



**Coimisiún na Scrúduithe Stáit**  
*State Examinations Commission*

# **JUNIOR CERTIFICATE 2008**

## **MARKING SCHEME**

### **SCIENCE (REVISED SYLLABUS)**

#### **HIGHER LEVEL**

# Junior Certificate Examination

## SCIENCE

### Higher Level Paper

#### WRITTEN EXAMINATION PAPER

**Three Sections: Biology, Chemistry and Physics, all questions to be answered by candidates.**

**Biology** Question 1 (52 marks); Question 2 (39 marks); Question 3 (39 marks)

**Chemistry** Question 4 (52 marks); Question 5 (39 marks); Question 6 (39 marks)

**Physics** Question 7(52 marks); Question 8 (39 marks); Question 9 (39 marks)

#### COURSEWORK A

**Count the number of mandatory biology investigations/experiments claimed on page 5 of the Coursework booklet and enter it in the Coursework A grid on the cover page.**

**Count the number of mandatory chemistry investigations/experiments claimed on page 6 of the Coursework booklet and enter it in the Coursework A grid on the cover page.**

**Count the number of mandatory physics investigations/experiments claimed on page 7 of the Coursework booklet and enter it in the Coursework A grid on the cover page.**

**Total the number of investigations / experiments claimed and award 2 marks per investigation / experiment to an amount not exceeding maximum 60 marks.**

#### COURSEWORK B

**Mark the SEC nominated investigations according to the agreed criteria. Enter the marks for each section in the Coursework B grid on the cover page of the coursework booklet.**

*or*

**Mark the candidate nominated investigation according to the agreed criteria. Enter the marks for each section in the Coursework B grid on the cover page of the coursework booklet.**

SCIENCE (REVISED SYLLABUS) HIGHER LEVEL 2008  
Summary of Marking Scheme

**BIOLOGY**

- Question 1 (7 × 6 + 1 × 10)
- Question 2      (a) (2 × 3), (2 × 3), (2 × 3)  
                      (b) (5 × 3), (2 × 3)
- Question 3      (a) (3), (3), (2 × 3), (3 × 3)  
                      (b) (2 × 3), (3), (3), (2 × 3)

**CHEMISTRY**

- Question 4 (7 × 6 + 1 × 10)
- Question 5      (a) (2 × 3), (3), (2 × 3), (2 × 3)  
                      (b) (3), (2 × 3), (3), (2 × 3)
- Question 6      (a) (2 × 3), (3 × 3), (3)  
                      (b) (3 × 3)  
                      (c) (3 × 3), (3)

**PHYSICS**

- Question 7 (7 × 6 + 1 × 10)
- Question 8      (a) (2 × 3), (3 × 3), (2 × 3)  
                      (b) (3)  
                      (c) (3), (3), (3), (2 × 3)
- Question 9      (a) (3 × 3), (3 × 3), (3)  
                      (b) (3), (3), (2 × 3), (3), (3)

**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 one from:** organism/ living thing/ plant/ animal/ bacterium... (3)  
**any one from:** breaks down (feeds on) (releases materials from) dead plants (dead animals) (organic material) (3) [6]
- (b) **red blood cell:** transports oxygen (3)  
**white blood cell any one from:** fights infection (diseases)/ makes antibodies immunity/ kills bacteria (microbes) (3) [6]
- (c) **any two from:** reduce burning of fossil fuels/ reduce release of sulfur (nitrogen) oxides/ reduce release of CFCs/ use only unleaded petrol/ reduce release of dioxins/ use smokeless fuels/ treat sewage/ avoid slurry spills/ dispose of waste properly/ recycle/ reuse/ plant trees /stop deforestation/ maintain biodiversity... (2 × 3) [6]
- (d) **phloem, any one from:** food/ sugar/carbohydrate/ named soluble sugar e.g. sucrose/ hormone/ named plant hormone (3)  
**xylem:** minerals/ named mineral (3) [6]
- (e) **what?:** chromosomes (3)  
**role:** inheritance/ passing on of characteristics/ produce protein (3) [6]  
**accept any named inherited character** e.g. hair colour
- (f) **why?:** higher pressure/ blood is pumped (3)  
**difference, any one from:** no valves in arteries/ veins have valves/ small lumen in arteries/ large lumen in veins (3) [6]
- (g) **(i) vitamins any one from:** lack of a vitamin can cause disease/ good skin/ night vision/ prevents scurvy (keeps gums healthy)/ prevents rickets/strong bones/ helps blood clotting/ prevents colds/ used in life processes/ prevents anaemia/ good hair/ gives energy/... (3)  
**(ii) minerals any one from:** lack of a mineral can cause disease/ red blood cells (can prevent anaemia)/ strong bones (teeth)/ growth/ healthy nerves / used in life processes/... (3) [6]  
**note:** look for different answers in (i) and (ii)
- (h) **(i) iris, any one from:** controls the amount of light entering the eye / controls the brightness of image on retina/ controls size of pupil (3)  
**(ii) pupil:** allows light to enter the eye (3)  
**Why?, any one from:** light absorbed/ no light reflected out (4) [10]

