



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

**JUNIOR CERTIFICATE EXAMINATION, 2005**

**SCIENCE**

**ORDINARY LEVEL**

*Marking Scheme*

# **GUIDELINES TO EXAMINERS ON CANCELLED, REPEATED OR EXCESS ANSWERS**

## **CANCELLED ANSWERS**

**ALL SECTIONS** If an answer is cancelled and a second answer given you should accept the cancellation and award marks for the uncanceled answer. If neither answer is cancelled then accept the first answer offered only and mark accordingly. If the only answer offered is cancelled ignore the cancelling and mark as normal.

**For answers to “describe an experiment” in SECTION B, C, D and E multiple attempts should be dealt with as follows:**

If candidates answer a question or part of a question only once and then cancel, you should ignore the cancelling and mark in the usual way.

If candidates answer a question or part of a question more than once and then cancel one attempt, you should ignore the cancelling and mark all the answers whether cancelled or not, however count only the marks gained in respect to the highest scoring answer. The disallowed marks should be enclosed in square brackets.

## **EXCESS ANSWERS**

**SECTION A** Mark all parts but count only the marks for the twelve highest scoring parts. Disallowed marks should be enclosed in square brackets.

**SECTION B, C D, AND E** Mark all questions but count only the marks awarded to the two highest scoring question in each section. Disallowed marks should be enclosed in square brackets.

**Care should also be taken with options in Q.13 (Materials Science).**

## **DEDUCTION OF MARKS FOR OMITTED DIAGRAM**

Assign marks in the usual way. Then use square brackets to deduct the marks.

# Junior Certificate Examination

## SCIENCE

### Ordinary Level Paper

#### Structure

Five sections A, B, C, D, E.

Section A:		1 question 15 parts in each question (attempt any 12 parts)
Section B:	Physics	3 questions (attempt any 2 questions)
Section C:	Chemistry	3 questions (attempt any 2 questions)
Section D:	Biology	3 questions (attempt any 2 questions)
Section E:	Applied Sc.	6 questions (attempt any 2 questions)

#### Requirements

Without Local Studies:	Section A + any 3 other sections
With Local Studies:	Section A + any 2 other sections

#### Grades

Grade	Marks	
	<i>Without LS</i>	<i>With LS</i>
A	306 - 360	245 - 288
B	252 - 305	202 - 244
C	198 - 251	158 - 201
D	144 - 197	115 - 157
E	90 - 143	72 - 114
F	36 - 89	28 - 71
NG	0 - 35	0 - 27

## Summary of Marking Scheme

### **SECTION A: CORE (144 MARKS)**

**Question 1** Answer any 12 parts (a), (b), (c), etc.

(a), (b), (c) etc.  $4 \times 3$

### **SECTION B: PHYSICS (72 MARKS)**

Answer any TWO questions.

**Question 2**

(a), (b) & (c),  $4 \times 3$

**Question 3**

(a), (b) & (c),  $4 \times 3$

**Question 4**

(a), (b) & (c),  $4 \times 3$

### **SECTION C: CHEMISTRY (72 MARKS)**

Answer any TWO questions.

**Question 5**

(a), (b) & (c),  $4 \times 3$

**Question 6**

(a), (b) & (c),  $4 \times 3$

**Question 7**

(a) & (b)  $4 \times 3$ ; (c),  $2 \times 3 + 6$

### **SECTION C: BIOLOGY (72 MARKS)**

Answer any TWO questions.

**Question 8**

(a), (b) & (c),  $4 \times 3$

**Question 9**

(a), (b) & (c),  $4 \times 3$

**Question 10**

(a), (b) & (c),  $4 \times 3$

**SECTION E: APPLIED SCIENCE**

**(72 MARKS)**

**Answer any TWO questions.**

**Question 11**

(a), (b) & (c),  $4 \times 3$

**Question 12**

(a), (b) & (c),  $4 \times 3$

**Question 13**

(a),  $4 \times 3$ ; (b),  $2 \times 3$ ; (c),  $6 \times 3$

**Question 14**

(a), (b) & (c),  $4 \times 3$

**Question 15**

(a), (b) & (c),  $4 \times 3$

**Question 16**

(a), (b) & (c),  $4 \times 3$

**SECTION A: CORE (144 MARKS)**

**Any 12 parts (a), (b), (c), etc.**

- 1 (a)** **Name:** Measuring (graduated) cylinder (3)  
**Use:** Volume/measuring of liquid (3)
- Name:** Test-tube holder /test tube peg (3)  
**Use:** Holding test-tubes (boiling tubes)/holding named (hot) object (3) [12]
- 

