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Examiners' Report
March 2013

GCSE Physics 5PH1H 01

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Introduction

This exam covers the first unit of the specification. The unit is divided into six topics and all six topics are tested in the exam.

It is intended that the exam paper will allow every student to show what they know, understand and are able to do. To achieve this, each question increases in difficulty as the question progresses. This allows students of all abilities within the higher tier to have access to all the questions. Within the questions, a variety of question types are included, such as objective questions, short answer questions worth 1 or 2 marks each and longer questions worth 3, 4 or 5 marks each. The two 6-mark questions are used to test quality of written communication.

Successful candidates were:

- well-grounded in the fundamental knowledge required
- willing to think through the possibilities and apply their knowledge when the question asked for suggestions to explain new situations
- able to tackle calculations methodically and show the stages in their working
- able to construct their explanations in a logical order, using the marks at the side of the questions as a guide.

Less successful candidates:

- had gaps in their knowledge
- found difficulty in applying their knowledge to new situations
- did not do well in calculations involving changing the subject of an equation and did not show the stages in their working.

This report will provide exemplification of candidates' work, together with tips and/or comments, for a selection of questions. The exemplification will come mainly from questions which required more complex responses from candidates.

Waves and the Solar System

Question 1(a)(ii)

Most candidates knew that Galileo observed the moons of Jupiter.

Many candidates knew that his observation supported the heliocentric model but there were also many who clearly had difficulty in deciding between geocentric and heliocentric.

Question 1(a)(iii)

Although examiners were looking for simple descriptions of the differences in construction of reflecting and refracting telescopes, credit was also be given for answers that compared their performance in terms of light-gathering ability. Many candidates could only repeat the information in the stem by writing about a reflecting telescope reflecting light.

(iii) Describe how a reflecting telescope is different from the simple telescope which Galileo used.

(2)

A reflecting telescope uses mirrors within the telescope where as a simple telescope uses a lenses to gather light.

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This is a straightforward answer that scored both marks.

(iii) Describe how a reflecting telescope is different from the simple telescope which Galileo used.

(2)

a reflecting telescope has mirrors which help to see things better and give you a clearer image, and a bigger image.

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examiner comment

A mark was awarded for identifying mirrors in a reflecting telescope, but the rest of the answer was too vague to earn any credit.

(iii) Describe how a reflecting telescope is different from the simple telescope which Galileo used.

(2)

A reflecting telescope is different and better than a simple telescope because, a reflecting telescope gathers more light because it is easier to make large mirrors than large lenses.

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examiner comment

This is a very good answer, which explains why a reflecting telescope can perform better than a refracting telescope. It was awarded both marks.

Question 1(b)(i)

Most candidates knew what is meant by amplitude of a wave and, compared with previous series, there were far fewer candidates who confused amplitude with peak-to-peak value.

Many candidates also knew how to find the wavelength of a wave and so answered this part of the question correctly.

Energy changes

Question 2(a)(i)

The majority of candidates could identify the energy transfer in an electric motor, but there were many errors in identifying energy transfer in a generator and in a diesel engine.

Question 2(a)(ii)

Most candidates knew that non-useful energy transfers in this case were those that resulted in either sound or thermal energy.

Question 2(b)(i) and (ii)

The majority of candidates could interpret the Sankey diagram to find the energy wasted.

Most candidates could start to use the equation given to find the efficiency but many made mistakes in rounding their answer correctly.

(i) Calculate the amount of energy wasted in one second in the generator.

(1)

energy wasted = 100 kJ

(ii) Calculate the efficiency of the generator.

(2)

efficiency = (useful energy transfered by device) / (total energy supplied to the device) x100

= ~~1300~~ 1300 kJ / 1400 kJ x100 % = 13/14 = 0.93

efficiency of generator = 0.93

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examiner comment

This is a clearly laid out answer. The candidate started to express efficiency as a percentage but then finally choose to express it as a simple decimal fraction. This is perfectly acceptable. The value is given to the correct number of significant figures. This response was awarded full marks.

