RECOGNISING ACHIEVEMENT

GCSE

Physics B J645

Gateway Science Suite

General Certificate of Secondary Education

Report on the Units

January 2009

J645/MS/R/09J

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GCSE Gateway Physics B (J645)

REPORT ON THE UNITS

B651/01 Unit 1: Modules P1, P2 and P3 Foundation Tier

General Comments.

The paper performed well with a high mean of 38.5 and a standard deviation of 6.5. It proved accessible to all, with all questions being answered. The paper had a lowest mark of 2 and a highest mark of 54. In general, centres entered candidates for the correct tier although there were several candidates scoring over 50 who would perhaps have been better on the higher tier. This is a small entry paper (428 entries) and there were very few weak candidates with only 5 candidates scoring below 20 marks. There was no evidence that the paper was too difficult or too easy and candidates were able to complete the paper in the time allocated.

Comments on Individual Questions

SECTION A - MODULE P1

Question 1
Part (a) was answered correctly by the majority of candidates however a significant number of candidates chose the glass of water, possibly misreading the question, as coldest.

Part (b) was again well answered with freezing being a common wrong answer.

Question 2
Parts (a) and (b) were answered well with about 75% of candidates giving the correct answer. For some reason, in part (a) a significant number of candidates thought that glass was a conductor. Most candidates gave a correct form of insulation in part (b), double glazing being the most popular.

Part (c) proved more difficult. About 50% of candidates answered the question correctly. The most common error was to divide 40000 by 10000 giving an efficiency of 4. The other, less common, error was concerning units – or the lack of them. The answers that were accepted were 0.25 (on its own) or 25%. Answers of 25 (on its own) or 0.25% did not receive the answer mark but still received the working mark.

Question 3

3 (a) proved more difficult than expected. Examiners were lenient and allowed any arrow up to 45 degrees from the vertical, however only half the candidates correctly drew this arrow.

Candidates were able to explain that radiation (heat) reflected off the foil back into the room. Several candidates described the radiation as ‘bouncing’ off the foil and it would have been far better if scientific terminology were used.

Well above half the candidates correctly answered 3 (c). Examiners were looking for a graph that started at the same temperature and was above the other curve **and** always decreasing.

Question 4
Part (a) proved difficult with only 1 in 5 answering this question correctly. Examiners were looking for the idea that microwaves penetrated about 1cm into the potato whereas the infra red from the conventional oven was absorbed by the surface. Common errors were that the microwaves pass through the potato and that microwaves cook from the inside out. About a

third of the candidates were able to give another use for microwaves, with many giving a similar use of defrosting or reheating.

In part (b) the majority of candidates gave two correct effects of ultraviolet rays and could explain how to reduce these effects.

Question 5
Similar questions to this have appeared on past papers but surprisingly only half the candidates were able to answer correctly. Many candidates thought D was a crest and gave half a wavelength instead of a full wavelength in part (ii).

In part (b) candidates could not explain what was meant by a digital signal.

SECTION B - MODULE P2

Question 6
In 6(a) a common error was to put electric instead of direct for the type of current.

In part (b) candidates should try to use the scientific answers in the specification. Far too often vague answers were given such as renewable, environmentally friendly, free, cheap etc. These were not credited as more detail was needed. For example: renewable *energy source,* no polluting gasses formed, does not use fossil fuels, no carbon dioxide made , *energy source is* free, the Sun's energy does not cost anything ,etc. Disadvantages were frequently omitted but the most common one was does not work at night.

Question 7
This concept seems to prove difficult however the question is phrased. Examiners were looking for two simple statements: move the magnet to the coil, and move the coil to the magnet. The majority of candidates gave the first answer only.

Question 8
8 (a) was the best answered question on the paper with 90% of candidates scoring both marks.

Part (b) however proved difficult. The equation for electrical energy was given at the front of the examination paper and candidates could have scored 1 mark for multiplying 5 by 3 or just stating 15 units of electricity used. The other mark was for multiplying 15 by 12 to give 180 pence. The correct answer on its own scored 2 marks.