- (b)**
- Volume:  $\text{cm}^3$  (3)  
Area:  $\text{cm}^2$  (3)  
Mass: kg (3)  
Length: cm (3) [12]
- 

- (c)**
- Changed/converted (3)  
Work (3)  
Nuclear (3)  
Chemical (3) [12]
- 

- (d)**
- Trundle wheel (3)  
Ammeter (3)  
Spring balance (3)  
Opisometer/trundle wheel (3) [12]
- 

- (e)**
- 1250 / (subtraction shown) (3)  
 $1250 \times 10 / 12500 / 125$  (3)  
Kilowatthour (3)  
Cooker/heater/dishwasher/washing machine/kettle/shower/dryer (3) [12]
-

- (f)
- Chemical:** boiling an egg, burning of wood (2×3)
- Physical:** melting of ice, tearing of paper (2×3) [12]
- 

- (g)
- Lustre (3)
- Malleability (3)
- Ductility (3)
- Alloys (3) [12]
- 

- (h)
- Solvent (3)
- Dissolves (3)
- Dilute (3)
- Concentrated (3) [12]
- 

- (i)
- Coal/oil/gas/turf(peat) (3)
- Dead plants/dead animals/organic matter (3)
- Carbon dioxide/nitrogen dioxide/sulphur dioxide/water vapour/  
carbon monoxide (3)
- Non-renewable (3) [12]
- 

- (j)
- Air: Mixture (3)
- Nitrogen: Element (3)
- Carbon dioxide: Compound (3)
- Neon/oxygen/argon/krypton/xenon/radon(not hydrogen) (3) [12]
-

**(k)**

Any **two** of:

Respiration/excretion/sensitivity/growth/reproduction/movement/feeding (2×3)

Mosquito/flies/rat/dog/fox/badger (3)

Foxglove(digitalis)/aspirin/cannabis/opium/tea (3) **[12]**

---

**(l)**

Ovary (3)

Womb (uterus) (3)

Anywhere along fallopian tube (3)

Egg (ovum/gamete)/hormone (oestrogen/progesterone) (3) **[12]**

---

**(m)**

Animals (Plants) (3)

Plants (Sun) (3)

Sun (3)

[Sun can only be used once]

Pollination / seed dispersal (3) **[12]**

---

**(n)**

Photosynthesis (3)

Oxygen (3)

Chlorophyll (3)

Water (3) **[12]**

---

**(o)**

Yogurt/cheese/antibiotics/silage/aiding digestion/help immune system (3)

[medicine(research) must be qualified]

Cheese/beer/food/wine/antibiotics/brewing/baking (3)

[medicine(research) must be qualified]

Disease/food poisoning/infection/food spoilage/tooth decay (3)

Measles/mumps/rubella/AIDS/meningitis/pneumonia/SARS/

Colds/flu/polio/rabies/small pox/chicken pox/some cancers (3) **[12]**

---



**SECTION B: PHYSICS** (72 Marks = 2 ×36 marks)

**Question 2** [36 marks]

- (a) Metre/centimetre/kilometre(or symbols or imperial units) (3)  
Second/minute/hour(or symbols) (3)  
m/s ( $\text{ms}^{-1}$ ) / km/h ( $\text{kmh}^{-1}$ ) (or imperial units) (3)  
100÷20 / 5 (3) [12]
- (b) Reflection (3)  
Light/bulb (3)  
Nothing/darkness/card (3)  
Travels in straight lines (3) [12]
- (c) Conduction (3)  
Fair test/all the same/explanation (3)  
Copper (3)  
Best conductor / conducts (3) [12]

**Question 3 [36 marks]**

(a) Any **two** of:

Brakes/tyres/steering wheel/clutch (2×3)

[answers like “in races” must be suitably qualified]

Any **two** locations where friction is problematic e.g.