(i) Calculate the amount of energy wasted in one second in the generator.

(1)

energy wasted = 100 kJ

(ii) Calculate the efficiency of the generator.

(2)

$\frac{1300}{1400} \times 100$

0.92

efficiency of generator = 92%

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1 mark was awarded for part (i). In part (ii) the candidate used the correct equation and substituted the correct values. This scored the first mark. Unfortunately it looks as though the candidate then simply truncated the value shown on the calculator (92.8571, etc.) to the first two digits. This gave an incorrect answer and the second mark could not be awarded.

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Make sure that you know how to round the value shown on your calculator correctly.

Question 2(c)

The question had been about non-useful, wasted energy and examiners were looking for a suggestion that considered how this wasted energy could be best dispersed. Many candidates knew that black surfaces are good absorbers of radiated heat and tried to justify the electric motors being painted black in terms of them being able to absorb the wasted heat in some way. Others thought that the motor needed to keep as much heat as possible so as not to waste any. More able candidates could apply their knowledge of the behaviour of black surfaces to correctly suggest that such surfaces are best at emitting heat and so help to keep the motor cool.

(c) The electric motors which drive the wheels are painted black.

Suggest why the motors are painted black.

(1)

They are painted black because that way no heat energy is wasted as black absorbs heat and won't heat the generator quickly.

(Total for Question 2 = 8 marks)

ResultsPlus
examiner comment

This is an example of a very common, incorrect response. Possibly the candidate had confused this scenario with devices like solar heating panels, which are designed to absorb infrared radiation. The mark was not awarded.

(c) The electric motors which drive the wheels are painted black.

Suggest why the motors are painted black.

(1)

This is to that they will be able to absorb the heat to take it away from the wheels.

(Total for Question 2 = 8 marks)

ResultsPlus
examiner comment

This candidate has the idea of removing heat, but has applied this in the wrong context. It was a common misconception that the electric motor could act as a type of heat-sink. This response was not awarded a mark.

(c) The electric motors which drive the wheels are painted black.

Suggest why the motors are painted black.

(1)

So they radiate the heat they produce faster.

(Total for Question 2 = 8 marks)

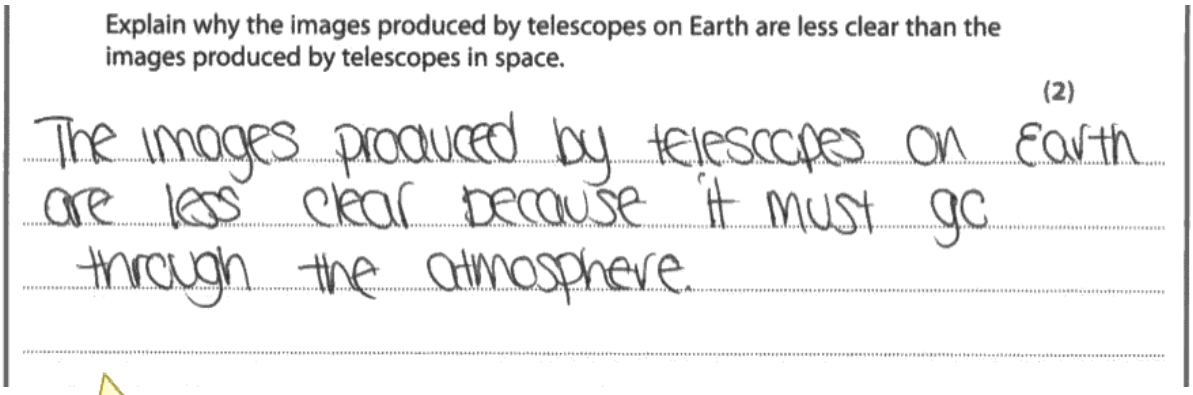
ResultsPlus
examiner comment

This is an example of a simple acceptable answer that was awarded the mark.