Question 9
Candidates were able to identify other types of object found in the universe in part (a) but few were able to explain how our Earth-Moon system could have been formed. The majority of incorrect answers thought that part of the earth had broken off when something hit the Earth.

Question 10
This proved a straight forward question with over 90% scoring full marks.

Question 11

The majority of candidates were able to identify the three types of nuclear radiation correctly. Of those who made a mistake the most common incorrect answer was x-rays.

SECTION C - MODULE P3

Question 12
This question was answered well by all candidates with most scoring full marks. Candidates were able to identify the instruments used to measure time and distance, although a few candidates still wrote metre stick as the measuring device.

In part (b) candidates were able to calculate the speed of the runner correctly.

Candidates were also able to interpret the graph correctly in part (c).

Question 13
In part (a) the majority of candidates chose the correct equation and successfully calculated the accelerating force.

Part (b) proved more challenging with many candidates missing the important word *'increase',* which was emboldened. Speed was a common incomplete answer, examiners were looking for an increase in speed and an increase in mass, the latter being a rare answer.

The majority gave a correct answer to part (c) although there were several strange answers such as uranium. Oil was the most common incorrect answer.

Question 14
Overall this question was answered well. The majority of candidates were able to identify three safety features in part (a) and were able to complete the sentences in part (b) correctly. The most common error was to think that power was measured in Joules in part (b).

Question 15
Candidates achieved 80% of the marks on this question. Candidates knew that Britney's speed increased after she left the plane and knew that gravity was causing this increase in speed.

In part (c) the majority stated correctly that air resistance or drag slowed her down but a significant number of candidates thought incorrectly that wind resistance slowed her down.

B651/02 Unit 1: Modules P1, P2 and P3 Higher Tier

General Comments

The candidates performed very well in the Higher Physics paper. Clearly they had been prepared thoroughly for the examination. The paper was accessible for the candidates. The mean mark was very close to that in June 2008. There were very few questions, or parts of questions, that were unanswered, candidates generally felt that they could attempt the question. The level of differentiation was very good in the vast majority of questions. The exceptions to this being 3(a) (i) & (ii) where the concepts of 'intensity' and 'phase' were poorly understood, even from able candidates although it should be noted that these are 'Higher Tier' ideas and not accessible by all candidates.

This was the first session where the number of objective questions was reduced and this may have presented difficulties for the C / D candidates. However, the performance of candidates stood up well across the grade range, especially in view of the fact that there were several areas of the specification examined that had not been tested previously or at least not in such depth for example the question on the formation of the Moon and related evidence [question 9 (a) & (b)] and on ABS [question 14(a)]. Also some of the calculations caused difficulties;

- cost of electricity calculations (question 7) continue to prove problematic for many candidates
- 'two stage' calculations like the one in question14(b) produce a poor return for many candidates

Centres should strongly encourage candidates to quantify (in a descriptive way) answers that are about increase or decrease such as the responses required in questions 8(a) and 13(b), and to a lesser extent 15. In this type of question merely writing 'coils' [8(a)] or 'mass' [(13(b)] whilst not totally incorrect is not **enough** to answer the question fully.

Nevertheless the performance across the three units, P1, P2 and P3, was consistent showing that the teaching had been complete in the modules of the specification being tested.

Comments on Individual Questions:

SECTION A - MODULE P1

Question 1

(a) The vast majority (almost 90%) of the candidates gained this mark and were off to a sound start. Where no mark was gained candidates failed to mention colour, e.g. 'different parts of the skin have a different temperature', 'they show up differently or in shades of grey'.

(b) Similarly a good response in the first calculation where almost 80% secured both marks with a clearly presented calculation and the correct answer. One mark answers usually had the decimal point in the wrong place or included unsuccessful attempts to convert grams to kilograms. Zero scores were due to multiplying energy supplied by the mass.

