

An Roinn Oideachais Agus Eolaíochta

Junior Certificate Examination 2001

Science

Ordinary Level

Marking Scheme

Introduction

In considering this marking scheme the following points should be noted.

- 1 Words or expressions separated by a solidus, /, are alternative answers which are equally acceptable for the award of the assigned mark
- 2 Words or expressions in round brackets, (), are alternatives to parts of an acceptable answer
- 3 In some instances acceptable partial answers are given in square brackets, [], after the full answer to the particular item. In such cases, the marks indicated within the brackets cannot be awarded in addition to any marks already awarded for the item.
- 4 Marks given in square brackets in the right hand column are the totals for parts of questions
- 5 The descriptions, methods and definitions in the scheme are not exhaustive and alternative valid answers are acceptable.
- 6 The detail required in any answer is determined by the context and manner in which the question is asked and by the number of marks assigned to the item in the examination paper. In any instance, therefore, the detail required may vary from year to year

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|-------------------------------------|
| SECTION A – Core (144 MARKS) |
|-------------------------------------|

Any 12 parts [12 × 12 marks]

- | | | | | |
|-------|-----|--|-------------------------------|------|
| 1. | (a) | Tripod Funnel Graduated (measuring) cylinder Round bottom flask / flask | (3) (3) (3) (3) | [12] |
| <hr/> | | | | |
| | (b) | Any two of: Mercury / Venus / Mars / Jupiter / Saturn / Uranus / Neptune / Pluto 365 days / 365 25 days / a year / 12 months / 52 weeks Any one of no oxygen (air) / no water / unsuitable temperature / unsuitable atmosphere | (2 × 3) (3) (3) | [12] |
| <hr/> | | | | |
| | (c) | Any one of iron / steel / cobalt / nickel Any valid use Repel Attract | (3) (3) (3) (3) | [12] |
| <hr/> | | | | |
| | (d) | Body Temperature Mercury / alcohol 0 °C / 273 K / 0° / 0 / 32 °F | (3) (3) (3) (3) | [12] |
| <hr/> | | | | |
| | (e) | Insulation Conduction Condensation Radiation | (3) (3) (3) (3) | [12] |
| <hr/> | | | | |
| | (f) | Corrosive Flammable Harmful Toxic | (3) (3) (3) (3) | [12] |
| <hr/> | | | | |
| | (g) | Aluminium Chlorine Neon Copper | (3) (3) (3) (3) | [12] |
| <hr/> | | | | |
| | (h) | Fuel / correct example Any one of: water / CO ₂ / powder / foam / halon / sand Any valid precaution e.g. install fire (smoke) alarm / use fire guard / etc | (3) (3) (6) | [12] |

- (i) **PHYSICAL**
 Dissolving sugar in tea (3)
 Candle melting (3)
- CHEMICAL**
 Coal burning (3)
 Milk going sour (3) [12]
-

- (j) **Any one of:** fizzy drinks / photosynthesis / fire extinguishers / stage effects / refrigeration / greenhouse effect (3)
- Limewater OR Lit taper (3)
 Milky OR Quenches (3)
- Any one of:** nitrogen / oxygen / water vapour / argon / named noble gas / etc (3) [12]
-

- (k) Enamel / crown (3)
 Pulp cavity / nerve / blood vessel (3)
 Calcium (3)
Any one of brush / clean / floss / avoid sugar in diet / visit dentist / use fluoride toothpaste (3) [12]
-

- (l) Heart / ventricle (3)
 Ovary (3)
 Kidney (3)
 Muscle / tendon / sinew (3) [12]
-

- (m) Hearing ear (3)
 Skin touch / feel (3)
 Eye sight (3)
 Smell nose (3) [12]
-

- (n) Flower / petal (3)
 Root (3)
Any one of reproduction / attracts insects / makes nectar (3)
Any one of anchors / absorbs (water) (minerals) (nutrients) (named nutrient) / food storage (3) [12]
-

- (o) **Any two of.** movement / respiration / excretion / sensitivity / reproduction / growth (2 × 3)
- Any one of** food / shelter / produce oxygen / pleasure / decoration / material / named materials / any correct example (3)
- Any one of** food / pets / work / transport / named materials / any correct example (3) [12]