The Universe

Question 3(b)

There were several acceptable explanations as to why images produced by telescopes on Earth are less clear than telescopes in space. These included the absorption or scattering of light by the atmosphere and light pollution. Some potentially good answers were spoilt by not being sufficiently precise. It was common to see light being 'blocked'. There were also very many candidates who thought that telescopes in space were sufficiently closer to the stars to give them an advantage over telescopes on Earth. There was also some confusion about the term 'image'. Answers such as 'the image is blocked by the atmosphere' were common.



Explain why the images produced by telescopes on Earth are less clear than the images produced by telescopes in space.

(2)

The images produced by telescopes on Earth are less clear because it must go through the atmosphere.

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The atmosphere was identified but no reason was given as to why it would make images less clear. This response was therefore awarded 1 mark.

ResultsPlus
examiner tip

If a question is allocated 2 marks then your answer must make two points.

Explain why the images produced by telescopes on Earth are less clear than the images produced by telescopes in space.

(2)

The images produced by tele scopes on earth are not as clear because of light poloution and some of the ligne from space is absorbed in are atmosphere

ResultsPlus
examiner comment

The first part of the answer is not relevant here but it carries on to make a correct statement about the light absorbed by the atmosphere. This scored 2 marks.

Question 3(c)

Many candidates could interpret the diagrams of red shift in terms of galaxies moving. There was less clarity about what the galaxies were moving away from. Many thought that the galaxies were moving towards the red end of the spectrum. Most candidates failed to make any specific comment about position of the galaxies. Nevertheless, a great many knew that red shift is evidence of an expanding Universe and were given credit for this as an alternative to the galaxies moving at different speeds. It was a common misconception that the galaxies themselves were expanding.

The light from galaxy 1 and galaxy 2 both show redshift.

Explain what these redshifts predict about the position and movement of the two galaxies.

(3)

These redshifts predict that the two galaxies are moving away from the sun in our galaxy.

ResultsPlus
examiner comment

2 marks were awarded for the correct statement about the movement of the galaxies.

The light from galaxy 1 and galaxy 2 both show redshift.

Explain what these redshifts predict about the position and movement of the two galaxies.

(3)

The galaxies are moving away from us. as the light is shifted to the red end of the spectrum. The galaxies are far away from the sun.

ResultsPlus
examiner comment

2 marks were awarded for 'moving away from us'. The candidate has also tried to write about the position of the galaxies, but the answer does not give enough detail to get the third mark.

The light from galaxy 1 and galaxy 2 both show redshift.

Explain what these redshifts predict about the position and movement of the two galaxies.

(3)

These redshifts show that both galaxies are moving away from us. However the spectrum from galaxy 2 is more redshifted so it is moving away from earth faster than galaxy 1. Galaxy 2 might also be further away from earth which would allow the doppler effect to develop more.

ResultsPlus
examiner comment

This is an excellent response, which was awarded full marks.

Question 3(d)

Very many candidates were clearly engaged by the question and wrote confidently about stellar evolution of massive stars. There is good evidence that candidates were well prepared for this topic and there were far fewer incorrect classifications such 'red dwarf' stars than seen in previous examination series.

Earthquakes

Question 4(a)(ii)

Although many candidates implied that the plates moved relative to each other, there were many that thought that one plate slipped underneath the other. It was also not always clear that the movement was sudden.

(ii) An earthquake occurs.
Its epicentre is at the place marked E on the diagram.
Describe what happens at the plate boundary to cause this earthquake.

(2)

The plate boundaries will force past each other despite ~~causing a~~ high friction causing the tectonic plates to jerk and an earthquake to occur.

ResultsPlus
examiner comment

This is a good response. It has the idea of sudden movement at the plate boundary. 2 marks were awarded.

(ii) An earthquake occurs.
Its epicentre is at the place marked E on the diagram.
Describe what happens at the plate boundary to cause this earthquake.

(2)

The plates slide past each other which is caused by convection currents which then creates a earthquake.