engine parts(axles/wheel joints/gears/steering parts/any moving parts in contact) (2×3) [12]

(b) Repel/push away (3)

Attract/join together/sticks (3)

Correctly drawn pattern (2×3) [12]

[2 sides gets 3 marks, 2 ends gets 3 marks or 1 end and 1 side gets 3 marks]

(c) **State or Show (4×3)**

**Method 1**

Glass (gas jar) filled with water

Cover with cardboard

Invert

Result / conclusion

**Method 2**

Can with small volume of water (3)

Heat / boil (3)

Seal the can (3)

Result / conclusion (3)

**Points have to be in the context of a valid experiment to merit marks**

**Method 3**

Plastic bottle (3)

Suction pump (3)

Evacuate (3)

Result / conclusion (3)

**Points have to be in the context of a valid experiment to merit marks**

**Diagrams must have at least one label**

**No labelled diagram – deduct 3 marks**

**Question 4** [36 marks]

- (a) Hotness (3)
- Convection (3)
- Tog value (3)
- Insulator (3) [12]

- (b) Brown (3)
- Green & yellow (3)
- Safety/melts (breaks circuit) if current too large/protects appliance/  
prevent overload (overheating/fire) (3)
- Electric shock/electrocution/water conducts electricity (3) [12]

- (c) Gets hot(warmer) (3)
- Thermometer/temperature probe (3)
- Insulation/explanation (3)
- Kettle/washing machine/dishwasher/any appliance with a heating element (3) [12]

**SECTION C :CHEMISTRY** (72 Marks = 2 ×36 marks)

**Question 5** [36 marks]

- (a) A: Melting (3)  
B: Boiling (3)  
C: Condensation (3)  
D: Freezing (3) [12]

- (b) Screening (3)  
Fluoridation (3)  
Chlorination (3)  
Settling (3) [12]

- (c) Boiling(heating)/ion exchange/distilling/bath salts/washing soda)/softener (3)  
Nicer taste/better for brewing (tanning)/minerals/good for bones(teeth) (3)  
Wastes soap/causes scum/blocks pipes(boilers)causes scale in kettles (3)  
B (3) [12]

**Question 6 [36 marks]**

- (a) Sulphur (3)  
Sodium (3)  
Oxygen / O<sub>2</sub> (3)  
Hydrogen/H<sub>2</sub> (3) [12]

- (b) Calcium carbonate(CaCO<sub>3</sub>)/marble chips/any carbonate or hydrogencarbonate (3)  
limestone/chalk (3)  
Hydrochloric acid (HCl)/ acid/named acid (3)  
Limewater (3)  
Fizzy drinks/fire extinguisher/dry ice/photosynthesis (3) [12]

- (c) **State or Show (4×3)**

**FILTRATION**

- Soil and water(mixture) in container (3)  
Funnel with filter paper (3)  
Pour (3)  
Soil remains in filter paper/water passes through (3) [12]

**or**

**EVAPORATION/DISTILLATION**

- Mixture in evaporating dish / beaker / container (3)  
Heat (3)  
Water boils off / evaporate (3)  
Soil remains in evaporating dish (container) (3) [12]

**Points have to be in the context of a valid experiment to merit marks**

**Diagram must have at least on label**

**No labelled diagram – deduct 3 marks**

**Question 7** [36 marks]

- (a) Electrons (3)  
Nucleus (3)  
Neutrons (3)  
Electrons (3) [12]

- (b) Red/pink (3)  
Blue/purple (3)  
Solution 2/pH = 4 (3)  
Solution 4/ pH = 14 (3) [12]

- (c) Electroplating/copper plating/electrolysis (3)  
Wears away/gets smaller/dissolves/erodes (3)

Covered/plated/coated/gets heavier

With copper (2 × 3) [12]

[Allow 3 marks for “*turning pink(brown)*” if neither of other 3s are awarded]

