



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

**JUNIOR CERTIFICATE 2010**

**MARKING SCHEME**

**SCIENCE**

**HIGHER LEVEL**



## Introduction

### General Points regarding the Marking Scheme for Junior Certificate Science

1. In many cases only key phrases are given in the marking schemes. These points contain the information and ideas that must appear in the candidate's answer in order to merit the assigned marks.
2. The descriptions, methods and definitions given in a marking scheme are not exhaustive and alternative valid answers are acceptable.
3. The detail required in any answer is determined by the context and the manner in which the question is asked and by the number of marks assigned to the answer in the examination paper. This may vary from year to year.
4. The word(s) / phrase(s) used in the scheme indicate the essential points required in the candidate's answer. Words, expressions or statements separated by a solidus (/) are alternatives which are equally acceptable for a particular point. A word or phrase given in brackets is an acceptable alternative to the preceding word or phrase. Note, however, that words, expressions or phrases must be correctly used in context and not contradicted. Where there is evidence of incorrect use or contradiction, the marks may not be awarded. A double solidus (//) is used within the marking scheme for the coursework component to indicate distinct points for which marks may be awarded.
5. In general, names and formulas of elements and compounds are equally acceptable except in cases where either the name or the formula is specifically asked for in the question. However, in some cases where the name is asked for, the formula may be accepted as an alternative. This is clarified within the scheme.
6. There is a deduction of one mark for each arithmetical slip made by a candidate in a calculation. If the incorrect calculated value is used 'correctly' in a subsequent calculation the marks for the subsequent calculation may be awarded.
7. **Cancelled & / or Repeated Answers**
  - (a) In the case of short-answer questions, if an answer is cancelled and a second answer given, the cancellation is accepted and marks are awarded for the uncanceled answer.
  - (b) If two answers are given and neither answer is cancelled, the first answer offered only is accepted and marked accordingly.
  - (c) If the only answer offered is cancelled, the cancelling is ignored and the answer marked as normal. However, in MCQ-type questions cancelling of an incorrect and correct answer applies.
8. For answers to "describe an investigation / an experiment", multiple attempts will be dealt with as follows:

If a candidate answers a question or part of a question once only and then cancels, the cancelling is ignored and the answer marked as normal. If a candidate answers a question or part of a question more than once and then cancels one attempt, the cancelling will be ignored and all the answers, whether cancelled or not, marked as normal. However, only the marks gained in respect to the highest scoring attempt will be counted. Points cannot be “mixed and matched from two attempts”. The disallowed marks should be enclosed in square brackets.

9. Where a candidate has received a modified examination paper under the reasonable accommodations arrangements the marking scheme applied has been modified accordingly.

<b>TABLE FOR ASSIGNING GRADES</b>	
<b>GRADE</b>	<b>RANGE</b>
<b>A</b>	510 - 600
<b>B</b>	420 - 509
<b>C</b>	330 - 419
<b>D</b>	240 - 329
<b>E</b>	150 - 239
<b>F</b>	60 - 149
<b>NG</b>	0 - 59

**Biology (130 MARKS)**  
**Answer each of the questions 1, 2 and 3.**

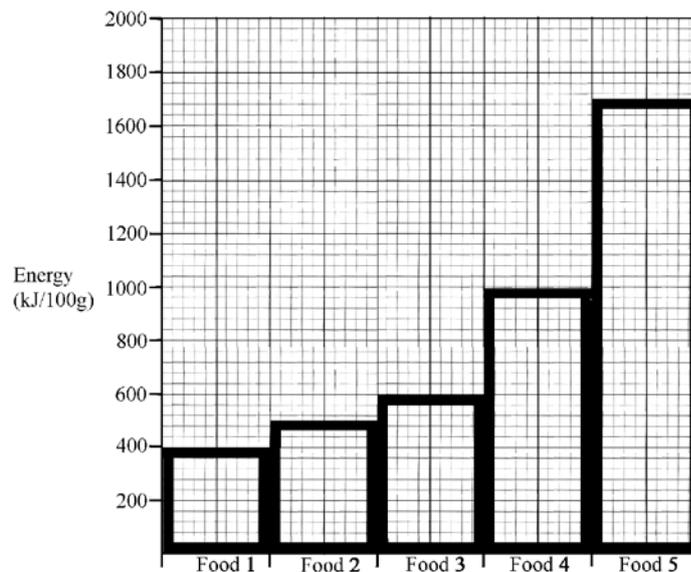
**Question 1. ( 52 Marks) All Items, (a), (b), (c), etc. (7 × 6 + 1 × 10marks)**