ResultsPlus
examiner comment

This answer has the idea of movement but does not mention that this movement is sudden. 1 mark was awarded.

Question 4(b)(i)

There were several ways in which candidates could answer this question correctly. The most common route was to rearrange the given equation for wave speed to get an expression for time taken and then substitute the given values before evaluating. This gave a result of about 123 seconds, which is about 2 minutes. This does require three steps including transposition of a formula.

Another, perfectly acceptable route is to take the value of time given (2 minutes) and the distance, (80 km) and calculate the speed. This gives a result of about 0.67 km/s, which can be compared to the true value of 0.65 km/s. This only requires two steps and does not involve transposition of a formula. Candidates who are less confident about transposition would be advised to take this route.

(b) The earthquake causes seismic waves.

(i) S waves are one type of seismic wave. They travel at 0.65 km/s.
There is a seismometer 80 km away from point E.
Show that it takes about 2 minutes for the S waves from the earthquake to reach the seismometer.

(2)

Time = Distance / speed

= 80 km / 0·65 km/s = 123·076923 seconds

123·076923 seconds = 2 Minutes 3 seconds.

ResultsPlus
examiner comment

This is a clearly laid out answer, which scored 2 marks.

(b) The earthquake causes seismic waves.

(i) S waves are one type of seismic wave. They travel at 0.65 km/s.
There is a seismometer 80 km away from point E.
Show that it takes about 2 minutes for the S waves from the earthquake to reach the seismometer.

(2)

0.65 km/s = 650 m/s 2 min = 120 s

Wave speed = Distance / Time Distance = Wave speed x Time.

650 x 120 = 78000 = 78 km

ResultsPlus
examiner comment

This is an example of an alternative route, which correctly transposes the equation and substitutes given values to arrive at a distance which is approximately 80 km. This response was also awarded 2 marks.

(b) The earthquake causes seismic waves.

(i) S waves are one type of seismic wave. They travel at 0.65 km/s.
There is a seismometer 80 km away from point E.
Show that it takes about 2 minutes for the S waves from the earthquake to reach the seismometer.

(2)

Speed = distance / time

80 / 120 = 0.66 = 0.65

ResultsPlus
examiner comment

Another method is to calculate the speed given the distance of 80 km and the approximate time of 2 minutes. This gives an answer which is approximately 0.65 km/s. This answer scored 2 marks.

Question 4(b)(ii)

There was much uncertainty about how seismometer readings can be used. On the simplest level, answers would mention the idea of using time and speed to calculate distance, but this was often expressed as using the time taken for the P or S waves to arrive. Only the more able candidates could correctly write about the difference in recorded time of arrival of the two types of waves. Many candidates seemed to know about triangulation (even if they did not quite express it in those terms).

(ii) P waves are another type of seismic wave.
They travel about 10 times more quickly than S waves.

Describe how scientists can use seismometer records of P and S waves to locate the epicentre.

(3)

They can use the seismometer recordings and use them in the method of triangulation to find the epicentre, which is using radius's of 3 different recordings to find the epicentre of the earthquake using circles from the radius's to find a meeting point of them all which is the epicentre.

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The candidate clearly has the right idea of triangulation but fails to mention anything about how the distance from seismometer to epicentre is calculated. The answer was awarded 1 mark only.

(ii) P waves are another type of seismic wave.
They travel about 10 times more quickly than S waves.

Describe how scientists can use seismometer records of P and S waves to locate the epicentre.

(3)

scientists find the difference in arrival times between P and S waves and use this to calculate the distance from the seismometer. They then use triangulation and draw as distance arc from at least 3 seismometers and where the arcs all cross is the epicentre.

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This is a much better answer, which clearly explains how the readings are used. It then goes on to describe triangulation to score all 3 marks.

Question 4(b)(iii)

There are many accounts of some animals behaving as if forewarned of an earthquake. Candidates were asked to suggest an explanation. Examiners were looking for the ability to use given information in an unfamiliar scenario. Credit was given for recognising that sounds produced by an earthquake would be below the human audible range but quite possibly within the audio range of some animals. More able candidates could then go on to explain that if low intensity (P) waves could be detected before the more destructive S waves then some early warning could be possible.

