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GCSE Physics/ Science

5PH1F/01 (Foundation Tier)

Support Materials

Top 10 Tips from the Principal Examiner for P1 and exemplar materials for the six-marker questions from the November 2011 session

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Top 10 Tips from the Principal Examiner for Physics 5PH1F (Foundation Tier)

1. Practice **substitution of given numbers into equations**. This can help to score partial marks for a numerical question even if the arithmetical part causes difficulty. This can be assisted if student is in the habit of copying the equation from page 2 into the question space. There is no mark for this copying but it helps to obtain the correct substitution.

2. A task starting with **'Calculate'** means that there is, at least some (possibly basic), arithmetic to do.

3. When the **identification of a unit** is asked for as part of a calculation, a specific place is given for this after the space for the numerical answer. This is designed to serve as a reminder.

4. Care should be taken with the **context of multi-meaning words**. Radiation can often be ionising and dangerous but sunlight is also radiation and does not contaminate sea water!

5. There is no alternative but to learn items identified in the specification. These will normally begin with a trigger such as **'State….'**. There are some technical terms such as converging, nebula and alternating or 'colours of the visible spectrum'.

6. Going one stage further than 'State', '**Describe'** can refer, for example, to a list of ideas, to a list of actions in sequence or to a change due to a given cause, an example of which would be to relate changes in image and object distances for a lens.

7. **'Explain'** items often require a statement/observation followed by a reason. For example, explaining the effect on a lamp of increasing the speed at which a generator turns implies a statement that the bulb will become brighter (or fuse etc.) BECAUSE the current/voltage/ power will be increased.

8. When asked to '**Compare'**, '**Describe how effects are different…'**, **'Distinguish between…'**, or **'Describe similarities and differences'**, candidates must make it clear which of their statements apply to which of the things being compared. 'Hedging bets' between descriptors of reflecting telescopes and refracting telescopes did not score and there was much ambiguity over the dangers posed by UV and IR radiations.

9. It is important to **read values from the correct place on a graph**. This can be assisted by drawing vertical and/or horizontal lines. This can also help to score partial marks.

10. A **line of best fit** (straight or curved) will only receive full credit:
    - if there is no tram-lining;
    - if it is drawn bearing in mind the majority of plotted points;
    - if (for a continuous variation) the points are not joined by a series of straight lines.

Exemplar Materials for Question 5(b)

Sample A

6 marks

Although called a (singular) similarity, several are included in the first concise paragraph. Differences are also clearly expounded. There are sufficient similarities and differences to easily qualify for a level three score of 6 marks.

*(b) Describe the similarities and differences between refracting telescopes and reflecting telescopes.

(6)

