



**Coimisiún na Scrúduithe Stáit  
State Examinations Commission**

**Junior Certificate Examination 2003**

**Science**

**Higher Level**

**Marking Scheme**

# **GUIDELINES TO EXAMINERS ON**

## **CANCELLED, REPEATED OR EXCESS ANSWERS**

### **CANCELLED ANSWERS**

**SECTION A** If an answer is cancelled and a second answer given you should accept the cancellation and award marks for the uncanceled answer. If neither is cancelled then give zero except in the case where both answers are correct.

**SECTION B, C, D and E** 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.

### **REPEATED ANSWERS**

**SECTIONS B, C, D AND E** If candidates repeat an answer (answer the same question twice) you should mark both answers and allow marks for 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 eight highest scoring parts. Disallowed marks should be enclosed in square brackets.

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

**SECTION E** Mark all questions but count only the marks awarded to the two highest scoring questions. Disallowed marks should be enclosed in square brackets. Extra care should be taken with Q.10 (Earth Science), Q.11 (Horticulture) and Q. 13 (Food): count only the marks awarded to the two highest scoring parts (a), (b) or (c). Care should also be taken with options in Q.12 (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

### Higher Level Paper

#### Structure

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

Section A:		3 question (attempt all questions)
		10 parts in each question (attempt any 8 parts)
Section B:	Physics	2 questions (attempt any 1 question)
Section C:	Chemistry	2 questions (attempt any 1 question)
Section D:	Biology	2 questions (attempt any 1 question)
Section E:	Applied Sc.	6 questions (attempt any 2 questions)

#### Marking

Without Local Studies:	$(6 \times 48) + (2 \times 36) = 288 + 72 = 360$ marks
With Local Studies:	$(6 \times 48) = 288$ marks

#### Grades

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

## Junior Certificate 2003

### Science – Higher level

#### Marking Scheme

Section A	Q.1		$8 \times 6$
	Q.2		$8 \times 6$
	Q.3		$8 \times 6$
Section B	Q.4	(a)	$2 \times 3, 1 \times 3, 2 \times 3, 3 \times 3,$
		(b)	$1 \times 3, 4 \times 3, 1 \times 3, 2 \times 3$
	Q.5	(a)	$1 \times 3, 2 \times 3, 1 \times 3, 1 \times 3, 2 \times 3, 1 \times 3,$
		(b)	$1 \times 3, 1 \times 3, 1 \times 3, 1 \times 3, 2 \times 3, 2 \times 3,$
Section C	Q.6	(a)	$2 \times 3, 2 \times 3, 1 \times 3, 2 \times 3, 1 \times 3,$
		(b)	$2 \times 3, 2 \times 3, 2 \times 3, 2 \times 3,$
	Q.7	(a)	$1 \times 3, 6 + 3, 1 \times 3, 3 \times 3,$
		(b)	$2 \times 3, 2 \times 3,$
		(c)	$6 + 3, 1 \times 3,$
Section D	Q.8	(a)	$4 \times 3, 4 \times 3,$
		(b)	$2 \times 3, 1 \times 3, 2 \times 3, 1 \times 3, 2 \times 3,$
	Q.9	(a)	$3 \times 3, 2 \times 3, 3 \times 3,$
		(b)	$1 \times 3, 3 \times 3, 2 \times 3, 2 \times 3,$
Section E	Q.10	(a)	$2 \times 3, 4 \times 3,$
		(b)	$1 \times 3, 3 \times 3, 2 \times 3,$
		(c)	$2 \times 3, 2 \times 3, 1 \times 6,$ Any two parts
	Q.11	(a)	$5 \times 3, 1 \times 3,$
		(b)	$2 \times 3, 4 \times 3,$
		(c)	$2 \times 3, 4 \times 3,$ Any two parts
	Q.12	(a)	$2 \times 3, 2 \times 3, 2 \times 3,$
		(b)	$2 \times 3, 4 \times 3,$ Any one of four (i) - (iv)
	Q.13	(a)	$3 \times 3, 3 \times 3,$
		(b)	$2 \times 3, 2 \times 3, 2 \times 3,$
		(c)	$2 \times 3, 4 \times 3,$
	Q.14	(a)	$2 \times 6, 2 \times 3,$
		(b)	$1 \times 3, 4 \times 3, 1 \times 3$
	Q.15	(a)	$2 \times 3, 2 \times 3, 2 \times 3,$
		(b)	$2 \times 3, 3 \times 3, 1 \times 3$

## SECTION A (144 MARKS)

Answer each of the questions 1, 2 and 3.

### Question 1. Any *eight* items, (a), (b), (c), etc. (8 X 6 marks)

- (a) energy that is replaced / will not run out (3)  
Biomass / geothermal / hydropower / solar (sun) / tidal / wind / (3) [6]
- (b)  $2 \times 8 / v = at / v = u + at$  (3)  
16 ( 16 only - allow 6 marks ) (3) [6]
- (c) **any one** of the four levers in the diagram marked (3)  
Point (line) about which a lever rotates (pivots) (turns) (3) [6]
- (d) Tack A is stable (3)  
Tack B is unstable (3) [6]
- (e) Sponge cake and whipped egg white are insulators/ air in sponge (egg) (6) [6]
- (f) changes to a gas / vapour (do not accept evaporate) (3)  
ammonium chloride / dry ice ( $\text{CO}_2$ ) (Carbon dioxide) / iodine/ camphor etc (3) [6]
- (g) Frequency / wavelength (6) [6]
- (h) A is blue (3)  
B is brown (3) [6]
- (i)  $2 \times 3 \times 10$  (3)  
 $60 / \text{€ } 0.6$  (60 only - allow 6 marks) (3) [6]
- (j) converges / forms an image /refracted / will focus (6)  
changes direction (bends) - allow 3 marks only [6]