Question 2

(a) The vast majority secured this mark with ease, wrong answers usually gave a reflective material or simply 'draught excluders', which would reduce energy loss but did not answer the question.

(b) Excellent responses in the main, many candidates **correctly** and **clearly** giving <u>both</u> 0.25 and 25%. Where no mark was gained candidates reversed the fraction (answer = 4) or used 50 000 joules as the total energy used.

(c) This question differentiated very well. A little under half of the candidates gained full marks whilst one in five failed to register anything. The very best answers often struck straight at three out of the first marking points in the first two lines of the answer. Many candidates made incorrect references to <u>density</u>; some wrote about the density of the **particles** while others reversed the correct order (e.g. less dense air falls). Poor answers were mainly about the circulation of the convection current and rarely gained more than one mark which was almost always for the 'air gains energy / heats up' marking point.

Question 3

(a) (i) The concept of **intensity** is a difficult one to express, certainly all but the most able candidates tried but failed. Most of the acceptable answers were for 'concentrated' rather than 'bright'. Powerful, focused or travels a long way were frequent answers that did not score the mark. Just over ¼ of the candidates gained this mark.

(ii) In a similar vein this question resulted in a selection of poor and incorrect answers. Many gave the 'in sync.' answer that was not acceptable for the mark or just stated the waves had the same frequency and / or wavelength. Often a vague answer was rescued at the very end with an adequate diagram. It should be noted that both parts of question 3(a) were aimed at the Higher Tier and it should not be anticipated that the vast majority of candidates will be able to gain the marks in this type of question.

(iii) As to be expected a much higher rate of success was seen in the last part of 3(a). Descriptions were often good, sometimes with too much detail whilst incorrect answers went down the route of **switching** on and off or mentioned that digital was 'better' than analogue or that digital did not 'pick up' interference. Similar to part (iii) a diagram often quickly secured the mark.

(b) (i) This type of question usually brings a higher success rate. Possibly with it being only a one mark question this meant that a reasonable statement could be undone by including an incorrect one. Cooking from the centre and microwaves going straight through the potato were common errors. Less common but still seen regularly were answers about the reflection of the microwaves. The mark for infrared only heats the skin or outer part was hardly even awarded.

(ii) This mark was gained much more readily than the previous one although it was often for the mark scheme 'allow' of <u>heat</u> reflection rather than reflection of microwaves.

(iii) A high success rate but 25% of the candidates failed to secure this mark, often giving another heating application or 'radio' without mentioning satellite or digital signals.

Question 4

(a) A poor response from too many candidates considering this is a Higher Tier paper and the question was only targeted at D-grade. Less than half of the entry scored this mark. Too many candidates did not use a ruler which did not help their answers. However, too many reflections was the main error, other candidates did not gain credit due to the rays penetrating the side of the fibre at a point or points of reflection.

(b) Although the second mark was usually gained the first part brought poor responses with no real pattern to the errors. The candidates failed to appreciate that they needed to give the names of two acceptable media in this part of the question. Consequently only 20% gained both marks, again surprising when it was aimed at C-grade.

Question 5

(a) Both parts brought some good response with a higher success rate in the second part. This was often due to potentially good answers in the first part adding information about contributions to the greenhouse effect or global warming thereby undermining previous good work.

(b) The omission from answers in this part of question 5 was ‘UV’. ‘Harmful radiation’, whilst not incorrect, was insufficient to gain any credit. Three-quarters of the entry were awarded this mark.

SECTION B - MODULE P2

Question 6

Candidates often found the difference between the two parts of this question difficult or too subtle to separate. In (a) candidates were asked to describe one **advantage** and one **disadvantage** of using photocells in a specific application. On the other hand in (b) they were asked to suggest two causes for a fall in **output** of the photocells. Often candidates repeated part of their answer from (a) in the second response and this sometimes brought reward depending on the answer as there was inevitably a degree of overlap between the acceptable answers for each part. The first part was targeted at Standard Demand whilst the second part was more demanding being targeted at High Demand.