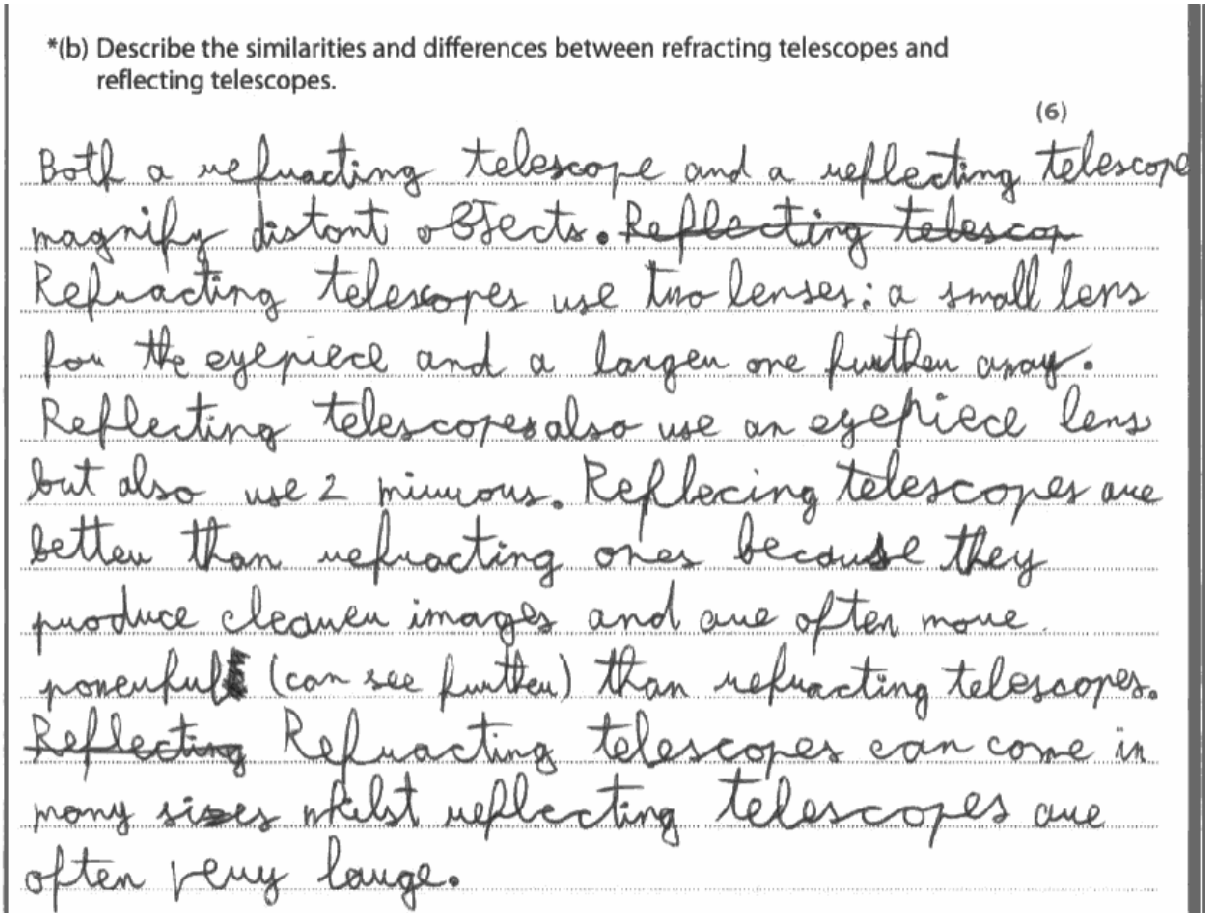
A similarity between reflecting and refracting telescopes is that they both use converging lenses to magnify the real image.

The main difference is that a reflecting telescope will use a large and a small concave mirror to produce the real image; whereas a refracting telescope simply uses two converging lenses.

Sample B

6 marks

This response distinguishes one similarity between telescopes and microscopes by mentioning that ***distant*** object are magnified. The eyepiece (a technical term) is used for both. Some detail about the positioning of the lenses in a refracting telescope is contrasted with the use of mirrors in reflecting telescope. Some effort is made to compare the images produced and the relative sizes of the telescopes, although few reasons are given for these comments. This is a level three response worth 6 marks.



*(b) Describe the similarities and differences between refracting telescopes and reflecting telescopes.