- (a) **any two from:** gills/ fins/ scales/ spines/ shape (streamlined)/ tail/ colour (camouflage) / lateral line... (2 × 3) [6]
- (b) **any two from:** urea/ water/ salts/... (2 × 3) [6]  
**accept urine for (3) if it is the only answer given**
- (c) **any two from:** brain/ eyes/ ear/ semicircular canals (organ of balance) / tongue... (2 × 3) [6]
- (d) **A:** cell wall (3)  
**B:** nucleus (3) [6]
- (e) **beneficial any one from:** decomposition/ decay/ food/ yoghurt/ vinegar/ cheese/ food supplements/ biotechnology/ insulin/ interferon/ healthy gut/ vaccination/ helps immune system/ antibiotics/ medicine / silage... (3)  
**harmful any one from:** disease/ TB/ pneumonia/ meningitis/ tetanus/ cholera/ anthrax/ food poisoning/ tooth decay/ sore throat/ pimples... (3) [6]
- (f) DNA (3)  
protein (3) [6]
- (g) (i) **what?:** phototropism (3)  
(ii) **what?:** make more food/ more photosynthesis/ absorb more light... (3) [6]
- (h) **candidate must clearly state names/ formulas of gases and directions of movement.**  
oxygen/ O<sub>2</sub> (2)  
into bloodstream/ out of alveoli (3)  
carbon dioxide/ CO<sub>2</sub> (2)  
out of bloodstream/ into alveoli (3) [10]

**Question 2. (39 marks) All items, (a), (b) and (c).**

- (a) (i) What? breakdown of food (3) [3]
- (ii) Why? make food soluble/ food can enter bloodstream/ to obtain nutrients... (3) [3]
- (iii) Name **A:** liver (3)  
**B:** pancreas (3) [6]
- (iv) Give **any one from:** kills bacteria/ digestion/ liquefies food/ mixes food/ produces HCl/ produces enzymes/ produces chyme... (3) [3]
- (v) Give **any one from:** absorb water/ form faeces/ store (transport) (expel) faeces... (3) [3]

- (b) (i) Draw



- five bars correct (9)  
**or**  
four bars correct (6)  
**or**  
three bars correct (3) [9]  
Tolerance ½

- (ii) Which? fat (3)  
What? cheese has most fat/ more fat than other foods (3) [6]
- (iii) Describe rub food on paper (3)  
translucent spot (translucent mark) (translucent stain) (3) [6]

**Question 3. (39 marks) All items, (a) and (b).**

(a) (i) Why?      **any one from:** destarch leaves/ starch goes from leaves      (3)      [3]

(ii) Why?      **any one from:** kill/ soften      (3)      [3]

(iii) Draw

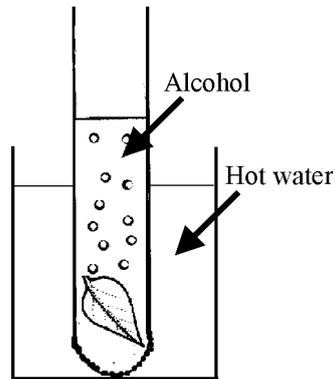
alcohol labelled correctly

(3)

hot water labelled correctly/  
alcohol being heated

(3)

[6]



[no diagram deduct 3 marks]

(iv) Name      iodine      (3)      [3]

(v) Suggest      **any one from:** no starch/ no photosynthesis/ no chlorophyll (green pigment)      (3)      [3]

(b) (i) Name      ovary      (3)

Role      contains ovules/ egg(s)/ female gamete(s)/ embryo(s)/ seed(s)      (3)      [6]

(ii) Name      anther      (3)

Role      produces pollen/ male gametes/ sperm      (3)      [6]

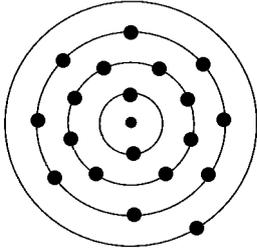
(iii) Give      **any one from:** insects/ wind/ named insect (bee) (fly)/ water...      (3)      [3]

(iv) Name      Zygote      (3)      [3]  
**accept: fertilised egg**

(v) What?      **any one from:** embryo/ seed/ plant      (3)      [3]  
**accept: fruit**