(a) Most candidates gained at least one mark (almost 90% scored one or two) poor responses were vague giving; ‘no pollution’ or ‘it’s cheap’ as an advantage and ‘relies on the sun’ or ‘do not work in bad weather’ as a disadvantage.

(b) As could be expected there was a drop in the number of candidates gaining two marks (16%) compared to part (a). However, only 17% failed to gain any credit and this more demanding part of the question differentiated well. Candidates often gave two answers that hit the same marking point and failed to address the two points in the specification, namely:
- o reduction in light intensity
- o reduction in exposed surface area

It should be noted that these statements alone were insufficient as the answer had to be in the context of the question and **reasons** for the reductions were required.

Question 7

Whilst it could be expected that almost all candidates would gain both marks in this type question they appear to find great difficulty with the cost of using electricity calculations. Errors usually ensue when trying, quite unnecessarily, to convert kW to watts or hours to seconds. Hence there was a surprisingly low number, about two-thirds, of candidates gaining both marks. Centres need to keep stressing the unit of **kilo**watt **hour** so that there can be an improved mark level in this Standard Demand topic.

Question 8

(a) A lot of good answers in this part of the question, most along the lines of more coils and stronger magnet although moving the coil and / or magnet faster and, to a much lesser extent, inserting an iron core were responses given by some candidates. Where candidates only gained one mark (22% of the entry) or zero (13%) it was inevitably because the change was not quantified in any way, e.g. ‘the coils’ or ‘the speed of the magnet’. Too many stated ‘bigger’ magnet and reduced the potential attainment.

(b) (i) A poor success rate in the first part (< 40%) where many candidates favoured 'B' as the answer.

(ii) The term 'cycle' in the second part was understood much better and almost 70% were awarded the mark.

(iii) A very good level of discrimination in this question with the candidates who scored one mark or zero giving a wrong time interval or failing to quantify the frequency of **4** in their answer. The very best answers referred back to the context of the question to answer in terms of cycles of AC.

Question 9
This is a new area of the specification to be tested and produced mixed success, especially in (b).

In (a) the main faults were not to specify, or wrongly specify, what collided with Earth and to write about a 'large chunk' that went on to become our Moon. Approximately half of the entry failed to register a mark which was disappointing.

Part (b) was targeted at the highest grade, approximately two thirds of the answers given were not worthy of a single mark. An answer such as; '*astronauts have brought back rocks from the Moon✓ and they are similar to rocks on Earth✓*', would have secured both marks. Poor answers included ideas about materials on the Moon having low boiling or melting points whilst too many said that the oxygen content is similar. The Moon having no water due to high temperatures produced in a collision and craters on the Moon were other common erroneous answers. A significant number wrote about the Big Bang.

Question 10
It was anticipated that this question would be well answered and that proved to be the case although there was a measure of differentiation with one in five candidates scoring one or zero.

Question 11
This was another topic in the specification not previously assessed to this degree and candidates struggled with less than 20% scoring both marks. Often answers only mentioned 'radiation' or 'radioactivity' without saying what problem it caused. Those that did identify a problem rarely went on to provide an associated or linked explanation. The most frequent route to a mark was to mention radiation (not worthy of credit on its own) then go on to provide an acceptable explanation as allowed in the Mark Scheme.

SECTION C - MODULE P3

Question 12
(a) Very few candidates failed to gain both marks.

(b) A similar success rate to (a) in the second part although some gave 'decreases' or 'stays the same' in the first part.

(c) (i) and (ii) These parts continued the high level of attainment in (a) and (b) although some undid potentially good answers by adding 'at constant speed' in one or both parts.

(iii) Too many candidates merely gave 'speed x time' or the better response 'average speed x time' and did not gain the mark. The candidates needed to answer in terms of the area under the **graph** to secure the mark. This question discriminated well for a one mark question targeted at C-grade.

Question 13
(a) Another calculation that candidates on the Higher Tier found relatively easy and 86% gained both marks. The error for the rest was to square the acceleration and end up with an answer of 10 800 N.