(iii) Seismic waves have a frequency of about 15 Hz.
P waves have a much smaller amplitude than S waves.

Some people claim that animals can detect an earthquake before people are aware of it.
Suggest an explanation for this.

(2)

15 Hz is below the normal range of human hearing 20 Hz. Animals can hear the waves because the frequency is within their range of hearing.

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This response communicates the idea of animals being able to hear frequencies below the human audible range so scored 1 mark.

(iii) Seismic waves have a frequency of about 15 Hz.
P waves have a much smaller amplitude than S waves.

Some people claim that animals can detect an earthquake before people are aware of it.
Suggest an explanation for this.

(2)

15Hz is below the hearing of humans, as human hearing is 20Hz - so this is infrasound. Many animals such as Elephants and tigers communicate long distances via infrasound, so animals can possibly detect earthquakes before humans.

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Credit was given here for the correct use of the term 'infrasound'. Another mark was given for the suggestion that some animals can hear infrasound and therefore hear the sound waves produced by the earthquake before humans. The answer therefore scored both marks.

(iii) Seismic waves have a frequency of about 15 Hz.
P waves have a much smaller amplitude than S waves.

Some people claim that animals can detect an earthquake before people are aware of it.
Suggest an explanation for this.

(2)

15 HZ is too low for humans to hear but animals could usually hear it. This means they can notice the P waves long before the more dangerous S waves arrive

(Total for Question 4 = 10 marks)

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This is a clear answer. Although it does not mention the term 'infrasound', it has the idea that detection of low amplitude P waves before the arrival of the destructive S waves would be a possible explanation. It also makes the point that humans cannot detect sound waves with a frequency of 15Hz. Both marks were awarded.

The electromagnetic spectrum

Question 5(b)

Most candidates were able to place the three types of radiation in their correct positions in the Venn diagram.

Question 5(d)

The most common answers described the use of gamma radiation to treat cancer by destroying the cancerous cells. The next most popular uses were sterilisation of surgical equipment and preservation of food by irradiation. Both of these use the gamma rays to destroy micro-organisms.

To get both marks the answer had to not only give the use but also provide some detail about how the gamma rays achieved the purpose.

(d) Describe a use of gamma radiation.

(2)

Gamma radiation can be focused into the body where cancer cells are located and kill them.

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This is typical of an answer that gained 2 marks.

(d) Describe a use of gamma radiation.

(2)

gamma radition can be used to ✱ sterlise surgical equipment

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1 mark was awarded for stating a use of gamma radiation.

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Answers allocated 2 marks normally need two facts linked together. If the candidate had gone on to write about killing microbes on the equipment then the second mark would have been awarded.

(d) Describe a use of gamma radiation.

(2)

gamma rays can be used to sterlise food.
gamma can be used to treat cancer

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Although two different uses are stated, neither of them is described. The two facts are not linked together so the answer can only score 1 mark.

Question 5(e)

Many candidates were well prepared for this question and could give very detailed accounts of these two classic experiments. The question asked for 'how' the results were interpreted. Some candidates allowed themselves to wander slightly and give historic details including dates and locations. Such answers tended to start to run out of space and became less detailed towards the end.

Nevertheless, a great many candidates were able to describe the results in terms of the initial data obtained, the trend or pattern of results observed and then how each experimenter went on to obtain further results from outside of the visible spectrum. These results were then interpreted as evidence of infrared and ultraviolet radiation. Less able candidates would either not describe the results in sufficient detail or would not mention that results were obtained from outside the visible spectrum. This type of response was typical of a Level 1 or Level 2 answer. More able candidates gave a very full and clear explanation.

*(e) Herschel and Ritter carried out experiments that contributed to the discovery of infrared and ultraviolet radiation.

Explain how the results of the experiments carried out by Herschel and Ritter led to these discoveries.