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

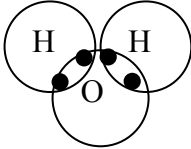
- (a) (i) How?     **renal arteries:** contain waste products (urea) (water) (salts) (waste)... (3)  
**renal veins:** contain no waste products (waste) (urea)... (3)     **[6]**  
**If no reference is made, in the answer, to arteries or veins but correct answers appear in the right order allow 3 marks**  
**alternative answer:** ‘more of the waste CO<sub>2</sub> in vein’  
**allow 3 marks**
- (ii) Account     kidneys remove (eliminate) (filter) (excrete) (waste/s) (urea).../ (3)  
from the blood (3)     **[6]**  
**alternative answer (matched to alternative answer above):** clear reference to *respiration* **allow 3 marks**  
*CO<sub>2</sub> produced* **allow 3 marks**  
**second alternative answer:** blood with waste/s enters the kidney **allow 3 marks**. Blood without waste/s leaves the kidney **allow a second 3 marks**
- (iii) What?     transport (pass) (carry) urine (urea) (water) (salts) (waste/s)... (3)  
to bladder (3)     **[6]**
- (b) (i) Name     amylase (3)     **[3]**
- (ii) Name     starch/ named starchy food (3)     **[3]**
- (iii) Describe     mix the starch with water/ produce saliva/ cut/ crush/ grind/ grate/ chew bread... (3)     **[3]**
- (iv) Give     37/ body temperature/ 34-40/ room temperature (3)     **[3]**
- (v) How?     10 minutes/ 5-30 minutes/ one day *matched* with room temperature (3)     **[3]**
- (vi) Describe     add iodine (3)  
mixture does not turn blue-black/ mixture stays the colour of iodine solution (yellow), (orange), (brown) (3)  
**or** (3)     **or**  
Fehling’s solution/ Benedict’s solution (3)  
red/ orange/ brown (3)     **[6]**
- accept an equivalent experiment using a different enzyme and substrate**

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

- (a) (i) Mark Vagina clearly labelled with S, **no arrow required, if an arrow is used the point of the arrow is taken as the part labelled** (3) [3]
- (ii) Mark any part of the fallopian tube clearly labelled with F, **no arrow required, see above.** (3) [3]
- (iii) Explain fusion (joining) (union)/ forms zygote (3)  
 sperm (male gamete) and egg (female gamete) (3) [6]  
**accept sex cell or nucleus for gamete above  
 allow 6 marks for "sperm enters egg"**
- (iv) State **before, any two from:** contractions (muscles in the uterus contract) (labour begins)/ 'breaking of the waters' (liquid, or amniotic fluid or fluid escapes) / cervix dilates(widens)/ baby is pushed through the cervix (into the vagina)/ baby head first/ vagina widens... (2 × 3)  
**after, any one from:** umbilical cord is (clamped) (cut)/ placenta separates from the uterus/ placenta/ (membranes), (cord), (afterbirth) is expelled/ breasts produce milk/ baby handed to mother/ baby cries... (3) [9]
- (b) (i) Write **any food chain from the food web shown.**
- Plant/s      —————>      Primary consumer
- e.g.      Plant/s      —————>      Mouse (3)
- Primary consumer      —————>      Secondary consumer
- e.g.      Mouse      —————>      Dog/ Fox (3) [6]
- accept letters in place of names for organisms  
 named organism and adaptation *matched***
- (ii) Select e.g. mouse has fur/ teeth/ ears/ legs... (3) [3]
- (iii) What? living things (organisms) needing the same resource **or a correct example of competition** e.g. plants compete for space (water) (minerals) (light)... (3) [3]
- (iv) Give **any example, from the food web, giving a way, in which, two named organisms depend on each other for survival.** Three possible examples are given below:  
 e.g. the butterflies depend on plants for food (3)  
       plants depend on butterflies for pollination (3)  
**or** **or**  
 e.g. the plants produce O<sub>2</sub> (use CO<sub>2</sub>) (3)  
       the mouse uses O<sub>2</sub> (produces CO<sub>2</sub>) (3)  
**or** **or**  
 e.g. mouse eats seeds (berries) (fruit) (3)  
       disperse seeds (3) [6]  
**allow 3 marks for an example of dependence only:**  
 e.g. birds eat flies (butterflies) i.e. *depend* on them for food