(b) As mentioned in the general comments candidates were often not specific enough to gain maximum credit. Answers were often only in terms of ‘mass’ or ‘speed / acceleration’ rather than stating an increase. Also, they often failed to make it clear if a mass increase was to the existing car (e.g. adding objects in the boot) or if they were using a different car (e.g. using a more powerful engine in the car) which is not what the question intended. References to going down hill and streamlining did not gain credit.

Question 14

(a) Yet again this question sought to assess in some depth an area of the specification not visited in previous examination papers. The question was aimed at the higher grades and differentiated very well with the numbers gaining three, two or one marks being fairly evenly distributed. A smaller proportion scored zero. Errors were mainly to do with the <u>brakes</u> locking, <u>increasing</u> the braking distance, failing to talk about **increased** friction or **better** grip and rounding off with vague references to safety rather than mentioning better <u>control</u> or <u>steering</u>.

(b) Candidates found the two stage nature of this calculation difficult to cope with. Consequently approximately 40% scored zero or one. All too often all that was given was **power** = 250 ÷ 15 which yielded no marks. However it was intended to test the more able candidates with the calculation and the question was successful in that aim, with a small minority of answers securing maximum marks. Centres should encourage candidates with poorer mathematics skills to do these calculations in two stages i.e. calculate the work done first then go on to calculate the power. This also adds a safety net for numerical errors along the way.

Question 15

(a) A very good level of differentiation was achieved in this question but one third of the candidates failed to register a mark, mainly due to:

- no mention of gravity pulling Britney, or acting **down** or gravity being **greater than** air resistance in **1**
- failing to use **weight** in the answer to **2**

(b) A much better success rate with eight out of ten candidates gaining the mark. Those who did not gain the mark wrote about wind resistance, increased weight or failed to state <u>increased</u> surface area or drag. Nevertheless, this was a satisfactory end for most candidates.

B652/01 Unit 2: Modules P4, P5 and P6 Foundation Tier

General Comments

This was the third occasion that this examination was available to be sat by candidates. There were approximately 80 candidates and marks ranged from 6 to 47 out of 60. 45% of the candidates achieved grade C.

The mean mark for the paper was 29.5 and the paper discriminated satisfactorily over the target grade range of G to C.

There was no evidence to suggest that candidates had insufficient time to complete the paper but there were a number of instances where parts of questions were omitted. Some candidates were unable to follow instructions regarding how to answer questions or how many answers to provide.

Candidates are encouraged to show how they work out the answer to numerical questions. In this way, credit can be given for showing how an answer is obtained, even if the answer is incorrect.

Comments on Individual Questions:

SECTION A - MODULE P4

Question 1
Two thirds of candidates could identify the colours of the neutral and earth wires in a plug. The majority of incorrect responses suggested the green and yellow wire should be connected to the live terminal.

Only half the candidates knew which two wires were connected to a double insulated appliance. Live and earth was the most common distracter.

Almost every candidate correctly used the equation provided to calculate a resistance of 3.3 Ω. Occasionally the final answer was wrong but correct working (ie 10/3) was awarded 1 mark.

Question 2
A third of the candidates correctly identified ultrasound as being a longitudinal wave. Most could list one use of ultrasound in hospital but X-ray was a common second use.

Question 3
Fewer than half knew the term background radiation.

Most knew that smoke detectors contained a source of alpha radiation; gamma radiation was the most common incorrect response.

The nucleus is a term most used correctly but only a minority described correctly where to place a substance to make it radioactive. There is a belief that radioactive sources will make something radioactive.

Question 4
This was generally well answered. The term radiographer was known by half the candidates.

Most could describe a danger of X-rays and gamma rays but a significant number repeated the stem of the question part (c) by stating that gamma radiation was used to treat tumours or cure skin cancer.

Question 5
Just over half of the candidates knew that the rod gained electrons and correctly selected B from the list.