(6)

Herschel was ~~looking at~~ studying the telescope and increase with his he wanted to know if any other colours existed so he had all the colours in a machine and put a thermometer in the purple end of ~~a~~ the spectrum which gave out a low reading. When he placed the thermometer in the red end of the spectrum, he ~~relea~~ realised that the temperature was most hot here this led to the discovery of ~~ultr~~ infrared radiation. Ritter heard of Herschel's discovery and set out to carry his own he looked at ~~colours~~ visible light through a glass block and released that a colour of violet had appeared this led to Ritter discovering ultraviolet radiation.

(Total for Question 5 = 12 marks)

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This answer gives a limited account of Herschel's experiment, which does not mention any readings from outside the visible spectrum. It is a Level 1 response with an appropriate quality of written communication and was awarded 2 marks.

*(e) Herschel and Ritter carried out experiments that contributed to the discovery of infrared and ultraviolet radiation.

Explain how the results of the experiments carried out by Herschel and Ritter led to these discoveries.

(6)

Herschel split the spectrum and put thermometers on each colours so he could find out which colour gives off the most heat and he found out that the last colour Red is the hotest so he discovered infrared. Ritter was doing the same experiment but with Silver chloride to see which colour turns it black the quickest to his amazement he found out the colour violet did so he put the Silver Chloride a little after before violet and that was the quickest so he had discovered ultra-violet **(Total for Question 5 = 12 marks)**

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This is a simple description of both experiments with a little more detail about Ritter's experiment. It is a Level 2 response, which was awarded 4 marks and could have scored better with more detail about Herschel's experiment. Once again, the quality of written communication is acceptable for this level.

*(e) Herschel and Ritter carried out experiments that contributed to the discovery of infrared and ultraviolet radiation.

Explain how the results of the experiments carried out by Herschel and Ritter led to these discoveries.

(6)

Herschel used a prism to separate visible light into the seven colours of the spectrum (He knew a prism did this). He then measure how hot each colour was by using a thermometer. He discovered that the temperature increased towards the red end of the spectrum. Finally he measured beyond red, where he couldn't see anything, he found it was even hotter, thus, Infrared, an invisible, previously unknown radiation. Ritter wanted to find out if there was anything on the other side of the spectrum. He knew that silver chloride turned black when exposed to light. In a darkend room, he used a prism to split visible light into the seven colours. He then measured how fast the silver chloride coated strips turned black when exposed to light. He found they turned black quicker towards the blue end. Finally, he timed how long it took just beyond violet and found it was even quicker. He discovered UltraViolet. A previously unknown, invisible type of radiation.

(Total for Question 5 = 12 marks)

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examiner comment

This is a very clear Level 3 answer which scored all 6 marks.

Generating electrical energy

Question 6(a)(i)

Candidates were required to make a recommendation based on data extracted from a graph. Examiners were looking for evidence of data being used. Many candidates gave simplistic responses such as 'A is more powerful than B' and failed to score the mark.

(i) Use the data in the graph to recommend the best turbine for Eric's barn.

(1)

The best turbine is A because it creates the most energy output.

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There is no evidence that the candidate has used data from the graph beyond noticing that the curve for A is above the curve for B.

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Read the question carefully. If the question asks you to use data then you need to show that you have done so. The best way is to quote values taken from the graph.

(i) Use the data in the graph to recommend the best turbine for Eric's barn.

(1)

The best turbine is A because turbine B only produces 5200 kw of energy at 13 mph, where turbine A produces enough.

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This candidate has supported the recommendation with data taken from the graph. This answer gets the mark.

Question 6(a)(ii)

Most candidates found this calculation straightforward and arrived at the correct answer of £840. There were many, however, who overcomplicated their calculation by trying to include conversion of years into days or divide kWh by minutes or seconds. These responses did not use the given equation correctly and so scored no marks. Other candidates used the equation correctly but made an error in their final step of converting pence into pounds. In such cases if the candidates showed their working then they scored 1 out of the 2 marks for this question.