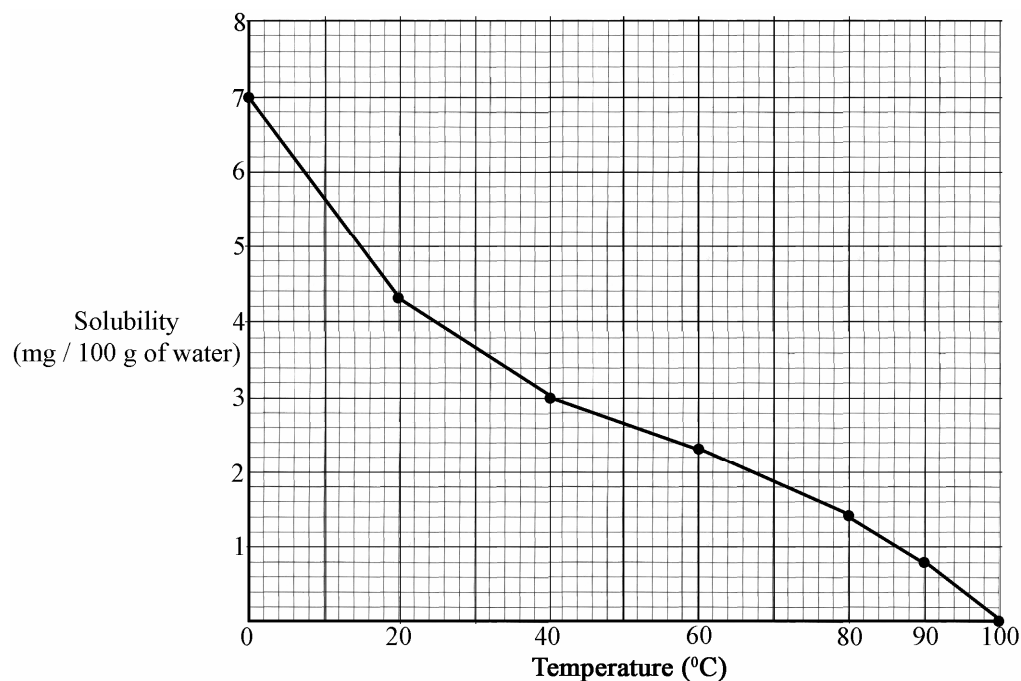
**Chemistry (130 MARKS)**  
**Answer each of the questions 4, 5 and 6.**