**SECTION D :BIOLOGY**

**(72 Marks = 2 ×36 marks)**

**Question 8 [36 marks]**

- (a) Incisors (3)  
Molars/premolars (3)  
Biting/cutting (3)  
Chewing/grinding (3) [12]
- (b) Oesophagus/food pipe (3)  
Large intestine/colon (3)  
Reabsorb water/absorb water/form faeces(waste)/carry waste (3)  
Enzyme/acid/bile/named (3) [12]
- (c) Lung (3)  
Trachea/windpipe (3)  
Alveolus/air sac [accept bronchioles] (3)  
Keep air tubes open/prevent collapsing of tube (3) [12]

**Question 9** [36 marks]

- (a) Petal (3)  
Sepal (3)  
Pollen/male gamete/male sex cell (3)  
Egg/ovule/female gamete/female sex cell[accept seed] (3) [12]

- (b) Clay[accept silt] (3)  
Gravel/stone (3)  
Clay (3)  
Humus/organic matter[accept named floating organic matter] (3) [12]

(c) **State or Show** (4×3)

- 2 containers with seeds (3)  
One with moisture (3)  
Warm place/leave for time (3)  
Seeds with moisture germinate(grow) (3) [12]

**Points have to be in the context of a valid experiment to merit marks**

**Diagram must have at least one label**

**No labelled diagram – deduct 3 marks**



**Question 10** [36 marks]

(a) Any **two** of:

Anchorage/water absorption/ absorb minerals(nutrients) /food storage (2×3)

Any **two** of:

Any correct function of leaf, stem, flower or bud e.g. Photosynthesis/transpiration/transport of water(minerals) (2×3) [12]

(b) Quadrat (3)

(Measuring) plant distribution(frequency/cover)/number of plants or sedentary animals (3)

Pooter (3)

Collecting insects(small animals) or named examples (3) [12]

(c) B (3)

A (3)

Nucleus (nucleolus) (3)

Vacuole (3) [12]

**SECTION E :APPLIED SCIENCE** (72 Marks = 2 ×36 marks)

**Question 11** [36 marks]

- (a) 365¼ days (3)
- 28 days (3)
- 366 days (3)
- 1 day (3) [12]

- (b) Anemometer (3)
- (Measure) wind speed (3)
- Barometer (3)
- Rain gauge (3) [12]

(c) **State or Show** (4×3)

- Two surfaces / containers (3)
- Same amount of water droplets / same volume of water (3)
- Use of a fan on one (3)
- Compare / result / conclusion (3) [12]

**Points have to be in the context of a valid experiment to merit marks**

**No labelled diagram – deduct 3 marks**

**Question 12 [36 marks]**

- (a) Dead(decaying/rotting) organic(animal or plant) material (3)  
Nutrient rich/pest (weed) free/correct pH/ good drainage/good aeration/  
retains moisture/easy to handle/improves soil(structure/texture)/recycling (3)

Any **two** of:

Burrowing/mixing soil/grinding soil/excretory products

Accept benefit:

Adds humus/improves drainage/ improves aeration/improves texture (2 × 3) [12]

- (b) Carnations/roses/lilies etc. (3)  
Morning (3)

Any **two** of:

Place in water / add nutrients (food/named nutrient or chemical) / crush end of woody stems /

Spray with mist / keep away from direct sunlight / keep cool / change water (2 × 3) [12]

- (c) Aphid or a named aphid e.g. greenfly (3)  
Accept valid plant e.g. roses/ cabbage/ dahlia (3)

Any **two** of:

Egg/ nymph/ wingless female/ winged female(male)/adult (2×3) [12]

**or**

Cabbage white butterfly (accept butterfly) (3)

Accept valid plant e.g. cabbage/cauliflower/broccoli(member of brassica family) (3)

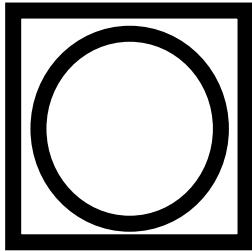
Any **two** of:

Egg / larva(caterpillar)/pupa(chrysalis)/adult(imago) (2×3) [12]

**Question 13** [36 marks]

- (a) Metal (3)
- Timber (3)
- Plastic (3)
- Textile (3) [12]

- (b) Do not bleach (3)



(3) [6]

(c)

**A: PLASTICS**

- (i) Oil / crude oil (3)
- (ii) Any valid use: bags/silage cover/cups/ruler/bottles/milk crates (3)
- (iii) **State or Show (4×3)**

