Year 9- Physics First Term Revision

- All objects EMIT and ABSORB infrared radiation
- The hotter the obect, the more infrared radiation it emits (gives off)
- Dark/Matte surfaces are good absorbers of infrared radiation however they are bad REFLECTORS of radiation.
- Light and shiny surfaces are good reflectors of infrared radiation but BAD absorbers.

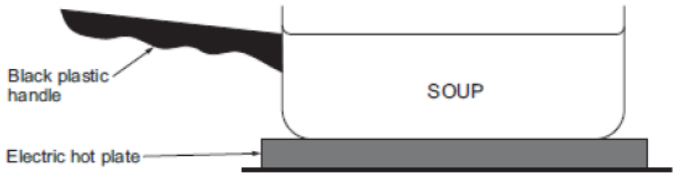
Comparison of surfaces abilities to reflect and absorb radiation

Type of surface	Ability to emit infrared radiation	Ability to absorb infrared radiation
dark, matt (dull)	good	good
light, shiny	poor	poor

1. Why do black surfaces become hot quickly?

2. Why does painting an object dull black maximise the rate of energy transfer?

3. The diagram shows a metal pan, containing soup, being heated by an electric hot plate on a cooker.



(a) Complete the following sentences using only the words provided in the box.
Each word can be used once, more than once or not at all.

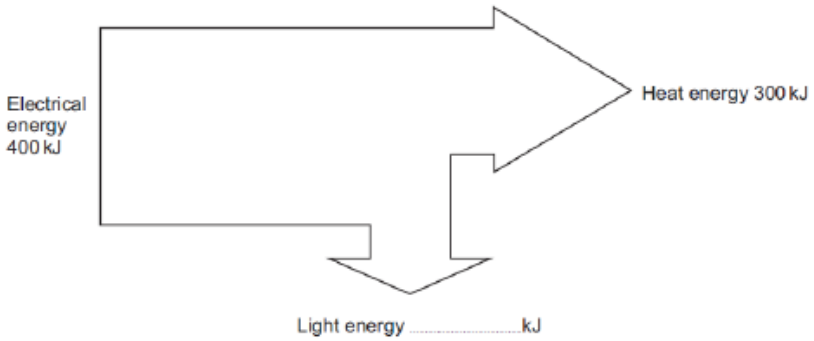
convection	radiation	conductor
insulator	conduction	

(i) The heat is transferred through the base of the metal pan by .....….....

(ii) All of the soup becomes heated by a …… current that is set up in the liquid.

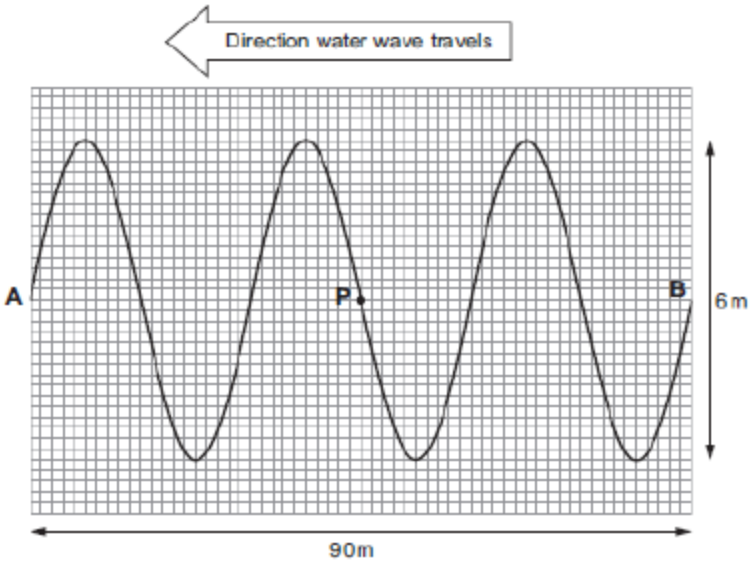
(iii) The handle is made from plastic as it is a poor …… It is black as it is the best colour at emitting infra-red by …… when hot.

(b) The Sankey diagram shows the energy transfers taking place when the metal pan is being heated. **Fill in** the missing value on the diagram and calculate the efficiency of the electric hot plate



4. The diagram shows some water waves that have been produced following a small

earthquake.



(a) (i) How many wavelengths are there between points **A** and **B**?
(ii) Calculate the wavelength of the wave.

(b) A boat at **P** moves up and down 5 times in 10 seconds.
(i) State the frequency of the water waves.

