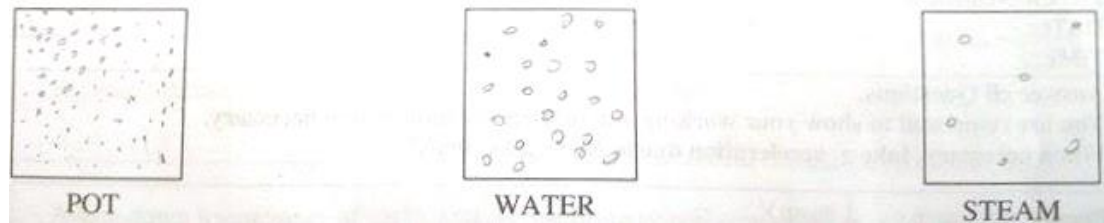


Physics Sept 2012

Paper I

1a)



1bi) particles in pot are close together so they vibrate back and forth about the same position

1bii) particles are slightly further apart so the particles vibrate and move rapidly over short distances

1biii) particles are far apart from each other so they move around haphazardly with very high speeds in all the space available

1c) heat increases, temperature increase, energy increases

1d) it will stop decreasing when the water reaches room temperature because it reaches an equilibrium with its surroundings

2ai) Evaporation is when water molecules have reached a certain level of energy, hence they change state and turn into gas and escape the liquid

2aii) - increase in temperature and - increase in surface area

2aiii) when some water molecules escape by evaporation, the remaining water molecules remain with a lower average kinetic energy than before, so the temperature decreases and the liquid cools

2b) 0.26°C (??)

3ai) gives both size and direction

3aii) gives size only

3b) scalar: mass, distance, speed

vector: velocity, weight, displacement, acceleration, pressure

3ci) A : weight of car B : reaction from each tyre

3cii) accelerate forward

3ciii) constant speed

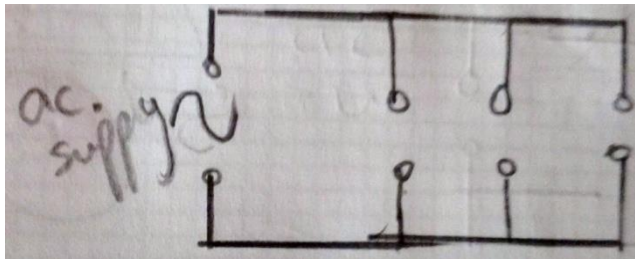
- 4ai) A, B
A, C
None

4aii) 15Ω

4bi) the other two sockets need to be closed since otherwise there will be an open circuit

4bii) since connected in series, the ac voltage supplied is shared between the 3 of them, hence not enough to make them work normally

4biii)

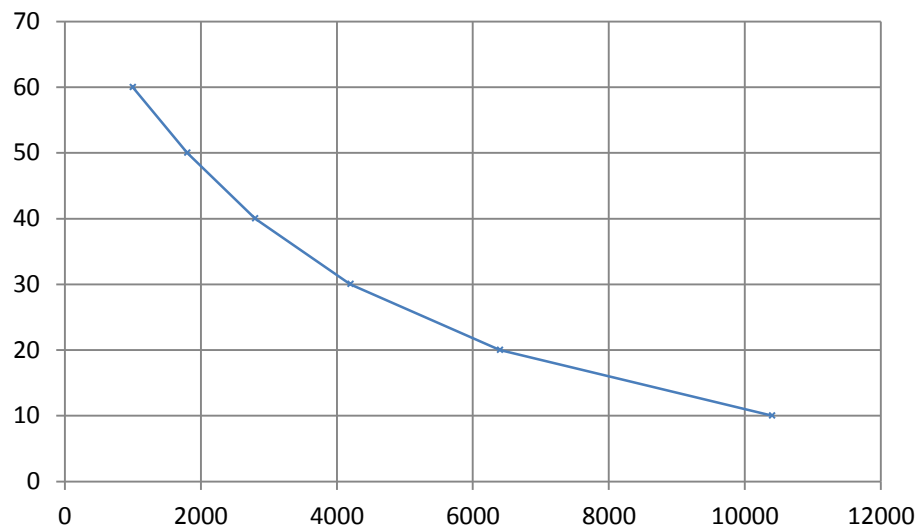


4biv) parallel

5a) removes Bunsen burner to stop the water from rising in temperature

Stirs water to make sure that the temperature of liquid is constant throughout

5b)