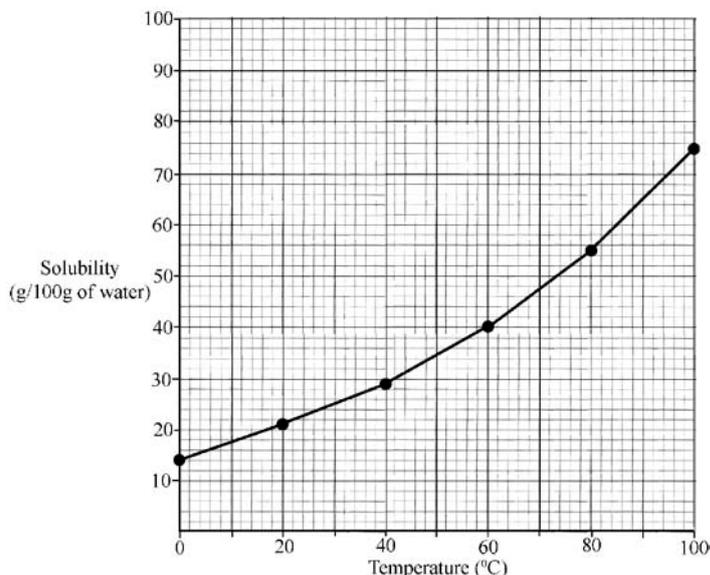
**Chemistry (130 MARKS)**  
**Answer each of the questions 4, 5 and 6.**

**Question 4. (52 marks) All items, (a), (b), (c), etc. (7 × 6 + 1 × 10marks)**

- (a) **any two from either list or one from each list:** Element Mg: is 'silver'/ metal/  
 shines/ bends/ ductile/ malleable/ reacts with acids releasing hydrogen/  
 conducts electricity/ conducts heat/ burns in air (Oxygen)...  
Compound Mg O: white/ powder/ base/ does not burn/ does not conduct  
 electricity/ does not conduct heat... (2 × 3) [6]  
**note: two different properties must be given to merit (2 × 3),**  
**assume that both answers refer to magnesium if the candidate does**  
**not specify to which substance the properties given are assigned.**
- (b) **any one from:** dissolves/ erodes/ corrodes/ wears away (3)  
**any one from:** limestone is calcium carbonate (CaCO<sub>3</sub>)/ chemical reaction (3) [6]
- (c) (i) **A** sand (3)  
 (ii) **B** water/ salt (3) [6]
- (d) two electrons in first orbit and eight in second orbit shown (3)  
 eight electrons in third orbit and one in fourth orbit shown (3) [6]  
**2, 8, 8, 1 with electrons not shown in diagram (3) only**
- 
- (e) soft (3)  
 only water in **B**/ dissolved substances (solute) remains in **A**/ hardness removed  
 by distillation (3) [6]
- (f) **any two from:** fluoridation/ chlorination/ filtration/ screening/ settling/ ultra  
 violet (UV)/ adjust pH/ flocculation/ ion exchange/ boiling... (2 × 3) [6]
- (g) **any two from:** electricity/ heat/ sound (2 × 3) [6]
- (h) (i) **A** (2)  
 (ii) to remove air (oxygen) (2)  
 (iii) to keep air (oxygen) out (2)  
 (iv) air (oxygen) is needed for rusting (4) [10]  
**accept air (oxygen) and water for (4) in (iv)**  
**water alone zero in (iv)**

**Question 5. ( 39 Marks) All items, (a), (b), (c), etc.**

(a) (i) Draw



(6)

six points plotted correctly  
 smooth curve (**accept** points joined by straight lines)  
 through all six points  
**allow (3) for four correct points**  
 Tolerance ½

(3)

[9]

(ii) Use

15-18

(3)

[3]

(iii) Describe

**show or state: (Marks are awarded *only* for a diagram that is correct in context of the experiment described by the candidate.)**

(3)

leave/cool

(3)

crystals form

(3)

filter/ evaporate

(3)

suitable diagram

**or**

**or**

(3)

crystal on string in solution

(3)

crystal grows

(3)

remove crystal (using string)

(3)

suitable diagram

**or**

**or**

(3)

heat solution

(3)

evaporate water

(3)

crystals form

(3)

suitable diagram

[12]

(b) (i) What?

0 – 14

(3)

**any one qualification from:** shows degree of acidity/ measures acidity/ shows degree of alkalinity (basicity)/ measures alkalinity (basicity)/ pH < 7 acid/ pH = 7 neutral/ pH > 7 alkali (base)

(3)

How?

