{12}{t}$$



e. The momentum of the dog increased from the 0 second to the 4th second.  
 after the 4th second, the dog's momentum remained constant

3a No, since there is an open circuit.

b. on on                      c. two-way switch  
 off off



e. increases,  
 decreases

- f. i. 240V, parallel, total res ↑ ??  
 ii.  $240V \div 20 = 12V$ , series, brighter  
 iii. 12V, parallel ??

4a. Renewable energy source: energy source which can be used over + over again and never runs out.

b. non-renewable source is a source which once used it can never be used again and takes millions of years to form.

c. } Renewable: solar energy, wave energy, geothermal, hydroelectric  
Non-renewable: nuclear, fossil fuels such as coal, oil, gas, peat.

4c. renewable: solar energy  
non-renewable: gas or coal

d. Renewable disadvantage: unreliable such as in solar energy or wind energy (the sun + wind are not always strong enough to produce enough energy)  
- Non-renewable: large amounts of energy are produced.

e. - Use of thick curtains and carpets } all of them are ways  
- Roof insulation } how heat from the  
- Draft excluders in doors } inside is not lost easily  
to the outside

$$f. \text{ eff} = \frac{P_0}{P_1} \times 100\%$$

$$80\% = \frac{P_0}{1500} \times 100$$

$$\frac{80 \times 1500}{100} = P_0$$

$$P_0 = 1200 \text{ W}$$

5 i. 0.004, 0.006, 0.008, 0.010, 0.012

ii. on graph paper

iii.  $P$  and  $V$  are directly  $\propto$

iv. if  $V$  halved,  $V \downarrow$ ,  $\therefore V \uparrow$  and  $P \uparrow$ ,  $\therefore P$  is doubled

v. when volume of gas is halved, the molecules have less space to move into, leading to more frequent collisions with walls of the container,  $\therefore$  more pressure, moreover pressure doubles

?? vi.

6a.  $P = IV$

$$900 = I \times 240$$

$$\frac{900}{240} = I = 3.75 \text{ A}$$

b. 30 mins  $\rightarrow 30 \div 60 = 0.5$  hrs.

$$P = 900 \text{ W} = 0.9 \text{ kW}$$

$$\therefore E = Pt = 0.9 \times 0.5$$

$$= 0.45 \text{ kWh}$$

$$\therefore \text{Cost} = 0.45 \times 17 = 7.65 \text{c}$$

c. Since  $I$  in (a) resulted to be 3.75 A, then fuse of 4 A would be adequate.

d. Earth wire : a connection to Earth to serve as an escape for current if a fault occurs, it safeguards a person from shock

Fuse : Always connected to live wire, so that when a fault occurs, it melts and hence an open circuit in the live wire results;  $\therefore$  appliance is safeguarded from excess current

Circuit breaker : Main fuse in a home; when current flows through

The Earth wire, the circuit breaker trips, stopping the supply of electricity from entering the electrical system of the house.

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7a Volume of air increases when heated.

b. Since  $V \uparrow$  and mass remains constant,  $\rho \downarrow$  since  $\rho \propto 1/V$ .  
Hence <sup>heated</sup> air becomes less dense + rises above (floats) the colder air.

d.  $\rho = \frac{m}{V}$   
 $0.164 = \frac{m}{2700}$

$m = 2700 \times 0.164 = 459.2 \text{ kg.}$

e. constant velocity,  
 $\therefore$  weight of balloon  
= air resistance  
by Newton's  
first law of motion.

c. to return balloon back to ground: let the hot air escape through the valve at the top to cool the air inside.

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8a: Lisa correct since South Africa is closer to the sun while Northern Europe is further away, due to the Earth's ~~tilt~~ tilt.

ii. John is incorrect, since both are facing the sun at the same time.

b. i. a planet rotates around the sun, <sup>(star)</sup> while a star is ~~at~~ the object around which planets rotate.

b ii. Proxima Centauri since both Prox. Cent. + Earth are within the same galaxy.

b iii.

9a. Geiger Muller Tube

b i.  $\beta$  since the thin sheet of aluminium reduced the radiation from 1500 to 37. so the aluminium stopped the  $\beta$  radiation.

ii because there is always background radiation present.

iii.

c. Use adequate clothing + use spatulas  
Dispose of it in lead containers.

d. to treat cancer  
for smoke alarms.

10a. the magnet will have the North Pole pointing in the direction of the Northern Hemisphere due to the Earth's Magnetic field

b. ① End B can be a south pole since opposite poles attract

(2) The ~~magnet~~ <sup>metal bar</sup> might not be magnetised,  $\therefore$  no S + N pole.  
since a magnetic material which is not a magnet <sup>is</sup> still be attracted to a magnet.

c.i. iron

OR

i. steel

ii. soft material but it doesn't make a permanent magnet.

ii. hard material so it makes a permanent magnet.

iii.

(1) Use a piece of magnetic material + a permanent magnet. Stroke the piece of magnetic material in the same direction along the permanent magnet, for a number of times.

OR

(2) Use a solenoid connected to direct current. While it is switched off, put in the piece of magnetic material. Then switch on current, turn it off again and pull the magnetic material out.

iv) Dropping the magnet on the ground may demagnetise the magnet.

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