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Examiners' Report / Principal Examiner Feedback

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GCE O

GCE O Level Physics (7540) Paper 02

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General Points and Observations

Many candidates found most parts of this paper very straightforward and scored high marks. This paper required candidates to answer questions on the spaces provided on the examination paper. It was still disappointing to see that, despite requests in previous examiners' reports, some candidates repeat parts of the question before starting their answers and then find it difficult to fit their answers in the remaining space. A number of candidates extended their answers beyond the space provided or continued their answers on one of the blank pages without indicating clearly that the answers continued elsewhere. The majority of candidates were able to attempt all parts of the paper in the time allocated but in a few cases there was evidence that candidates had run out of time. Candidates are encouraged to allocate their time appropriately. Many wrote good answers to questions requiring explanations of physical principles but some of it was irrelevant, incorrect and could be contradictory. Twenty marks were gained from calculations and these were very well answered well although units were still being missed off or written incorrectly. In such questions a few candidates did not always show all steps in their working and could not be given any credit where an incorrect answer was the result of an arithmetical error.

Question 1

This question was fairly well answered and good candidates gained high marks.
Q1(a)(i) Most candidates gave an acceptable meaning of centre of gravity although too many did not use the term "point" which is preferable to "where" or "place".
Q1a(ii) The line in bold at the start of the question included the phrase centre of gravity. Candidates lost these marks if they did not use this term in their answers with many just trying to answer in terms of the prism's weight or moments.
Q1(b) (i) Candidates rarely scored well on this question. Again they almost never referred to the position of the centre of gravity in relation to the base.
Q1b(ii) A majority scored this mark although many referred to a larger surface area without adding "of the base" and hence lost the mark.
Q1(c) Weaker candidates simply stated that a moment is force times distance without saying that it was to the pivot or that it was the perpendicular distance. Some undid themselves by saying it was the distance moved. About half failed to explain the effect or just wrote that clockwise moment equals anticlockwise moment.
Q1(d) The calculations were well done and only a few lost a mark through omitting the unit in (i) or giving an incorrect unit. Part (iii) was poorly answered with many saying they needed a wider rope or they would put a 600 N load on her left arm. Another common incorrect answer would give the person a long stick without explaining how this would be used to restore balance.
Q1(e) Many scored one mark for saying that elastic objects would return to their original length but they often did not say that this would happen when the force was removed.
A majority stated that a suitable material was rubber, elastic band, spring or string and hence did not score.
Q1(f) Definitions of density were usually correct but some omitted to say it was mass per unit volume.
A majority said that the density would decrease but they did not always say it was because volume increased preferring to use the term area increased which did not score. Candidates who stated that the density would remain the same were given full credit if their explanation stated why their volume would remain constant.

Question 2

Again many candidates were able to apply their Physics knowledge well to most of this question and scored well.
Q2(a) Most gave slope and area although a few had not read the question and tried to calculate the values here.
2(b) The calculations were usually correct although in (ii) candidates who did not use the area and instead tried to use speed times time did not score.
Q2(c)(i) Most candidates plotted the points correctly but too many failed to label the axes correctly with units. A small number lost the curve mark by joining some or all of the plots using straight lines.
Q2(c)(ii) Too many lost the marks by drawing a line to the curve at 21.5 m/s rather than 23 m/s as required and so gave the incorrect value for distance.
Q2(d) Most candidates scored both marks for the calculation of kinetic energy. However, too many tried to use the equations of motion in calculating stopping distance and usually got into a muddle and so failed to score any of the three marks available. Equations of motion are not required for this syllabus. Candidates who used work done divided by braking distance usually scored all three marks.
Q2(e) Many candidates probably guessed the answers. Some ticked more than one box in each row. The most common error was thinking that the braking force would be greater than on a dry road, presumably because they thought you would need to push the brakes hard.

Question 3

This was a traditional question and some candidates expressed themselves poorly.
Q3(a)(i)A lot of good answers were seen here but many lost a mark by omitting the cutting of magnetic lines.
Q3(a)(ii) Most candidates could see from the diagram that coil Y had more turns but fewer realised that magnet Y would be stronger. Answers about more cutting of lines or about bigger magnets did not score.
3(a)(iii) Candidates answers were not always explicit, talking about changing the direction of movement or changing poles rather than moving the magnet away or reversing the poles.
3(a)(iv) To score here greater speed was required rather than more motion or more vigorous motion. Some candidates wanted to change the coil despite being told not to.
Q3(b)(i) This usually scored well although some gave unsuitable metals or stated that their metal was quicker to magnetise rather than easier to magnetise.
Q3(b)(ii) Many well-structured accounts were seen with many scoring four or five marks. A number of candidates had not seen a relay and thought that the current would pass from the coil to the core, through the armature and hence power the heater.
Q3(b)(iii) The calculation was usually well done with the most common error being due to using an incorrectly rearranged equation.
Q3(b)(iv) Many candidates waffled here. The key was that once magnetised the core and armature would remain magnetised and so the contacts would remain closed once when the low voltage switch was opened. A small number of candidates did not understand the terms open and closed in relation to switches and unfortunately could not be give much credit for responses which set out to describe in great detail why nothing would happen, this despite the diagram showing the switch open.

Question 4

This question required the application of the knowledge of refraction to a familiar context.
Q4(a)(i) Most candidates knew the term refraction.
Q4(a)(ii) Many candidates tried to answer this question in terms of optical density, a property of the glass, rather than in terms of the effect of speed, a property of light, and so failed to score the marks.
Q4(a)(iii) Most candidates gave correct answers to this part.
Q4(a)(iv) Most candidates gave correct answers to this part although some wrote refraction, diffraction or spectrum here
Q4(a)(v) Again candidates replied in terms of optical density rather than speed. Those that did say that the speeds were different did not usually then go on to say which slowed down the most.
Q4(b)(i) Most candidates gave correct answers to this part although some got them the wrong way round.
Q4b(ii) and (iii) Candidates rarely scored more than two out of the four marks available. Many compared effects of these radiations rather than properties.
Q4(b)(iv) Better candidates used the situation shown in the diagram and chose a suitable IR detector, placed it at X and notes a change in reading. Some described a different experiment but again would name or describe a suitable detector, an appropriate source of IR and a change in reading. A minority assume that radiation always involves ionising and tried to use a GM detector and were given no credit.
Q4(c) Both calculations were usually well done, although some candidates did not use sines in part (ii), used incorrect numbers or just assumed the refractive index of glass would always be 1.5. Although those missing the degree symbol in (ii) were not penalised those that used it with the refractive index and those that applied other units such as m/s were penalised.

Question 5

Candidates have become familiar design question and scored well in most parts.
Q5(a) Candidates scored well in (i) and (ii) although the calculation in (ii) sometimes omitted *g* and so failed to score.
5(b)(i) Most candidates could name at least two suitable pieces of apparatus.
5(b)(ii) Many candidates were able to provide more than two acceptable measurements.
5(b)(iii) Descriptions of experiments have improved and candidates usually scored well as there were nine acceptable points and they only needed five. It is good to see that most repeated the experiment and that they could fit the answers into the space provided.
5(b)(iv) Many candidates failed to score if they did not include the units in their proposed table headings.
Q5(b)(v) Although most scored both marks many candidates failed to score if they did not labels the axes with output energy and mass.

PHYSICS 7540, GRADE BOUNDARIES

Grade	A	B	C	D	E
Lowest mark for award of grade	**78**	**68**	**59**	**54**	**35**

Note: Grade boundaries may vary from year to year and from subject to subject, depending on the demands of the question paper.

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