**any one from:** pH paper/ pH meter/ pH probe / universal indicator

(3)

[9]

(ii) Name

gastric juice

(3)

blood

(3)

[6]

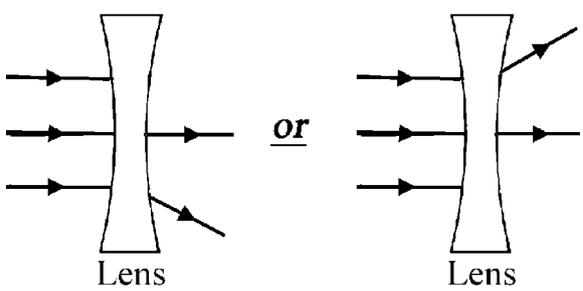


**Physics (130 MARKS)**  
**Answer each of the questions 7, 8 and 9.**

**Question 7. (52 marks) All items, (a), (b), (c), etc. (7 × 6 + 1 × 10marks)**

- (a) change of state/ liquid to solid/ latent heat (6) [6]  
 (b) less dense/ lower density (6) [6]

(c)



(3)  
(3) [6]

3 marks for each correct emergent ray from either diagram to a max. of (2 × 3)  
**allow marks if line is drawn correctly but the arrow is omitted**

- (d) kiloWatt-hour/ kWh (3)  
 450/ €4.5 (3) [6]  
**allow (2) for €450/ 3 × 10 × 15**

- (e)  $\frac{480000}{4}$  **or** 120 000 (3)  
 $\text{Nm}^{-2}$  (N/m<sup>2</sup>) (newtons per meter squared)/ Pa/ Pascal (3) [6]

- (f) **any two from either list or one from each list:**  
Heat: form of energy/ Joules/ can not be measured at a point/ can be converted into other forms of energy/ depends on mass (substance) (temperature)...  
Temperature: measure of how hot (cold) (degree of hotness)/ Celsius (centigrade)/ can be measured at a point/ differences can cause heat to flow/ independent of mass (substance)/ measured with thermometer... (2 × 3) [6]  
**note: two different points must be made to merit (2 × 3), it must be clear to which item the point is assigned in the candidate's answer.**

- (g)  $30 \times \mathbf{X} = 3 \times 40$  (3)  
 $\mathbf{X} = 4$  (3) [6]  
**allow 6 marks if '4' alone appears.**

- (h) (i) **B** (3)  
 (ii) forward bias/ + end (anode) of LED to + of battery/  
 - end (cathode) of LED to - of battery (3)  
 (iii) control (limit)current/ without **R** the diode would burn out (4) [10]

**Question 8. (39 marks) All items, (a), (b), (c), etc.**

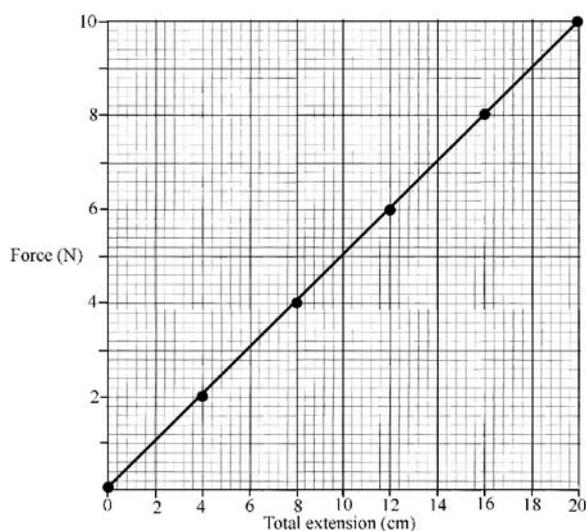
(a) (i) Calculate

Force (N)	Scale reading (cm)	Total extension (cm)
0	31.0	0
2	35.0	4
4	39.0	8
6	43.0	12
8	47.0	16
10	51.0	20

five extensions correctly calculated (6)  
3-4 extensions correctly calculated (3) only

(6) [6]

(ii) Draw



six points  
plotted correctly  
straight line through the six points  
**allow (3) for joining any six points**

(3)  
(3) [6]

(iii) What?

extension *directly* proportional to applied force (6)  
extension proportional to applied force (3) only  
**accept reverse order: 'applied force *directly* proportional to extension' for (6). If 'directly' is omitted from above (3) only.**

(6) [6]

(iv) Use

7 +/- 0.1

(3) [3]

(b) (i) What?  
(ii) Explain

bubbles of air/ water level falls  
air in flask expanded

(3) [3]  
(3) [3]

(iii) What?

water rises up glass tube/ bubbles stop

(3) [3]

(iv) Explain

air in flask contracted/ air pressure in flask less than atmospheric/  
partial vacuum

(3) [3]

(c) Why?