Add weight to one plastic / apply force (3)

Measure bend (3)

Repeat with second plastic (3)

Comparison of bending/ result (3) [18]

**No labelled diagram – deduct 3 marks**

**B: TEXTILES**

(i) Any two of:  
Cotton/silk/wool/flax(linen) (2×3)

(ii) **State or Show (4×3)**

**Method 1**

Weigh (find mass) of two textiles (3)  
Immerse(soak) in water (3)  
Reweigh (3)  
Comparison of mass change/ result (3) **[18]**

**Method 2**

Known volume of water (3)  
Immerse(soak) one textile in water (3)  
Repeat with second textile (3)  
Comparison of water absorbed (remaining)/ result (3) **[18]**

**No labelled diagram – deduct 3 marks**

**C: METALS**

- (i) Zinc/lead (3)
- (ii) Galvanising/ roofing/fishing weights/batteries/plumbing/gun cartridges/  
radiation screen/solder (Must be matched) (3)
- (iii) **State or Show (4×3)**
- Nail / sharp implement / ball bearing (3)
- Scratch / mark one metal (3)
- Repeat with second metal (3)
- Comparison of markings / result (3) **[18]**

**No labelled diagram – deduct 3 marks**

**D: TIMBER**

- (i) Oak/ash/sycamore/any broad leaf tree grown in Ireland (3)
- (ii) Pine/larch/any coniferous tree grown in Ireland (3)
- (iii) **State or Show (4×3)**
- Add weight to timber / apply force (3)
- Measure bend (3)
- Repeat with second timber (3)
- Comparison of bending / result (3) **[18]**

**No labelled diagram – deduct 3 marks**

**Question 14** [36 marks]

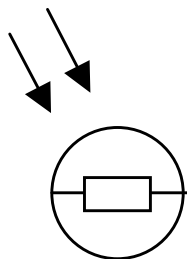
- (a) Meat (3)  
Milk (3)  
Vegetables/meat/coffee/milk (3)  
Coffee/milk/vegetables/meat (3) [12]
- (b) Bread/rice/potato/flour/pasta/root vegetable or example/cereal or example (3)  
Iodine (3)  
Energy/fibre/prevent constipation (3)  
Protein/fat/mineral/vitamin (3) [12]
- (c) **State or Show** (4×3)
- Cream (3)  
Shake/whip/churn/whisk/blend (3)  
Lumps of fat/solid forms/butter forms (3)  
Drain off(decant)liquid (3) [12]

**No labelled diagram – deduct 3 marks**

**Question 15 [36 marks]**

- (a) Light Emitting Diode (LED) (3)
- Resistor (3)
- LED will light (3)
- Battery/power supply/cells (3) **[12]**

- (b) Dependent (3)

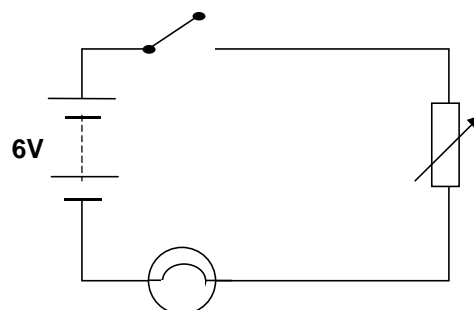


(3)

Turning on (off) street lights/burglar alarms/light meters (3)

Dim/poor/low (3) **[12]**

- (c) Bulb(lamp) (3)
- Variable resistor (3)
- Battery (3)
- Complete circuit (3) **[12]**



**Deduct 3 marks if circuit not complete**



**Question 16** [36 marks]

- (a) Kinetic to Heat / Kinetic to Sound (3)  
Kinetic to Sound (3)  
Chemical to Light (3)  
Potential to Kinetic (3) [12]
- (b) Moves/jumps away (3)  
Moves in opposite direction (3)  
Electric motor/drill/electric trains/washing machine /hair dryer/ any device with an electric motor/ammeter/voltmeter/galvanometer/loudspeaker. (6) [12]
- (c) Iron (3)  
Lift iron pins(paper clips) (3)  
Chemical to electrical/electrical to heat (3)  
Cranes in scrap yards(lifting cars)/electric bell/relay/doorbell (3) [12]