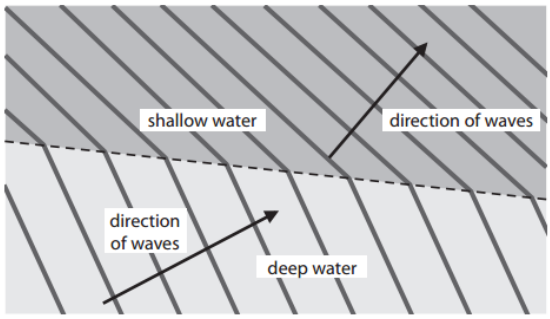
(ii) to calculate the speed of the water waves.

(iii) **Draw an arrow** at P to show the direction that the boat moves.

(c)A pulse of sound is produced at the bottom of a boat. The sound travels through the water and is reflected from the sea-bed. The sound reaches the boat again after 1.3s. The sea-bed is 1000m below the boat. Using this information, what is the speed of sound in the water?

(d)) Visible light is another type of electromagnetic wave. The frequency of green light is 5×10^{14}Hz. The wavelength of green light is 6×10^{-7}m.
Calculate the speed of green light.

(e) The diagram represents water waves travelling from deep water into an area of much shallower water. When the waves go from deep water to shallow water, the



i) speed_____
ii) Frequency_____
iii) Wavelength _____

(f) Explain another change which can be seen from the diagram when the waves go from deep water to shallow water.

5. (a) Microwaves and X-rays are both electromagnetic waves.

(i) Which row of the table is correct for microwaves and X-rays in a vacuum?

	their speeds are	their frequencies are
☐ A	different	different
☐ B	different	the same
☐ C	the same	different
☐ D	the same	the same

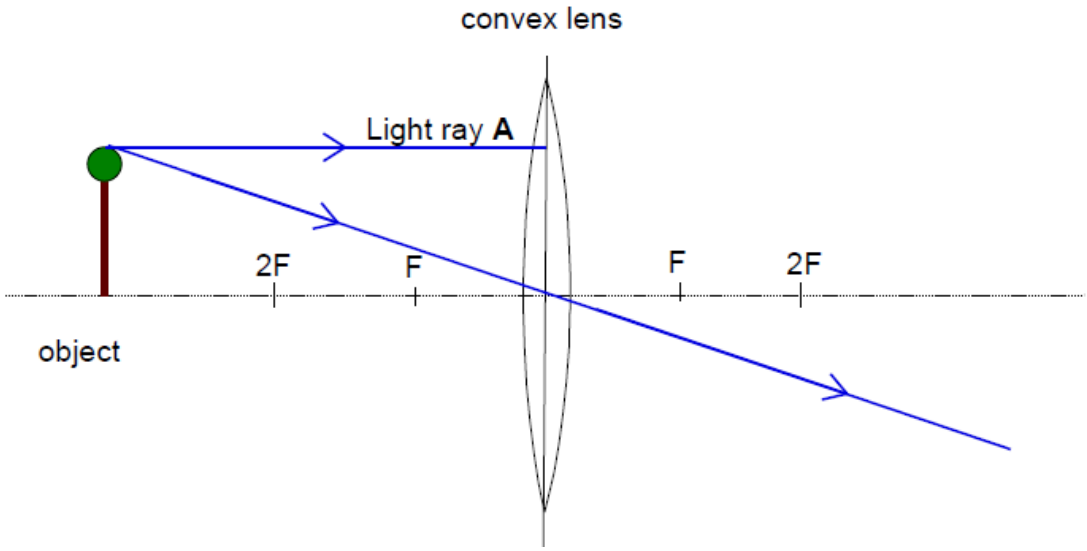
(ii) State **one** harmful effect of X-rays on living matter.

(b) X-rays are ionising radiation.
(i) State **one** other ionising radiation in the electromagnetic spectrum.

(ii) State **one** use of an ionising radiation.

(c) Radio waves are electromagnetic waves. Sound waves are not.
State **three** other ways in which radio waves differ from sound waves.