Most candidates attempted the extended prose question and scored one or two marks. There were, however, some references to electrostatics helping paint stick to the car.

SECTION B - MODULE P5

Question 6
The majority of candidates scored two of the three marks describing the motion of satellites. Many scored all three marks.

Question 7
A quarter of candidates realised that when cars went in opposite directions their relative velocity increased.

Part (b) discriminated well at the grade C/D border. Whilst many correctly calculated the distance travelled, those who did not do so may have been awarded one mark had they shown some working.

There were few correct answers to part (c). A few candidates conveyed the idea of the driver continuing to move forward.

Question 8
Some candidates identified the sport as opposed to the projectile. Some candidates described a collision for part (a) and then found themselves repeating this for part (b).

The majority of candidates used the equation to calculate the momentum of the football.

Question 9
The majority of candidates correctly answered true or false to the statements about waves.

Question 10
This question was not well answered. Refraction was not well known as the name given to the deviation of light. The colour that deviated the most was identified as blue or violet by just over a third of the candidates. The expected answer, medium, was not seen as the name of a substance through which light travels but transparent was accepted.

There were no correct responses to the alternative name of a convex, converging, lens.

SECTION C - MODULE P6

Question 11
The thermistor is the best known component from the description of its behaviour and the diode is the least well known.

Over half the candidates correctly described what happened to the length of resistance wire in the circuit but only a third could relate this to the effect on the resistance and the resulting effect on the brightness of the bulb.

Question 12
The majority of candidates drew a circuit diagram but included the magnet within the circuit.

Few candidates knew the frequency of mains electricity in the UK but a quarter of them did appreciate the need for AC to make transformers work.

Question 13
The majority of candidates could name a kitchen device containing a motor, but toaster was a common incorrect response.

Two thirds of the candidates understood the effects on a motor of increasing the current or having fewer turns of wire, but only half knew the effect of using stronger magnets. Many thought that reversing the current direction would cause the motor to slow down or stop.

Question 14
Nearly two thirds of candidates knew the truth table for a logic gate and could explain the meaning of 0 and 1. There were no correct responses to part (b).

B652/02 Unit 2: Modules P4, P5 and P6 Higher Tier

General Comments

This was the third occasion that this examination was available to be sat by candidates. There were approximately 200 candidates and marks ranged from 14 to 58 out of 60. 50% of the candidates achieved grades A or A*.

The mean mark for the paper was 39 and the paper discriminated satisfactorily over the target grade range of A* to C.

There was no evidence to suggest that candidates had insufficient time to complete the paper but there were a number of instances where parts of questions were omitted. In general, candidates were able to follow instructions regarding how to answer questions or how many answers to provide.

Candidates are encouraged to show how they work out the answer to numerical questions. In this way, credit can be given for showing how an answer is obtained, even if the answer is incorrect.

Comments on Individual Questions

SECTION A - MODULE P4

Question 1
The majority of candidates scored full marks. Most knew that the rod gained electrons and correctly selected B from the list.

The extended prose question was well answered. Many candidates scored full marks and wrote at length about four or five possible marking points. There were, however, some references to electrostatics helping paint stick to the car.

Question 2
Almost every candidate correctly used the equation provided to calculate a resistance of 3.3 Ω. Occasionally the final answer was wrong but correct working (ie 10/3) was awarded 1 mark.

Most candidates knew if the current became too large the fuse blows. Voltage was a common incorrect alternative to current. There were a number of descriptions for the fuse blowing some such as melt were acceptable whilst others, including pops or blows up were not.

Most candidates knew that double insulation reduced the chance of an electric shock. Few explained that double insulation related to the casing. A significant number thought there were extra layers of insulation on the wires whilst others thought there were merely two layers of insulation. Some also thought the plastic was earthed.

Question 3
Half of the candidates correctly identified longitudinal wave displacement. There was no pattern in the incorrect answers given which hints at much guesswork by these candidates.