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| SECTION B – PHYSICS (72 marks) |
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Any two questions (2 × 36 marks)

Question 2 [36 marks]

- (a) (i) Area (3)
- (ii) Time (3)
- (iii) Mass (3)
- (iv) Density (3) [12]

- (b) (i) **Any correct example, e.g. allows motion / tyres / brakes / walking / sanding / erasers** (3)
- (ii) **Any correct example, e.g. wear away machine parts / slows down motion / wastes energy** (3)
- (iii) **Any two forces push / pull / bend / weight / electric / magnetic / gravity / twist** (2 × 3) [12]

(c) **State or show (4 × 3)**

- | | | | | |
|--|-----------|--|-----------|--|
| Glass of water Card on top Invert Card stays on | OR | Can of water Boil Seal Can collapses | OR | Plastic bottle Suction pump Remove air Bottle collapses |
| OR | | Ruler on desk Cover with sheet of paper Strike ruler Ruler breaks / paper tears (does not rise) | | (3) (3) (3) (3) [12] |

[No labelled diagram – deduct 3 marks]

[Note: a diagram must have at least one label to merit marks]

Question 3 [36 marks]

- (a) (i) Volt (3)
(ii) Ampere (3)
(iii) Watt (3)
(iv) Kilowatt-hour (3) [12]

- (b) (i) Heats water / temperature rises / water boils (expands) / switch is open – nothing happens (3)
(ii) Any appliance with heating effect (3)
(iii) $3 \times 2 / 6$ (3)
 $6 \times 8 / 48$ (3) [12]

[48 only – allow 2×3 marks]

- (c) **State or show (4×3)**
Container / thermometer (3)
Contains liquid (3)
Heat (3)
Liquid level rises (3) [12]

[No labelled diagram – deduct 3 marks]

Question 4 [36 marks]

- (a) (i) Ability (3)
to do work / move something (3)
- (ii) **Any two forms of energy (except light)** (2 × 3) [12]
potential / kinetic / sound / heat / nuclear / electrical / chemical / magnetic
- (b) **RENEWABLE**
- Wave (3)
Wind (3)
- NON RENEWABLE**
- Coal (3)
Oil (3) [12]
- (c) (i) Blue (3)
- (ii) Yellow (3)
- (iii) White (3)
- (iv) Any correct example, e.g. rainbow (3) [12]

| |
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| SECTION C – CHEMISTRY (72 marks) |
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Any two questions (2 × 36 marks)

Question 5 [36 marks]

- (a) C Carbon (3)
Na Sodium (3)
Cl Chlorine (3)
N Nitrogen (3) [12]

- (b) (i) Distillation (6)
(ii) Condenser / Liebig (3)
(iii) Alcohol (3) [12]

(c) **State or show (4 × 3)**

- | | | | |
|----------------------|-------------------|-------------------|----------|
| Filter paper / sieve | Mixture in beaker | Mixture in vessel | (3) |
| Pour water and sand | Allow to settle | Heat | (3) |
| Water goes through | Pour off water | Water boils off | (3) |
| Sand stays behind | Sand stays behind | Sand stays behind | (3) [12] |

[No labelled diagram – deduct 3 marks]

Question 6 [36 marks]

- (a) (i) Sulphur dioxide (3)
- (ii) **Any one of** harms trees / kills fish / affects buildings / corrodes metals / destroys lakes / causes pollution (3)
- (iii) Universal indicator (pH paper) / pH meter (3)
- Colour gives pH / read meter (3) [12]
- [Litmus paper changes colour – 3 marks only]
- (b) (i) Hydrogen / H (3)
- Oxygen / O (3)
- (ii) Surface tension (6) [12]
- (c) (i) B (3)
- (ii) Boiling / ion exchange (3)
- (iii) **Any one of** good for teeth / nice taste / contains calcium / good for brewing / good for tanning (3)
- (iv) **Any one of** blocks pipes / wastes soap / produces scum (3) [12]

Question 7 [36 marks]

- (a) (i) Mixture metals (3)
(3)
- (ii) Any named alloy (3)
- (iii) Any matching use (3) [12]
- (b) (i) A (3)
- (ii) Remove air (oxygen) (3)
- (iii) **Any two of** painting / oiling / greasing / alloying / galvanising / electroplating / keep dry (2 × 3) [12]
- (c) (i) Electroplating / copper plating / electrolysis (3)
- (ii) Coated with copper / changes colour / becomes heavier (6)
- (iii) Wears away / loses copper / dissolves / becomes lighter (3) [12]