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

- (a) **liquid:** hydrochloric acid (HCl), **accept any suitable named acid.**  
**accept** vinegar (3)  
**solid:** marble/ calcium carbonate/ CaCO<sub>3</sub>/ bread soda/ sodium  
hydrogen carbonate (sodium bicarbonate)... (3) [6]  
**accept any named carbonate or hydrogen carbonate**  
**(bicarbonate) including common names e.g. bread soda**
- (b) calcium, magnesium, zinc, copper (6) [6]  
**allow 3 marks if there is one error in listing i.e. 3 out of 4 in correct order**  
**or if the metals listed in order of increasing reactivity**
- (c) **charge:** *electron* negative (-/-ve), *proton* positive (+/+ve) (3)  
**mass:** *electron* 'zero'/very small/one 1836<sup>th</sup> ( one 2000<sup>th</sup> ) of the of the mass  
of a proton/ less than a proton  
*proton* 1/ greater than the electron/ ×1836 (×2000) the mass of an electron (3) [6]
- (d)  two shared pairs shown, one pair between each hydrogen  
atom and the oxygen atom (shape not required) (2 × 3) [6]  
**accept a diagram using dashes/lines to represent**  
**shared pairs**  
*or* *or*  
**correct description:** shared pair between first H atom  
and O atom, shared pair between second H atom and O (2 × 3)  
**[no diagram deduct 3 marks]**  
**allow 3 marks:** for a diagram showing two shared pairs  
(two single bonds) in 'HO'<sub>2</sub> (wrong formula)
- (e) **precaution shown in photo, any one from:** wearing goggles/ looking through  
wall (side) of test tube/ tube in holder/ apparatus in centre of bench (3)  
**precaution when heating, any one from:** point tube away/  
add boiling chips to a liquid/ use small amounts/ lab coat/  
heat gently/ screen/ gloves/ tie hair back... (3) [6]
- (f) **name, any one from:** enamelling/ coating with plastic/ chromium/ plating/  
galvanising (coating with zinc)/ greasing(oiling)/ alloying (mixing with other  
metals)/ named alloy e.g. stainless steel/ painting (3)  
**how?: prevents air or water contacting (reacting with) the iron, only one**  
**required** (3) [6]
- (g) **fossil fuel:** fuel produced from dead animals and plants (3)  
**allow 3 marks for a named fossil fuel,** excluding natural gas  
**main constituent:** methane (CH<sub>4</sub>) (3) [6]
- (h) (i) white (2)  
(ii) blue *stayed* blue and red *turned* blue (2 × 2)  
(iii) the product (it) is a base (alkali) (4) [10]  
**note if colour change in (ii) above is given 'blue turns red' give no marks for**  
**(ii) but if the candidate then gives 'acid' in (iii) i.e. matched colour change**  
**and conclusion allow 4 marks.**

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

(a) (i) Draw



four points plotted correctly (3)  
 curve drawn correctly (through the points) (3) [6]

(ii) Use 3.6 **allow +/- 0.3** (3) [3]

(iii) What? solubility decreases (3)  
 as temperature increases (3)  
**or** (3)  
 solubility increases (3)  
 as temperature decreases (3) [6]

(iv) What? less oxygen (3)  
 for respiration (breathing)/ fish (animals) die (3) [6]

(b) (i) Define number of protons (positive charges in the nucleus)/ (3)  
 number of electrons in a *neutral atom* (3) [3]

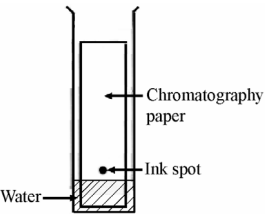
(ii) Explain same number of protons / same atomic number/ same element (3)  
 different number of neutrons/ different mass number (3) [6]

(iii) What? alkaline earth (3) [3]

(iv) Why? outer orbit (shell) (energy level) (3)  
 'full' of electrons/ octet (eight electrons)/ stable (3) [6]



**Question 6. (39 marks) All items, (a), (b) and (c).**

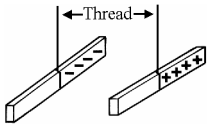
- (a) (i) What? attractive (electrical) force (3)  
 between positive and negative (oppositely charged) ions (3)  
**or** **or**  
**some candidates may describe the formation of an ionic bond, allow marks for this answer as follows:**  
 transfer of electron/s from one atom to another (3)  
 charges (ions) attract each other (3) [6]  
**note: this answer may be given as a diagram or an equation**  
**allow 3 marks for:** bond between a metal and a non-metal
- (ii) Name/ Give **name:** table salt, copper sulphate (2 × 3)  
**allow 3 marks for 'B'**  
**reason:** conduct electricity/ bulb glows (3) [9]
- (iii) Why? allow the particles to move/ the solids would not conduct/ water breaks ionic bonds (3) [3]
- (b) Classify **acidic:** lemon juice/ soda water (3)  
**basic:** tooth paste/ lime water (3)  
**neutral:** pure water (3) [9]
- (c) (i) Describe  **show or state**  
 chromatography (filter) paper (3)  
 ink spot on paper above water (3)  
 water (3) [9]  
**[no diagram deduct 3 marks]**
- (ii) How? **any one from:** no separation (only one colour) for an ink composed of a single colour/ separation (more than one colour) for an ink composed of a mix of coloured inks (3) [3]