**any one from:** light faster/ sound slower

(6) [6]

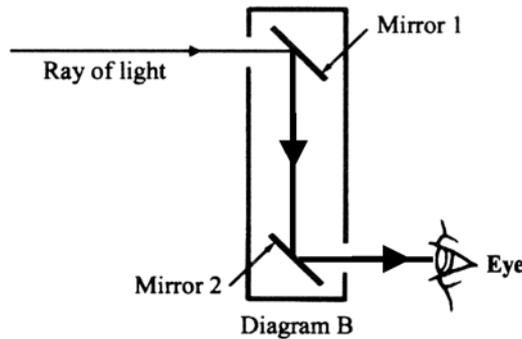
**Question 9. (39 marks) All items, (a) and (b).**

(a) (i) Name **any two from:** hydropower/ wind/ tidal/ geothermal/ biomass/ infra red (IR) from the sun/ wave (2 × 3) [6]

(ii) Give **any two from:** lower CO<sub>2</sub> emissions/ less carbon tax/ energy security/ lower energy costs/ sell surplus electricity/ sustainable/ cleaner/ kinder to the environment... (2 × 3) [6]

(b) (i) Complete

ray from mirror 1 to mirror 2 correctly drawn as shown (3)



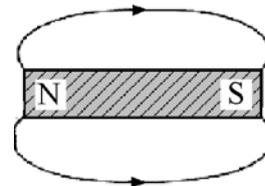
ray from mirror 2 to eye correctly drawn as shown (3)

**allow marks if line is drawn correctly but the arrow is omitted**

(ii) Give **any one from:** see over objects/ see around corners/ submarine... (3) [3]

(c) (i) Label

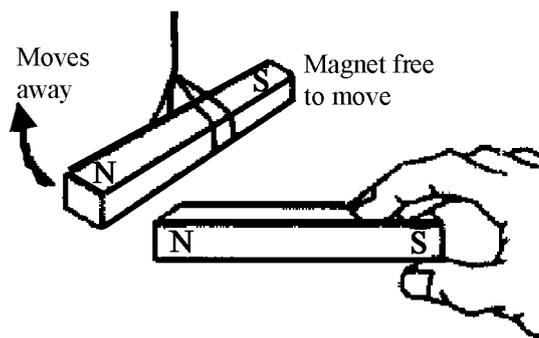
north or south pole correctly labelled



(ii) What? the direction in which a magnetic compass needle points/ the direction in which an isolated north pole would move if free to do so **accept: direction of magnetic force** (3) [3]

(iii) Describe **show or state**

bring a magnet towards a second magnet that is free to move



if two north poles or two south poles are brought close to each other they repel each other

[no diagram deduct 3 marks]

(iv) Name **any one from:** iron/ steel/ cobalt/ nickel (3) [3]

(v) How? the earths magnetism turns the needle of a magnetic compass/ use a compass/ freely suspended bar magnets north pole points north... (3) [3]

## **Junior Certificate Examinations**

### **New Science Syllabus**

## **Junior Certificate Examinations**

### **Science**

## **Investigation Titles 2010**

### **Coursework B**

Candidates opting to carry out investigations nominated by the State Examinations Commission for the Coursework B component of the 2010 Junior Certificate Examinations of the Science syllabi should present reports on two of the following three investigations in the relevant Reporting Booklet in accordance with the instructions in that booklet and the enclosed Circular S75/09

### **Biology**

Qualitatively investigate two factors that affect the uptake of water by a plant.

### **Chemistry**

Compare by way of investigation the abilities of different indigestion remedies to neutralise excess stomach acid.

[A pre-prepared stock solution of 0.15 M HCl may be used as “stomach acid”.]

### **Physics**

Investigate two factors that affect the distance taken for a toy car to stop after rolling down a ramp.

[Note The coursework booklets are designed for reporting on different kinds of investigations. In as far as possible the reports should be filled out under all of the headings provided in the booklet. However, some headings, e.g. “controls”, may not be applicable in some investigations.]