SECTION D – BIOLOGY (72 marks)

Any two questions (2 × 36 marks)

Question 8 [36 marks]

- (a) (i) Pork chop (3)
- (ii) Bread / bran flakes (3)
- (iii) Lemon juice (3)
- (iv) Bran flakes / bread (3) [12]
-
- (b) (i) Stomach (3)
- (ii) Colon / large intestine (3)
- (iii) Reabsorbs water / forms faeces / egestion (3)
- (iv) **Any one of** enzymes / acid / saliva / bile / digestive juices / water (3) [12]
-
- (c) (i) **Any one of** wrist / neck / temple / groin / any accessible artery (3)
- (ii) 72 (3)
- (iii) **Any one of** exercise / fear / fright / work / excitement / named stimulants / heat / stress (3)
- (iv) **Any one of** don't smoke / exercise / reduce fat (salt) intake / reduce stress / healthy diet (3) [12]

Question 9 [36 marks]

- (a) (i) Petal (3)
- (ii) **Any one of:** Pollen / male gamete / pollination / reproduction / fertilisation / male part (6)
- (iii) Sepal (3) [12]
-
- (b) (i) Plant bends (3)
- (ii) Phototropism (6)
- (iii) Gets more light / photosynthesis / growth (3) [12]
-
- (c) (i) Oxygen / O (3)
- (ii) Leaf / stem / chloroplast (3)
- (iii) **Any two of** light / water / carbon dioxide / chlorophyll / heat (2 × 3) [12]

Question 10 [36 marks]

- (a) (i) Nucleus (3)
- (ii) Cell membrane (3)
- (iii) Control centre / brain of cell (3)
- (iv) **Any one of** cell wall / chlorophyll / chloroplast / vacuoles (3) **[12]**
[Must be linked to correct cell]
- (b) (i) Any named habitat (3)
- (ii) Any plant (must match habitat) (3)
- (iii) Any example of animal adaptation (must match habitat) (3)
- (iv) **Any one of** oil / fertilisers / sewage / slurry / agricultural waste / heat / industrial waste / litter / acid rain (3) **[12]**
- (c) (i) Quadrat (3)
- (ii) Count / record number of plants (sedentary animals) (3)
- (iii) Pooter (3)
- (iv) Collect insects / small animals (3) **[12]**

| |
|---|
| SECTION E – APPLIED SCIENCE (72 marks) |
|---|

Any two questions (2 × 36 marks)

Question 11 – Earth Science [36 marks]

- (a) Cumulus Y (3)
- Cirrus X (3)
- Stratus Z (3) [9]
-
- (b) (i) Orbits around / revolves around (3)
- (ii) 28 days / one month / four weeks / 27 – 31 days (3)
- (iii) **Show:**
- Three bodies in line (3)
- Identified (3)
- Correct order (3) [15]
-
- (c) Definite amount of water on surface / in beaker (3)
- Fan (3)
- Record time to evaporate (3)
- Repeat without fan (3) [12]

Question 12 – Horticulture

[36 marks]

- (a) (i) Any common flowering plant, e.g. rose, tulips, daffodils, lily, etc. (3)
- (ii) Misting (3)
- (iii) **Any two of** place in water / cut stems under water / crush end of woody stems / spray with mist / keep in cool place / keep away from direct light / change water / add chemicals (sugar) (disprin) (flower food) (2 × 3) [12]
- (b) (i) **Any two of** water / minerals (nutrients) / support / named nutrient (2 × 3)
- (ii) **Any one of** improve aeration / drainage / loosens up soil / mixing of soil / improve soil texture / make soil fertile / wastes add nutrients / dead bodies become humus (3)
- (iii) **Any one of** pest free / weed free / correct pH / good drainage / feeds plant / nutrient supply / improve soil structure / retains moisture (3) [12]
- (c) Suitable medium (3)
- Sow seeds (3)
- Leave for time (3)
- Count the number of seeds that germinate (3) [12]

Question 13 – Materials Science

[36 marks]