**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)**

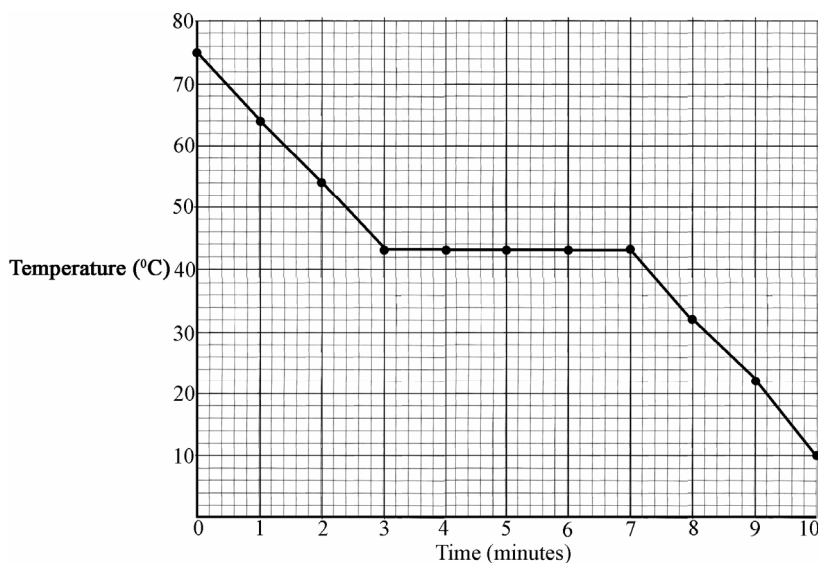
- (a) (i) potential/ stored (3)  
(ii) kinetic (3) [6]
- (b) anticlockwise moment ( turning effect) (3)  
equals (balances) clockwise moment ( turning effect) (3) [6]  
**note:** equals (balances) can be with either statement  
**accept:** ‘left’ and ‘right’ for the directions of rotation in place  
of anticlockwise and clockwise
- (c) **any two from:** weight/ keeps things on the surface of the  
earth/ causes to fall... (2 × 3) [6]
- (d) **any two from:** A is blue/ B is green and yellow (**accept** green  
alone)/ C is brown (2 × 3) [6]
- (e) **advantage, any one from:** renewable/ no pollution/ does not  
increase global warming/ secure energy source/ wave energy  
is ‘free’... (3)  
**disadvantage any one from:** energy of waves vary/ storms  
could damage (destroy) the device/ corrosion problems/  
‘fouling’ (build-up) by (of) sea creatures/ danger to shipping/  
cost/ problems getting electricity ashore/ no waves... (3) [6]
- (f) **any two from:** heat is a form of energy (temperature is not a  
form of energy)/ temperature can be measured at a point  
(heat can not be measured at a point)/ heat is measured in  
Joules/ temperature is measured in <sup>0</sup>C (K)/ differences in  
temperature causes heat to move / temperature is degree of  
hotness (how hot or cold something is)/ heat depends on mass  
(temperature does not depend on mass)/ heat depends on the  
type of substance (temperature does not depend on the type of  
substance)... (2 × 3) [6]
- (g) **is?:** reflection (3)  
**any one from:** water surface acts like a mirror/ water surface  
is flat/ mirror image/ image ‘appears’ on surface/ light does  
not enter water... (3) [6]
- (h) alternating current changes direction, direct current moves in  
the same (fixed) direction (2 × 3)  
**accept correct voltage vs. time graphs for a.c. (e.g. sine  
wave) and for d.c. (line parallel to time axis) for (2 × 3)**  
220-240 (4) [10]

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

- (a) (i) How? the rods can be charged by friction (rubbing) with a cloth (3) [6]  
(3)
- (ii) Describe What?  **show or state**  
suspend rod/s (3)  
bring the rods close/ together (3)  
**result:** the rods attract each other (3) [9]  
**[no diagram deduct 3 marks]**
- (iii) Explain dampness/ moisture/ water (3)  
allows electric charge to move (escape)/ earthed/ (3)  
does not allow charge to build up... (3)  
**or** **or**  
**assume dry conditions if candidate answers as below:**  
charge builds by friction with wheels (3)  
charge does not leak away (3) [6]
- (b) Give **any one from:** magnifying glass/ microscope/ camera/  
projector/ binoculars/ telescope/ spectacles (glasses)/  
start a fire/ focus infra red (IR) (heat)/spotlight... (3) [3]
- (c) (i) What? mixture of different coloured lights (made of many  
colours)/ colours listed (3) [3]
- (ii) What? dispersion (3) [3]
- (iii) What? spectrum (3) [3]
- (iv) State X is red (3)  
Y is violet/ purple (3) [6]