## BIOLOGY – Marking Criteria for Coursework B

Section	Aims	Total Mark	<u>Guide to mark assignment</u>	H.L.
			Qualitatively investigate two factors that affect the uptake of water by a plant.	
<b>Introduction</b>	Clear statement of the problem/topic to be investigated, background research undertaken in preparation for the investigation: people, books, websites, etc. as sources of relevant information.	5	<p><b>Statement / identification of problem / topic to be investigated:</b></p> <p><b>Research:</b> Any reference to book / internet (web) / person consulted etc.</p>	(3)  (2)
<b>Preparation and planning</b>	<p>Identification of variables and controls as required</p> <p>List of equipment needed for the investigation</p> <p>List of tasks to be carried out during the investigation</p>	20	<p><b>Variables / Controls :</b> Identify <b>five</b> variables, the <b>two essential</b> variables that are going to be examined and any <b>three other</b> variables, and/or indication of how some of these need to be controlled or held fixed: <u>Possible Essential Variables:</u> Temperature // Sunlight // Wind (air movement) // Humidity // Leaf area // Time // Uptake of water <u>Other Variables:</u> Identical Plants // Same (sized) plants // Same availability of water // Plant type // Leaf type</p> <p><b>Equipment needed:</b> Identify any <b>five</b> pieces of equipment used: Water // Oil // Plants // Light // Fridge // Oven // Heater // Thermometer // Test tubes // Beakers // Fan (hair dryer) // Hygrometer // Clock // Growing medium (soil) // Balance // Measuring tape (metre stick) // Cling film to cover soil // Light meter // Any valid piece of equipment pertinent to procedure</p> <p><b>List of tasks:</b> Identify any <b>four</b> tasks carried out in investigation: Procure plant(s) // Put plant in water (Growing medium) (soil) // Set (vary) factor 1 // Set (vary) factor 2 // Allow time for water uptake // Measure (monitor) uptake of water // Record data // Graph (or otherwise present)</p>	<p>(3 + 3)</p> <p>(1 + 1 + 2)</p> <p>(1 + 1 + 1 + 1 + 1)</p> <p>(1 + 1 + 1 + 2)</p>



**CHEMISTRY – Marking Criteria for Coursework B**

		<u>Guide to mark assignment</u>		
<b>Section</b>	<b>Aims</b>	<b>Total Mark</b>		<b>H.L.</b>
<b>Introduction</b>	Clear statement of the problem/topic to be investigated, background research undertaken in preparation for the investigation: people, books, websites, etc. as sources of relevant information.	5	<p><b>Statement / identification of problem / topic to be investigated:</b></p> <p><b>Research:</b> Any reference to book / internet (web) / person consulted etc</p>	<p>(3)</p> <p>(2)</p>
<b>Preparation and planning</b>	<p>Identification of variables and controls as required</p> <p>List of equipment needed for the investigation</p> <p>List of tasks to be carried out during the investigation</p>	20	<p><b>Variables / Controls :</b> Identify <i>five</i> variables, the <b>two essential</b> variables and any <b>three other</b> variables, and/or indicate how some of these need to be controlled or held fixed: <u>Essential Variables:</u> Indigestion remedies // pH of mixture // Volume of acid // Mass (volume) (dose) of remedy // volume of base <u>Other Variables:</u> Amount of indigestion remedy // Concentration of (stomach) acid (HCl) // Amount of (stomach) acid (HCl) // Temperature // Time over which reaction was let run</p> <p><b>Equipment needed:</b> Identify any <i>five</i> pieces of equipment used:</p> <p>Indigestion remedies // (Deionised) (distilled) water // (0.15 M) HCl // Beakers (flasks) (Test tubes) // pH meter (paper) (universal indicator solution) // Stirrer (Glass rods) // Clock (stopclock) Graduated cylinder (burette) (pipette) // Any valid piece of equipment pertinent to procedure</p> <p><b>List of tasks:</b> Identify any <i>four</i> tasks carried out in investigation: Procure indigestion remedies // Prepare remedy for use (e.g. crush, measure) // Set (vary) remedy 1 <i>versus</i> acid // Set (vary) remedy 2 <i>versus</i> acid // Mix remedy and acid // Set or record time // Measure (monitor) acid used <i>or</i> pH <i>or</i> amount of remedy // Record data // Graph (or otherwise present)</p>	<p>(3 + 3)</p> <p>(1 + 1 + 2)</p> <p>(1 + 1 + 1 + 1 + 1)</p> <p>(1 + 1 + 1 + 2)</p>