5c) resistance and temperature are inversely proportional

5d) C

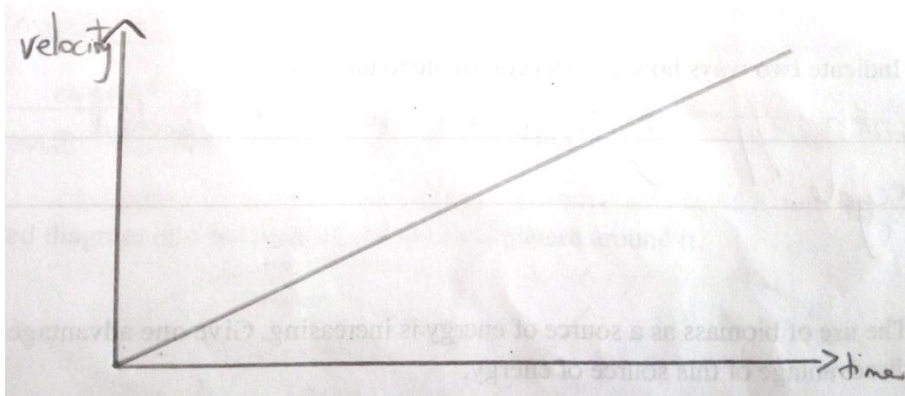
5e) non ohmic

6ai) 1.29m

- 6aii) during thunderstorm, first one sees the light coming from the lightning and then we hear the sound
- 6bi) the vibration creating the wave are parallel to the direction of travel of the wave
- 6bii) sound waves in air travel slower than sound waves in the steel pipe which is more dense
- 6biii) $t = 0.27s$ in air, but first sound is heard in steel hence, $0.27 - 0.24 = 0.03s$
- 6biv) 2947 m/s

7a) this is the acceleration due to free fall which is caused by the acceleration due to gravity

7b)



- 7c) 21 m/s
- 7d) 22.05 m
- 7e) if air resistance is ignored it wouldn't make a difference, they would fall at the same time and rate and end with the same velocity
- 8a) - using energy efficient appliances with high energy labels
-change to renewable energy
- 8b) - switch off light and appliance when not in use
-recycle
- 8c) advantage: biomass creates no atmospheric pollution and can be used in under-developed countries

disadvantage: large space is required to store the biomass there
- 8di) input – potential energy in the stored water

output – light energy in the bulb
- 8dii) 7.5W

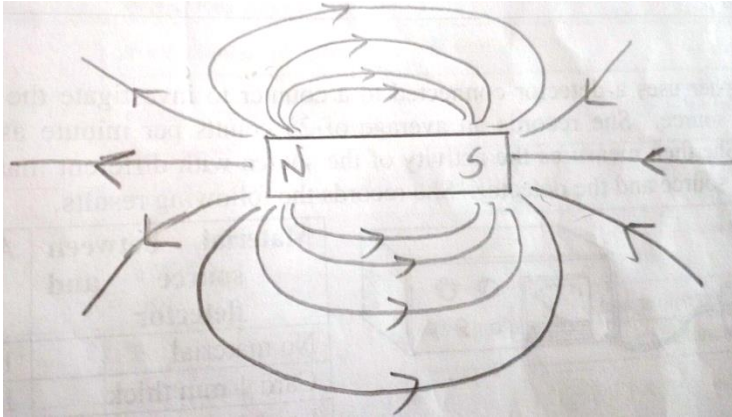
9a) because brass is a non-magnetic material so it is not attracted to the bar magnet, but iron is. Hence only the iron is collected by the magnet

9b) place compass close to one end of the bar magnet.

If north points away from the end, then that end has the same polarity, a north

If north points toward the end, then that end has an opposite pole, a south

9c)



9d) the poles

9e) - by hammering it repeatedly against a solid

-by heating it above the Curie temperature

-by placing the magnet in a long coil which is connected to an ac supply

10a) 27, 33

10b) they should be handled with proper gloves or spatulas and stored in a lead container

10ci) alpha : yes, since card stopped some radiation

beta : yes, since all radiation was stopped by the lead

gamma : no, since lead would not stop gamma radiation, but in this case all radiation is stopped

10d) cosmic rays from the sun (see notes for more)

10e) $15 \div 5 = 3$, so 12.5 %