- (a) (i) Petrol (3)
(ii) Cotton (3)
(iii) Oak (3)
(iv) Nylon (3) **[12]**

- (b) (i) Do not bleach (3)
(ii)  (3) **[6]**

(c) **A – PLASTICS**

- (i) Any named plastic (3)
(ii) Use of named plastic (3)
(iii) **State or show (4 × 3)**
Two beakers wrapped with different plastics / two different plastic cups (3)
Fill with hot water (3)
Note temperature drop after interval (3)
Compare (3) **[18]**

[No labelled diagram – deduct 3 marks]

B – TEXTILES

- (i) fibres . fabrics (2 × 3)
(ii) **State or show (4 × 3)**
Mass of two textiles Two textiles (3)
Immerse in water Immerse in water (3)
Dip **OR** Remove (3)
Reweigh Indication of volume absorbed (3) **[18]**

[No labelled diagram – deduct 3 marks]

C – METALS

(i) **Any two of:** Gold / silver / copper / iron / platinum / rhodium (2 × 3)

(ii) **State or show (4 × 3)**

| | | |
|---------------------|-----|-------------|
| Two pieces of metal | (3) | |
| Scratch | (3) | |
| Implement | (3) | |
| Compare mark | (3) | [18] |

[No labelled diagram – deduct 3 marks]

D – TIMBER

(i) **Any named hardwood** e.g. beech, oak, ash, teak, mahogany, ebony, birch, cherry, walnut, rosewood, sycamore, etc (3)

(ii) **Any named manufactured timber** e.g. MDF, hardboard, plywood, blockboard, chipboard, etc (3)

(iii) **State or show (4 × 3)**

| | | |
|--|-----|-------------|
| Support strip of wood | (3) | |
| Add weights to centre (other end) | (3) | |
| Record weight needed to break strip / measure bend | (3) | |
| Repeat with other wood | (3) | [18] |

[No labelled diagram – deduct 3 marks]

Question 14 – Food

[36 marks]

- (a) (i) Ham (3)
- (ii) Pizza / ham / pineapple (3)
- (iii) Pineapple / ham (3)
- (iv) Corn flakes / pineapple (3) [12]
-
- (b) (i) **Any one of** butter / margarine / cheese / etc (3)
- (ii) **Any one of** energy / insulation / protection (3)
- (iii) Benedict's / Fehling's (3)
- (iv) **Any one of** unbalanced diet / mineral (vitamin) deficiency / anorexia /
named dietary condition (3) [12]
-
- (c) **State or show (4 × 3)**
- Shake / blend / churn (3)
- Separates into liquid and solid (3)
- Drain off liquid (3)
- Solid is butter (3) [12]

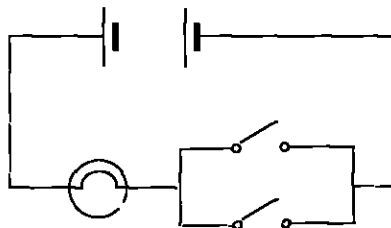
Question 15 – Electronics

[36 marks]

- (a) (i) LDR (3)
- (ii) Variable resistor (3)
- (iii) Diode (3)
- (iv) LED (3) **[12]**

- (b) (i) Correctly assign label X – anywhere on cathode or on base beside cathode (3)
- (ii) Negative (3)
- (iii) **Any one of.** calculators / indicator lights in appliances, e.g. clocks, radios (3)
- (iv) Protect the LED / limit the current (3) **[12]**

(c) **Diagram (4 × 3)**



- Correct symbol battery (3)
- Correct symbol bulb (3)
- Correct symbol switch (3)
- Two switches wired in parallel (3) **[12]**

[Incomplete or incorrect circuit – deduct 3 marks]

Question 16 – Energy Conversions

[36 marks]

- (a) (i) Any correct example (6)
- (ii) Any correct example (6) **[12]**
-
- (b) (i) It moves (3)
- (ii) Moves in opposite direction (3)
- (iii) Motor / loudspeaker / galvanometer (6) **[12]**
-
- (c) **State or show (4 × 3)**
- Food, e.g. nuts, crisps or any combustible food (3)
- Place under test-tube of water (3)
- Ignite food (3)
- Temperature of water rises / water gets hot (3) **[12]**
- [No labelled diagram – deduct 3 marks]**