<b>Procedure</b>	Procedure, apparatus, safety, data collection/observations <ul style="list-style-type: none"> <li>▪ Safety precautions required for this investigation</li> <li>▪ Procedures followed in the investigation</li> <li>▪ Recorded data/observations</li> </ul>	20	<p><b>Safety:</b> Identify any <i>two specific</i> safety precautions followed in conducting the investigation</p> <p><b>Procedure: State or Show</b> Identify any <i>five</i> steps taken in conducting investigation:</p> <p><b>pH method:</b> Measure same amount of HCl solution // Measure pH (add same amount of universal indicator solution) // Prepare remedy // Add indigestion remedy // Allow react for same period of time <i>or</i> monitor pH <i>against</i> time // Measure pH again // Repeat to verify // Repeat with other remedy // Record data / Graph (present)</p> <p><b>Titration method:</b> Add HCl to burette // Put dose of remedy in titration flask // Make suspension of (prepare) remedy in titration flask // Put dose of remedy in titration flask // Add indicator to remedy mix // Add acid in small quantities // Allow time for reaction to occur // When colour change persists (acid persists) note volume of acid added // Repeat to verify (average results) // Repeat with other remedy // Record data / Graph (present)</p> <p><b>Fixed acid method:</b> Measure fixed amount of acid // Add indicator // Prepare remedy // Add remedy in small quantities until colour changes // Note amount of remedy added // Repeat to verify (average results) // Repeat with other remedy // Record data / Graph (present)</p> <p><b>Recorded Data / Observations:</b> Identify any <i>two</i> points related to method used: <b>Type of indigestion remedy and pH</b> <i>or</i> <b>Type of indigestion remedy and amount of acid</b> <i>or</i> <b>Type of indigestion remedy and amount of remedy or amount of base used in back titration</b> <b>Repeated for second remedy</b> [Table presentation likely]</p>	<p>(2 + 3)</p> <p>(1 + 1 + 2 + 3 + 3)</p> <p>(2)</p> <p>(3)</p>
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<p><b>Procedure Continued</b></p>	<p>Procedures followed in the investigation</p>	<p>10</p>	<p><b>Procedure: State or Show</b>  Identify any <i>five</i> steps taken in conducting investigation:  <b>Back titration method:</b>  Measure acid into flask // Add indicator // Titrate with NaOH (Na<sub>2</sub>CO<sub>3</sub>)... solution to endpoint (neutral) // Note volume used // Fresh acid and indicator // Add remedy // Allow to react // Titrate to neutral // Note volume base used // Repeat to verify (average results) // Repeat with other remedy // Remedy requiring least base is the strongest // Record data / Graph (present)</p> <p><b>Reaction time method:</b>  Measure acid into flask // Add indicator // Add remedy // Start clock (timing) // mix (swirl) (agitate) mixture // Permanent colour change // Note time // Repeat to verify (average results) // Repeat with other remedy // Record data / Graph (present)</p>	<p>(1 + 1 + 2 + 3 + 3)</p>
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**PHYSICS – Marking Criteria for Coursework B**

			Guide to mark assignment	
Section	Aims	Total Mark	Investigate two factors that affect the distance taken for a toy car to stop after rolling down a ramp.	<b>H.L.</b>
<b>Introduction</b>	Clear statement of the problem/topic to be investigated, background research undertaken in preparation for the investigation: people, books, websites, etc. as sources of relevant information.	5	<p><b>Statement / identification of problem / topic to be investigated:</b></p> <p><b>Research:</b> Any reference to book / internet (web) / person consulted etc.</p>	(3)  (2)
<b>Preparation and planning</b>	<p>Identification of variables and controls as required</p> <p>List of equipment needed for the investigation</p> <p>List of tasks to be carried out during the investigation</p>	20	<p><b>Variables / Controls:</b> Identify <i>five</i> variables, the <b>two essential</b> variables and any <b>three other</b> variables, and/or indicate how some of these need to be controlled or held fixed: <u>Possible Variables:</u> Distance travelled before stopping // Elevation (vertical height) (slope) (angle) of ramp // Surface(s) on which the toy car rolls after the ramps // Length of ramp // Same ramp // Starting position on ramp // Toy car (i.e. use same one or identical ones) // friction // K.E. (velocity) of car leaving ramp // Mass of toy car // Shape of car (air resistance)</p> <p><b>Equipment needed:</b> Identify any <i>five</i> pieces of equipment used: Toy car(s) // Ramp // Balance // Oil // Meter stick (tape measure) // Retorts (or other mechanism to elevate ramp) // Different rolling surfaces // Any valid piece of equipment pertinent to procedure</p> <p><b>List of tasks:</b> Identify any <i>four</i> tasks carried out in investigation: Procure toy car // Set up ramp Set (vary) factor 1 // Set (vary) factor 2 // Clean rolling surface of anything that might interfere with result (dirt or grit) // Release car // Measure distance travelled // Record data // Graph (present)</p>	<p>(3 + 3)</p> <p>(1 + 1 + 2)</p> <p>(1 + 1 + 1 + 1 + 1)</p> <p>(1 + 1 + 1 + 2)</p>