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

(a) (i) Draw



six points plotted correctly (6)  
*or*  
 three points plotted correctly (3)  
 curve drawn correctly (through the points) (3) [9]

(ii) Explain cooling (temperature falls) (graph shows decrease in temperature) (3)  
 liquid to solid/ change of state/ latent heat (3)  
 cooling (temperature falls) (graph shows decrease in temperature) (3) [9]

(iii) Use 43 +/- 1 (3) [3]

(b) (i) Name light/ photons (3) [3]

(ii) Name chemical (3) [3]

(iii) Give chemical to electrical (3)  
 electrical to light (3) [6]  
**note:** chemical to electrical to light merits (2 × 3)  
**allow 3 marks for:** chemical to light

(iv) Identify LED (light emitting diode) (3)  
Give **any one from:** use very little energy (current)/ cheap/  
 reliable/ can be switched on and off rapidly without ‘blowing’/  
 long lasting/ fit into small spaces/ arrays (lots) can be used/ (3) [6]  
 energy efficient/...

## BIOLOGY – Marking Criteria for Coursework B

<u>Guide to mark assignment</u>				
Section	Aims	Total Mark	Investigate the effectiveness of using commercial flower preservative compared with two other (food) household substances	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.	5	<b>Statement / identification of problem / topic to be investigated:</b>	(3)
			<b>Research:</b> Any reference to book / internet (web) / person consulted etc.	(2)
<b>Preparation and planning</b>	Identification of variables and controls as required	20	<b>Variables / Controls :</b> Identify any <b>four</b> variables and/or indicate how some of these need to be controlled or held fixed: type of plant food and 2 household substances / type of flower (same / named flower) / time for flower to die / flowers to be cut at same time / stem length / number of flowers per container / mass of preservative / volume of water used / identical containers / place in similar environment (light or/and temperature)	(2 × 2 + 2 × 3)
	List of equipment needed for the investigation		<b>Equipment needed:</b> Identify any <b>four</b> pieces of equipment used: Flowers / water / containers / commercial plant food / other plant foods (household substances) / pestle & mortar / scissors (scalpel) / measuring cylinder / balance (scales)	(2 × 1 + 2 × 2)
	List of tasks to be carried out during the investigation		List of tasks: Identify any <b>three</b> tasks carried out in investigation: get flowers / cut flowers / make up feed solutions / put flowers in feed solutions / monitor / record data / graph	(2 × 1 + 2)

<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:</b> State <u>or</u> Show          Identify any <i>five</i> steps taken in conducting investigation:          get flowers /          cut stems of flowers to same length /          measure length of flowers / mass of plant food / measure volume of water /          make up feed solutions /          put flowers in feed solutions /          place in same environment /          monitor / record data /          graph /          repeat</p> <p><b>Recorded Data / Observations:</b> Identify any <i>two</i> points related to method used:  <b>life</b> of flowers for // different <b>foods</b>          [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 relevant</i> 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 investigation</p> <p>Limited comprehension (1 + 1)  <b>OR</b>          Good comprehension (3 + 3)  <b>OR</b>          Excellent comprehension (5 + 5)</p>	