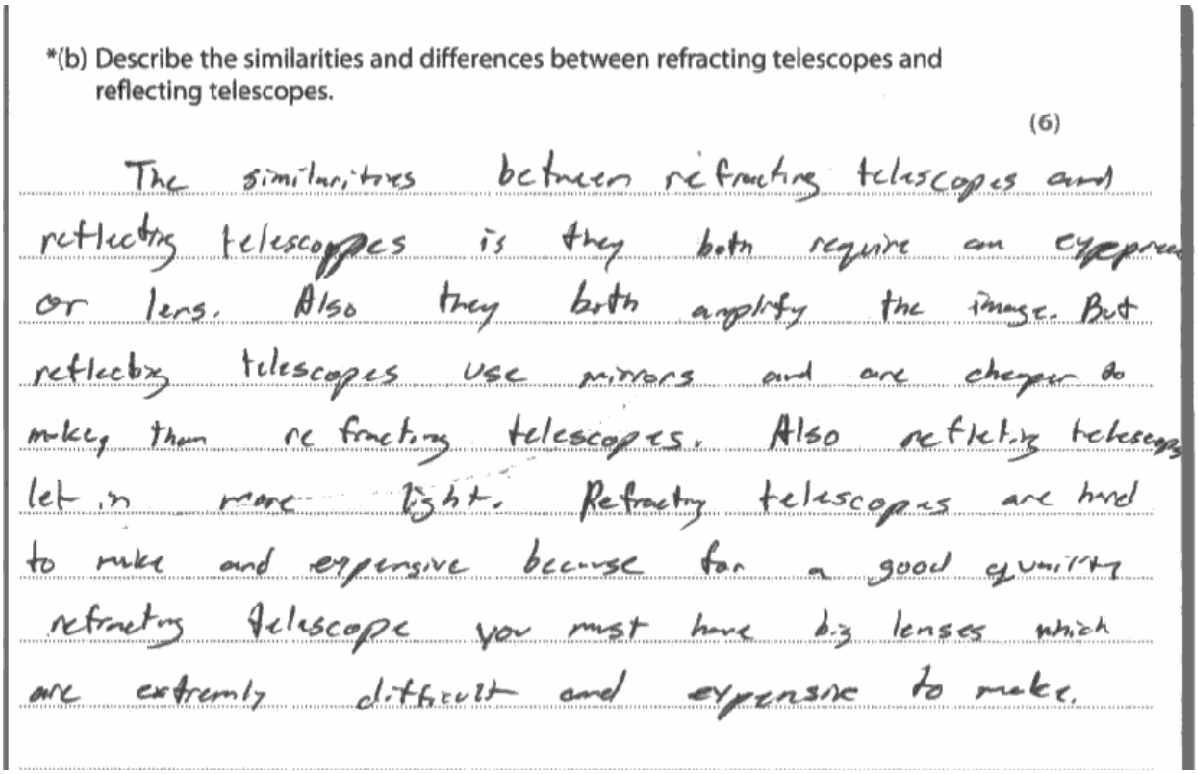
(6)

Both a refracting telescope and a reflecting telescope magnify distant objects. ~~Reflecting telescop~~ Refracting telescopes use two lenses: a small lens for the eyepiece and a larger one further away. Reflecting telescopes also use an eyepiece lens but also use 2 mirrors. Reflecing telescopes are better than refracting ones because they produce clearer images and are often more powerful (can see further) than refracting telescopes. ~~Reflecting~~ Refracting telescopes can come in many sizes whilst reflecting telescopes are often very large.

Sample C

4 marks

Some similarities and differences are outlined but there is lack of detail such as the types of lenses and which image is magnified. As such, it is worth a level two score of 4 marks.



*(b) Describe the similarities and differences between refracting telescopes and reflecting telescopes.

(6)

The similarities between refracting telescopes and reflecting telescopes is they both require an eyepiece or lens. Also they both amplify the image. But reflecting telescopes use mirrors and are cheaper to make than refracting telescopes. Also reflecting telescopes let in more light. Refracting telescopes are hard to make and expensive because for a good quality refracting telescope you must have big lenses which are extremly difficult and expensive to make.

Sample D

2 marks

The only difference given is between one using mirrors and the other using a lens. Magnification is hinted at but of what is not clear.

*(b) Describe the similarities and differences between refracting telescopes and reflecting telescopes.