<b>Procedure</b>	Procedure, apparatus, safety, data collection/observations <ul style="list-style-type: none"> <li>▪ Safety precautions required for this investigation</li> <li>▪ Procedures followed in the investigation</li> <li>▪ Recorded data/observations</li> </ul>	20	<p><b>Safety:</b> Identify any <i>two specific</i> safety precaution followed in conducting the investigation</p> <p><b>Procedure: <u>State or Show</u></b>          Identify any <i>five</i> steps taken in conducting investigation:          Set up ramp // Vary heights (angles) (surfaces) (length of ramp) (starting position on ramp) (mass of car) (air resistance) //          Clean rolling surface of anything that might interfere with result (dirt or grit) //          Release car from fixed point on ramp //          Measure distance travelled //          Repeat to verify //          Repeat for factor 2 //          Record data // Graph (present)</p> <p><b>Recorded Data / Observations:</b> Identify any <i>two</i> points related to method used:  <b>Factor 1</b> <i>versus</i> <b>distance</b> travelled  <b>Factor 2</b> <i>versus</i> <b>distance</b> travelled          [Table presentation likely]</p>	(2 + 3)  (1 + 1 + 2 + 3 + 3)  (2) (3)
<b>Analysis &amp; Conclusions</b>	Analysis <ul style="list-style-type: none"> <li>▪ Calculations/data analysis</li> <li>▪ Conclusion(s) and evaluation of results(s)</li> </ul>	20	<p><b>Calculations / Data analysis:</b>  <i>One</i> relevant comment analysing data <b>or</b> calculation <b>or</b> graph</p> <p>Limited manipulation of data (4)  <b>OR</b>          Good manipulation of data (7)  <b>OR</b>          Excellent manipulation of data (10)</p> <p><b>Conclusion:</b> <i>One</i> relevant conclusion drawn <b>or</b> evaluation of results obtained</p> <p>Limited treatment (4)  <b>OR</b>          Good treatment (7)  <b>OR</b>          Excellent treatment (10)</p>	
<b>Comment</b>	Comments (e.g. refinements, extensions, sources of error etc.)	10	<p><b>Two</b> comment on <b>refinement / extension / source of error</b>          reliability of data / how process could be improved / sources of error / possible reason for unexpected result / possible extension of the investigation</p> <p>Limited comprehension (1 + 1)  <b>OR</b>          Good comprehension (3 + 3)  <b>OR</b>          Excellent comprehension (5 + 5)</p>	

## OWN INVESTIGATION – Marking Criteria for Coursework B

Guide to mark assignment				
Section	Aims	Total Mark	Total Mark	H.L.
<b>Introduction</b>	Clear statement of the problem/topic to be investigated, background research undertaken in preparation for the investigation: people, books, websites, etc. as sources of relevant information.	10	<b>Statement / identification of problem / hypothesis statement / topic to be investigated:</b> (must elaborate on title) <b>Research:</b> Any <i>two</i> references to book / web / person consulted etc (must qualify why this person was a suitable consultant)	(6) (2 × 2)
<b>Preparation and planning</b>	Identification of variables and controls List of equipment needed for the investigation List of tasks to be carried out during the investigation	40	<b>Variables &amp; Controls*:</b> Identify any <i>five</i> variables / controls: Must include <b>two</b> essential variables with respect to title. Any <b>three</b> other relevant variables <b>Equipment needed:</b> Identify any <i>five</i> pieces of equipment used <b>List of tasks:</b> Identify any <i>three</i> tasks carried out in investigation * If variables/controls not relevant to the type of investigation undertaken allow 10 marks for stating so and then readjust equipment to (5 × 3) and tasks to (3 × 5)	(2 × 4) (3 × 4) (5 × 2) (2 + 4 + 4)
<b>Procedure</b>	Procedure, apparatus, safety, data collection/observations <ul style="list-style-type: none"> <li>▪ Safety precautions required for this investigation</li> <li>▪ Procedures followed in the investigation</li> <li>▪ Recorded data/observations</li> </ul>	40	<b>Safety:</b> Identify any <i>two</i> safety precautions followed in conducting the investigation <b>Procedure:</b> State or Show Identify any <i>eight</i> steps taken in conducting investigation <b>Recorded Data / Observations:</b> Identify any <i>two</i> points related to method used [Table presentation likely]	(2 × 3) (8 × 3) (2 × 5)
<b>Analysis &amp; Conclusions</b>	Analysis <ul style="list-style-type: none"> <li>▪ Calculations/data analysis</li> <li>▪ Conclusion(s) and evaluation of results(s)</li> </ul>	40	<b>Calculations / Data analysis:</b> <i>Two</i> relevant comments analysing data or calculation or graph Limited manipulation of data <b>OR</b> Good manipulation of data <b>Conclusion:</b> <i>Two</i> relevant conclusions drawn and evaluation of results obtained Limited treatment <b>OR</b> Good treatment	(7) } × 2 (10) } (7) } × 2 (10) }
<b>Comment</b>	Comments (e.g. refinements, extensions, sources of error etc.)	20	<i>Three</i> comments on <b>refinements / extensions / sources of error</b> e.g. What was learnt* / reliability of data / how process could be improved / sources of error / extension of investigation / possible reason for unexpected result * Other than conclusions already stated	(5 + 5 + 10)