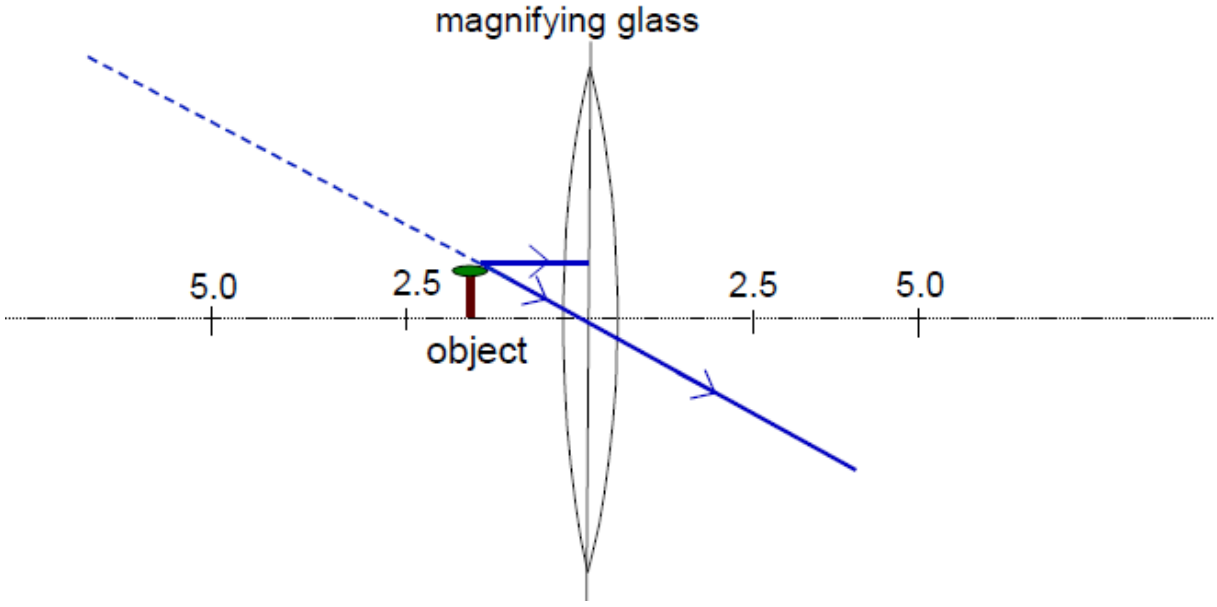
6.(a) Janine examines an object through a convex image with focal length, F.
Complete the path of **light ray A** through the lens below to show the position of the image.



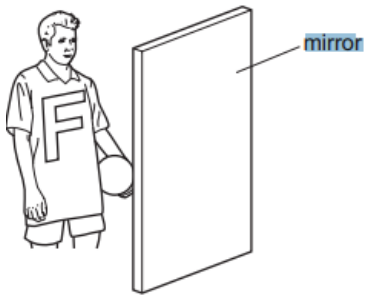
(b) John uses a magnifying glass made from a convex lens with a focal length of

2.5 cm to look at an object.

Complete the ray diagram below to show the position of the image.



(c) A boy wears a shirt with a letter F on the front. He stands in front of a plane mirror.What does he see in the mirror?

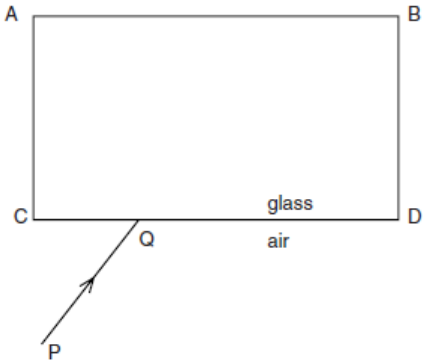


A B C D

(d) Fig. shows a ray PQ of blue light incident on the side of a rectangular glass block.

(i) By drawing on Fig., continue the ray PQ through and beyond the block.

(ii) Mark the angle of incidence at CD with the letter i and the angle of refraction at CD wit the letter r.



7. (a) A hydroelectric power station generates

electricity from a renewable energy source.

(i) Explain what is meant, in this context, by renewable.

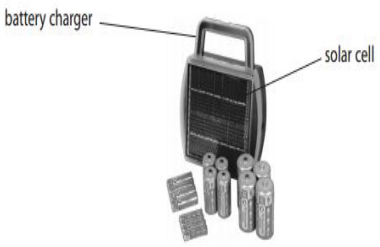
(ii) State two other renewable energy sources.

(b) Drax power station in Yorkshire can generate electricity by burning biofuels. Give one advantage of using biofuel in a power station instead of using coal or oil.

(c). Describe two ways in which electricity can be produced using energy from Sun.

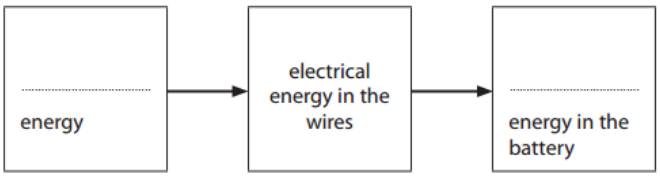
8. A student uses a solar powered battery charger to charge some batteries

(a) The diagram is an energy transfer diagram for a battery being charged.
Use words from the box to complete the energy transfer diagram.



light	kinetic	sound
electrical	chemical	

Energy transfer diagram



9. A 200-kg boulder is 1000-m above the ground.

a) What is its potential energy when it is 1000-m above the ground?

b) What is its kinetic energy when it is 1000-m above the ground?

c) The boulder begins to fall. What is its potential energy when it is 500-m above the ground? Where did the "lost" potential energy go?

d) What is the kinetic energy of the boulder when it has fallen 500-m?

e) What is the kinetic energy of the boulder just before it hits the ground?