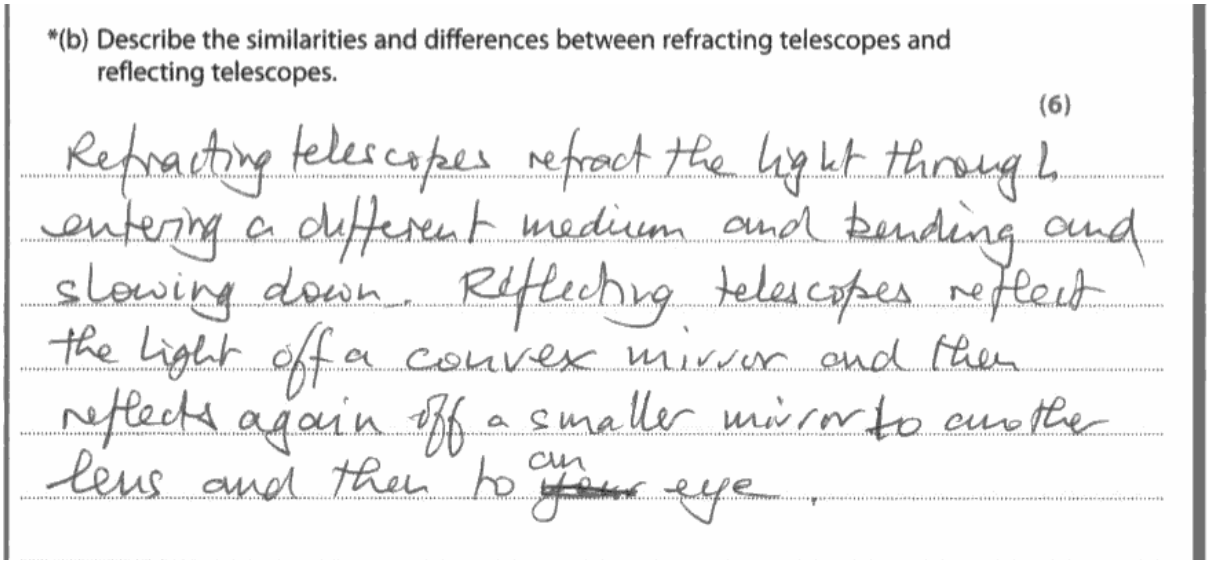
(6)

if you have a reflecting telescope the image will be reflected of mirrors to make the image bigger
And refracting telescope is where you see threw an objective lense So that will make the image bigger

Sample E

1 mark

This response gives a limited description of refraction at a single surface but does outline the construction of a reflecting telescope without specifying whether it is a similarity or a difference! The phrase 'another lens' leaves considerable ambiguity and restricts the level one score to 1 mark. It is, however, attempting to be relevant and is better than an answer which just defines reflection and refraction.



*(b) Describe the similarities and differences between refracting telescopes and reflecting telescopes.

(6)

Refracting telescopes refract the light through, entering a different medium and bending and slowing down. Reflecting telescopes reflect the light off a convex mirror and then reflects again off a smaller mirror to another lens and then to ~~your~~ an eye.

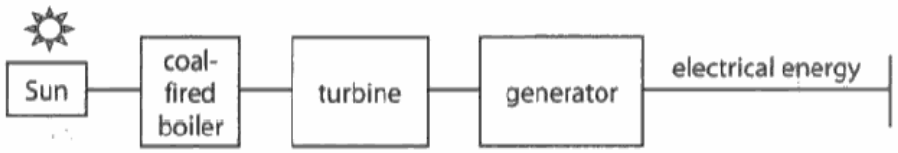
Exemplar Materials for Question 6(d)

Sample A

2 marks

This scored 2 marks, since all that was required at level one was either a mention of a type of energy in a named place or an idea of the same (or less) energy being transferred from one place to another. In this example, the second idea is given by '…..then the generator changes the energy in to electrical energy…..'

*(d) The diagram shows how some of the energy released by the Sun is converted into electrical energy.



A student boils some water using energy which came from the Sun.

Using the information in the diagram, describe the energy transfers involved in producing the electrical energy he used.

(6)

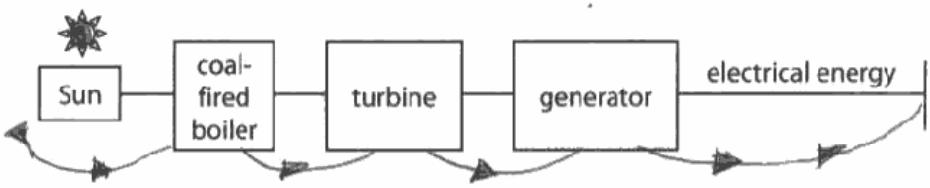
The turbine takes the steam from the boiler and transfers it in to energy then the generator changes the energy in to electrical energy to form power to the nation grids.

Sample B

1 mark

This also scored at level one but lack of clarity of expression restricted this idea of energy flow to 1 mark.

*(d) The diagram shows how some of the energy released by the Sun is converted into electrical energy.