Question 6(a)(iii)

A great many candidates were able to give a clear statement in words about how to calculate payback time. There were, however, a large number who found this too challenging.

(iii) Eric looks at the cost of installing the turbine.

State how he should work out the payback time.

(1)

how much it cost to install ÷ the annual saving = amount of payback years

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This is a clear, correct answer, which gained the mark.

Question 6(a)(iv)

Many candidates attempted to answer this question in terms of the inconveniences of energy-efficient lamps such as the time taken for them to reach full light output or their initial cost. More able candidates realised that halogen lamps produced more heat than energy-efficient types but did not go on to say why this might be a disadvantage in this situation. Nevertheless, there were a large number of candidates who could identify that, in this case, the heat was not being wasted but was actually a benefit. This was normally expressed in terms of the health of the chicks, but a small number of strong candidates did suggest that Eric would have to provide an additional source of heat if he were to change the lamps.

(iv) The chicks need to be kept warm at all times.
Eric uses halogen lamps to provide heat and light for most of the day.
Eric thinks about changing his halogen lamps for energy saving lamps.
Suggest why this might not actually be a benefit.

(2)

Because halogen lamps give out some thermal energy as well, whereas energy saving lamps do not.

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This answer makes the point about halogen lamps producing heat energy. It does not go on to say why this may be important in this situation. 1 mark only was awarded.

(iv) The chicks need to be kept warm at all times.
Eric uses halogen lamps to provide heat and light for most of the day.
Eric thinks about changing his halogen lamps for energy saving lamps.
Suggest why this might not actually be a benefit.

(2)

This may not be a benifit as the halogen lamps emit more heat than the energy saving ones, so it can keep the chicks warmer than energy saving lamps can

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This response links the reduction of heat produced by energy-efficient lamps with the fact that, in this situation, the heat energy is required rather than just being unwanted waste. 2 marks were awarded.

(iv) The chicks need to be kept warm at all times.
Eric uses halogen lamps to provide heat and light for most of the day.
Eric thinks about changing his halogen lamps for energy saving lamps.
Suggest why this might not actually be a benefit.

(2)

Energy saving lamps cost more money than ordinary bulbs. Also energy saving bulbs produce less heat than halogen lamps.

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This response correctly identifies the heat produced by halogen bulbs. The fact that energy-saving lamps cost more than halogen lamps is not, on its own, sufficient reason unless potential savings are also evaluated. 1 mark only was awarded.

Question 6(b)

It was disappointing that, given the amount of popular interest in this important topic, candidates did not have a better understanding of the principles involved. There was a considerable amount of confusion in many of the answers. Solar power was often described in terms of using the Sun to heat up water so that it could drive a turbine or provide hot water for domestic use. Hydro-electric power was often described in terms of wave power or, quite frequently, wind turbines. There were also many examples of candidates confusing it with fuel cells. Examiners were looking for answers which not only displayed an understanding of the relative merits and problems of each energy resource, but could also evaluate them in terms of large-scale use.

*(b) There are several large-scale energy resources which are suitable alternatives to fossil fuels in some situations.
Two of these alternatives are hydro-electric power and solar power.

Compare hydro-electric power with solar power as energy resources for the large-scale generation of electricity.

(6)

Although hydro-electric power and solar power reduce the chance of damaging our enviromer and less greenhouse gases, they can be expensive and only work in suitable climates. Solar power is good for producing electricity when there is a lot of sun but probably not good to use as your only source of electricity. It's the same with hydro-electric powe- it only produces electricity when there is a lot of water/rain. So it's nearly impossible to rove it as your only soura of energy.

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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This answer correctly identifies the benefits of both energy resources in terms of reduction of greenhouse gases. It also mentions a drawback of each. Although there is some reference to the need for suitable locations, it does not go on to discuss large-scale generation of electricity. This is a Level 2 answer which scored 4 marks.