**CHEMISTRY – Marking Criteria for Coursework B**

		<u>Guide to mark assignment</u>		
Section	Aims	Total Mark	Investigate how particle size affects the speed of loss in mass from the reaction of marble chips and dilute HCl	
			<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	<b>Statement / identification of problem / topic to be investigated:</b>	(3)
			<b>Research:</b> Any reference to book / internet (web) / person consulted etc	(2)
<b>Preparation and planning</b>	Identification of variables and controls as required	20	<b>Variables / Controls :</b> Identify any <b>four</b> variables and/or indicate how some of these need to be controlled or held fixed: particle size (size of chips) / fixed mass of chips / volume of HCl / conc. of HCl / change in mass (of apparatus) / same reaction vessel / time taken for mass to change / same temperature / same amount of cotton wool	(2 × 2 + 2 × 3)
	List of equipment needed for the investigation		<b>Equipment needed:</b> Identify any <b>four</b> pieces of equipment used: reaction flask / electronic balance / weigh boat (filter paper) / cotton wool / marble chips / HCl solution / measuring cylinder / Safety glasses / gloves / stopclock (watch)	(2 × 1 + 2 × 2)
	List of tasks to be carried out during the investigation		List of tasks: Identify any <b>four</b> tasks carried out in investigation: sort marble chips by size / weigh marble chips / measure acid / react marble chips with acid / measure mass loss / record data / graph	(4 × 1)

<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</i> specific safety precautions followed in conducting the investigation</p> <p><b>Procedure:</b> State <u>or</u> Show          Identify any <i>five</i> steps taken in conducting investigation:          how chips were sorted / equal mass of different chips / acid was measured / how to start reaction / plug vessel with cotton wool / how to measure mass loss (mass recorded at timed intervals) / record data / repeating for different sized chips / repeat to get averages/ graph results</p> <p><b>Recorded Data / Observations:</b> Identify any <i>two</i> points related to method used: indication of <b>sized chips</b> and <b>mass loss in specified time</b> /          [Table presentation likely]</p>	<p>(2 + 3)</p> <p>(1 + 1 + 2 + 3 + 3)</p> <p>(2 + 3)</p>
<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>          e.g. 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>	



**PHYSICS – Marking Criteria for Coursework B**

		Guide to mark assignment	
Section	Aims	Total Mark	H.L.
			Investigate the thermal insulation properties of 3 fabrics including denim when dry and wet
<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> (3)</p> <p><b>Research:</b> Any reference to book / internet (web) / person consulted etc. (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> (2 × 2 + 2 × 3)</p> <p>Identify any <b>four</b> variables and/or indicate how some of these need to be controlled or held fixed:                      type of fabric / amount (size) of fabric / quantity of water in calorimeters (containers) /                      initial temp. of water in calorimeter (containers) / drop in temperature / identical (similar) calorimeters (containers) /                      same wetting procedure /                      same conditions /                      same (similar) lids /                      same length of time</p> <p><b>Equipment needed:</b> (2 × 1 + 2 × 2)</p> <p>Identify any <b>four</b> pieces of equipment used:                      three calorimeters (containers) /                      denim and two other fabrics /                      thermometers (temp probe) /                      hot water / graduated cylinder(s) /                      kettle (Bunsen / hot plate) /                      elastic bands (method of securing)/                      scissors / gloves (tongs) / lids /                      stop clock ( watch / timer)</p> <p>List of tasks: Identify any <b>four</b> tasks carried out in investigation: (4 × 1)                      measuring (cutting) same size pieces of fabric / attach fabric to calorimeters/                      measure volume of water / add hot water /                      monitor temperature over time /                      soak fabric /                      record data /                      graph</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</i> specific safety precaution followed in conducting the investigation</p> <p><b>Procedure:</b> State <u>or</u> Show          Identify any <i>five</i> steps taken in conducting investigation:          measuring (cutting) pieces of fabric / attaching fabric to calorimeters (containers) / heating the water / measuring hot water / adding hot water into calorimeters (containers) / note initial temperature / recording temperature drop / record data / repeat to verify / soak fabrics / repeat with wet fabrics / graph results</p> <p><b>Recorded Data / Observations:</b> Identify any <i>two</i> points related to method used: temperatures over time // for wet and dry material [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	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: <b>Equipment needed:</b> Identify any <i>five</i> pieces of equipment used <b>List of tasks:</b> Identify any <i>four</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)	(5 × 4) (5 × 2) (3 × 2 + 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 <u>or</u> 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 <b>or</b> calculation <b>or</b> graph Limited manipulation of data <b>OR</b> Good manipulation of data <b>Conclusion:</b> <i>Two</i> relevant conclusions drawn <b>or</b> evaluation of results obtained Limited treatment <b>OR</b> Good treatment	(7) } (10) } × 2  (7) } (10) } × 2
<b>Comment</b>	Comments (e.g. refinements, extensions, sources of error etc.)	20	<b>Three</b> 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)