A student boils some water using energy which came from the Sun.

Using the information in the diagram, describe the energy transfers involved in producing the electrical energy he used.

(6)

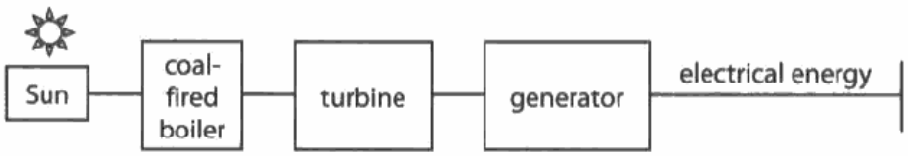
the student will loose most of the energy in the process because it has to go through 3 different parts of turning into ~~energy~~ energy for instead he will only get 84% of the energy he originally collects from the sun to boil the kettle or he may of used solar [redacted] pannals.

Sample C

4 marks

This has stepped up to level two because it includes some types of energy change but without clearly specifying where they occur to form the sequence needed of a level three response.

*(d) The diagram shows how some of the energy released by the Sun is converted into electrical energy.



A student boils some water using energy which came from the Sun.

Using the information in the diagram, describe the energy transfers involved in producing the electrical energy he used.

(6)

when the sun shines it heats up the water and boils it, thus creating steam. The steam the rises due to convection and travels to the turbine. The steam produced, will be able to turn the turbine and the turbine will then power the generator. The generator (which is a A.C current) will then produce electrical energy. The energy is transferred from heat energy to heat again, then Kinetic energy to, the Kinetic again, to end with elecerical energy.

heat → heat → Kinetic → Kinetic → electrica

↓

Sound (wasted)

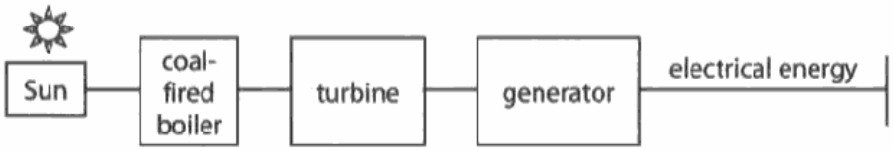
(Total for Question 6 = 12 marks)

Sample D

6 marks

This is a level three response which, although not perfect, contained sufficient and reasonably well explained information to show a sequence of energy changes and where they occurred.

*(d) The diagram shows how some of the energy released by the Sun is converted into electrical energy.



A student boils some water using energy which came from the Sun.

Using the information in the diagram, describe the energy transfers involved in producing the electrical energy he used.

(6)

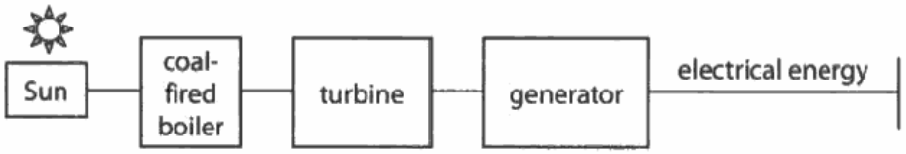
When the student boils the water, the water ~~is used to spin the t~~ will create steam, this is heat energy, the steam spins the turbines which is kinetic energy, the turbines spin the magnet in the generator which creates ~~steam~~ electricity, this is electrical energy. The energy that boils the water is solar energy. So it goes solar energy → heat energy → kinetic energy → electrical energy.

Sample E

5 marks

This response clearly shows a sequence of energy changes and has the idea of energy conservation (although imperfectly at times). Thus, it is acceptable for level three but is restricted to 5 marks by the inaccuracies.

*(d) The diagram shows how some of the energy released by the Sun is converted into electrical energy.



A student boils some water using energy which came from the Sun.

Using the information in the diagram, describe the energy transfers involved in producing the electrical energy he used.

(6)

Firstly the Sun would transfer heat and light into heat for the boiler then it would transfer heat into kinetic and some heat energy to power the turbine. then kinetic energy would be transfered into heat, chemical and electrical energy for the generator, which would use the electricale and heat energy to boil the water.