*(b) There are several large-scale energy resources which are suitable alternatives to fossil fuels in some situations.
Two of these alternatives are hydro-electric power and solar power.

Compare hydro-electric power with solar power as energy resources for the large-scale generation of electricity.

(6)

hydro-electric powes is a good source because you will never run out of water and you can use it everyday no matter the weather, you can also use it at night because it will always be there. But solar power can be used all day that alright but sometimes ~~not~~ if the weather is ~~so~~ really bad or we have a solar eclipse they can not be used, also they can not be used at night unlike the hydroelectric power, over all they are both great energy sources but I believe that hydroelectric is better.

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

ResultsPlus
examiner comment

This response attempts to make comparisons between the two energy resources in terms of their relative availability. There is some confusion about solar power but just sufficient description to reach Level 1. 2 marks were awarded.

*(b) There are several large-scale energy resources which are suitable alternatives to fossil fuels in some situations.
Two of these alternatives are hydro-electric power and solar power.

Compare hydro-electric power with solar power as energy resources for the large-scale generation of electricity.

(6)

Solar panels can be a good source of renewable energy but it will only make a great amount of energy if you are in a sunny place, because it relies on the weather it is very unreliable. Hydro-electric power is where you get water to spin a turbine as it goes through. This relies of on a lot of water being kept in one place.

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

ResultsPlus
examiner comment

This is another Level 1 answer. The candidate identifies an advantage and a disadvantage of solar power but does not make a valid comparison with hydro-electric power. 2 marks were awarded.

*(b) There are several large-scale energy resources which are suitable alternatives to fossil fuels in some situations.
Two of these alternatives are hydro-electric power and solar power.

Compare hydro-electric power with solar power as energy resources for the large-scale generation of electricity.

(6)

Hydro-electric power is useful in some areas because of the wind speed. However ~~if they~~ are if the turbines are not kept turning constantly at a good enough speed then they won't produce enough energy for the large-scale generation of electricity. Solar panels are widely used by the public. But they cannot work without the sun. When it is sunny the right amount of solar panels can produce enough electricity for large-scale generation, however they don't work well without the sun.

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

ResultsPlus
examiner comment

This candidate has confused hydro-electric power with wind power. There is mention of a limitation of solar power but no benefit or advantage of solar power is given. This answer could not be awarded any marks.

ResultsPlus
examiner tip

It is a good idea to stop writing after the first sentence and just check that you are answering the question.

*(b) There are several large-scale energy resources which are suitable alternatives to fossil fuels in some situations.
Two of these alternatives are hydro-electric power and solar power.

Compare hydro-electric power with solar power as energy resources for the large-scale generation of electricity.

(6)

Hydro-electric power is building a dam across a river and allowing water to flow through to turn a wheel to provide electricity, solar power is placing to harnessing the suns energy to provide electricity, there are pros and cons to both of them. For example neither of them release any pollutants into the atmosphere such as carbon dioxide and sulfur dioxide. Hower hydro-electricity is unsuitable for many areas of the UK as they don't live near bodies of water suitable and solar energy requires Sun which isn't always availble in the UK. Hydro-electricity is also costly and could damage the environments of many rivers. The time spent building the dam could also mean pollutents are produced and non-renewable resources used. Both alternatives don't use need fuel costs, in conclusion I think solar power is better

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

ResultsPlus
examiner comment

In this answer there is good discussion of advantages and disadvantages of both types of energy resource. The answer also considers large-scale use, particularly with regard to suitable sites in the UK. This is a Level 3 response. The quality of written communication is appropriate for this level. It scored 6 marks.

Summary

Based on their performance on this paper, candidates should:

- make sure that they have a sound knowledge of the fundamental ideas in all six topics
- get used to the idea of applying their knowledge to new situations
- show their working at each stage of a calculation
- make sure that they know how to round values from a calculator to the correct number of figures
- use their time effectively by writing answers appropriate to the command words such as: **state**, **describe**, **explain**
- read the question carefully and underline the key words, for example ‘large-scale use’ in Q6(b).

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