Whilst most answers referred to ultrasound giving images of soft tissue, the second answers were often too vague and merely mentioned the fact that there was no damage to people. Better answers showed clear reference to cell damage.

Question 4
This question discriminated well and the more able candidates scored full marks. Although an error carried forward was allowed for part (b), a mark profile similar to part (a) existed.

Question 5
Two thirds of candidates scored full marks. Fission was generally known as the process giving out energy in a reactor.

Less well known was the name of the particle causing the fission process to start.

The use of control rods to absorb neutrons was similarly less well known although there were some very detailed responses.

SECTION B - MODULE P5

Question 6
The majority of candidates scored two of the three marks describing the motion of satellites. The most common error was to describe the satellite in polar orbit as orbiting the equator.

Only a small minority of candidates did not know that a geostationary satellite takes 24 hours to orbit.

Question 7
Fewer than half of the candidates could correctly calculate relative velocity. The majority added instead of subtracting the two velocities stated.

Part (b) discriminated well at the grade C/D border. Whilst many correctly calculated the distance travelled, those who did not do so may have been awarded one mark had they shown some working.

Part (c) discriminated well at the grade A/B border. Whilst some candidates conveyed the idea of momentum, few realised that the force was due to a rapid change in momentum.

Question 8
Most calculated the momentum correctly.

Few candidates wrote about vectors or components of velocity. Most scored their marks by stating that there was acceleration vertically but constant velocity horizontally. Some candidates gave confused answers describing the football as slowing down under gravity without stating that this referred to the initial upward motion.

Question 9
The majority of candidates at grade C or above knew the properties of waves. Some candidates confused reflection with diffraction.

Question 10
Three quarters of candidates scored both marks. The relationship between the size of the gap and wavelength to provide maximum diffraction was probably the least well known statement.

Question 11
Most candidates gained one mark for completing the ray diagram. The most common correct answer was to complete the ray so that it passed through the focus to the right of the lens. There were significantly fewer rays drawn through the centre of the lens to identify the position of the image.

Nearly one in ten candidates did not attempt part (b) and fewer than one in five stated how to show that an image was real. Many stated that the rays crossed or met without mentioning a screen.

SECTION C - MODULE P6

Question 12
Only half the candidates correctly described what happened to the resistance and the resulting effect on the brightness of the bulb. Even candidates at grade A found this more difficult than might be expected.

There were few good answers for part (b). The effect of heat on resistance was not well known. Some candidates did describe the bulb as being non-ohmic and were awarded a mark.

Question 13
This question was generally well answered. The effect of heat on the resistance of a thermistor is understood as is the effect of light on a light dependent resistor. The consequent effects on the motors were also well understood.

The majority of candidates could use the equation provided to calculate the output voltage from the potential divider.

Question 14
The majority of candidates understood the effects on a motor of increasing current, using stronger magnets or less turns of wire. However, many thought that reversing the current direction would cause the motor to slow down or stop.

Only half the candidates realised that an isolating transformer was used for safety reasons but more knew that both coils had the same number of turns.

Question 15
Many candidates failed to answer this question. Only grade A candidates scored marks. The relay was rarely mentioned. The most common mark awarded was for mentioning the low voltage output from a logic gate.

Question 16
The role of the brushes in a generator is not well known. Many candidates wrote as if they were being asked about an electric motor instead. The idea of the slip rings allowing the coil to rotate was better known.

Grade Thresholds

General Certificate of Secondary Education
Physics B (Specification Code J645)
January 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B651/01	Raw	60	-	-	-	39	33	27	21	15	0
	UMS	69	-	-	-	60	50	40	30	20	0
B651/02	Raw	60	46	38	30	23	16	12	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B652/01	Raw	60	-	-	-	31	26	21	16	11	0
	UMS	69	-	-	-	60	50	40	30	20	0
B652/02	Raw	60	48	40	32	25	18	14	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J645	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J645	29.2	81.3	91.7	97.9	100.0	100.0	100.0	100.0	100.0	48

85 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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