**Question 2. Any eight items, (a), (b), (c), etc. (8 X 6 marks)**

- (a) hydrogen peroxide / H<sub>2</sub>O<sub>2</sub> (3)  
manganese dioxide/ MnO<sub>2</sub> (3) [6]
- (b) **any one from:** sulphur dioxide (SO<sub>2</sub>) / nitrogen dioxide (NO<sub>2</sub>)  
(nitrogen oxides) (NO<sub>x</sub>)/ sulphur trioxide (SO<sub>3</sub>) (3)  
**any one from:** kills plants / kills fish / damages buildings  
(stone)  
reduces crop yields / releases toxic elements (Al) (Cd) from  
soil / corrosion etc. (3) [6]
- (c) **any two from:** wear eye protection (goggles) (safety glasses) /  
do not point the test-tube at anyone / never look into the open  
end of a test-tube / use test-tube holder (peg)/ hold at an angle  
/use a small amount of substance / heat gently etc. (2 × 3) [6]
- (d) **method:** magnetic / filtration / evaporation /  
distillation / separating funnel / chromatography etc. (3)  
**example matched mixture:** iron and sand / sand and water /  
salt and water / alcohol and water / oil and water/ dyes etc. (3) [6]  
(Accept suitable mixture for 3 marks only)
- (e) Graduated (measuring) cylinder (3)  
pipette / burette / volumetric flask / syringe (3) [6]
- (f) Prevents/ protect (hardens) (strengthens) (3)  
tooth decay/ teeth (enamel) (3) [6]  
(any reference to teeth - allow 3 marks)
- (g) A: toxic / poisonous (3)  
B: flammable (3) [6]
- (h) remove hardness / softens (3)  
from water (3) [6]  
prevents limescale – allow 6 marks
- (i) Capillarity / capillary action (3)  
absorbency of fabrics / transport in plants / rising damp/  
chromatography etc. (3) [6]
- (j) **any one from:** it rusted (corroded) / combined (reacted) with  
oxygen / (3)  
became iron oxide (3) [6]  
**why?:** oxygen used up (removed)

**Question 3. Any eight items, (a), (b), (c), etc (8 X 6)**

- (a) **any one from:** gastric juice / digestive juice / hydrochloric acid (acid) / enzymes / correctly named enzyme in the stomach etc. (3)  
**part A:** large intestine / colon / bowel (3) [6]
- (b) heart (3)  
72 **accept 69 to 75** (3) [6]
- (c) by (on) decaying (dead)(organic) matter (3)  
**any one from:** recycle matter (elements) / dispose of dead plants (animals) / dispose of organic wastes (faeces) (fallen leaves)/ /fertiliser (humus) / prevents build up of organic waste etc. (3) [6]
- (d) **any two from:** excretion / protection / sensitivity / insulation / helps control temperature / perspiration / makes vitamin D (2×3) [6]
- (e) **part A:** enamel / crown (3)  
**item:** artery / vein / capillary / nerve / blood / lymph/ bacteria (3) [6]
- (f) **any one plant:** tomato / pea / water lily / dandelion etc (3)  
**any one matched way:** animal / self / water / wind etc (3) [6]
- (g) **leaf, any one from:** photosynthesis (makes food) / gaseous exchange (gives off oxygen) (takes in CO<sub>2</sub>) / absorbs sunlight/ transpiration (releases water vapour) / food storage / propagation (3)  
**root, any one from:** anchors (supports) plant / absorbs water (minerals) / stores food / propagation (3) [6]
- (h) growth (response) of plant to gravity (3)  
(3) [6]
- (i) diaphragm (3)  
movement (3) [6]
- (j) Petal (3)  
Pollen / male gamete / male part (3) [6]

## SECTION B – PHYSICS (48 marks)

Answer either question 4 or question 5.

### Question 4. (48 marks)

- (a) Define Force / F (3)  
divided by area / over A (3) [6]
- Give  $\text{Nm}^{-2}$  /  $\text{Ncm}^{-2}$  / Pa / B / psi / atm / torr (3)  
(symbols or words) [3]
- Why? Greater / increased (3)  
pressure (3) [6]
- Describe **Show or state:**  
boil water in can (3)  
seal can and cool / stop heating and (3)  
seal  
can collapses (3)  
**or** **or**  
tumbler of water covered with card (3)  
invert, holding card in place (3)  
card does not fall, when hand is (3)  
taken away (3) [9]  
**accept equivalent experiments**  
**[no diagram – deduct 3 marks]**
- (b) What? Vibrates / moves (3) [3]
- Describe **Show or state:**  
vibrating fork / sound source (3)  
microphone (3)  
C.R.O (3)  
wave on display (3) [12]  
**accept equivalent experiments**
- What? 0.33 (3) [3]
- Calculate  $f = \frac{v}{\lambda} / \frac{330}{0.33} / 330$  divided by (3)  
incorrect value  
1000 / 1 kHz (3) [6]



**Question 5. (48 marks)**

(a) Name ammeter (3) [3]

Copy



(3)

shown in series

(3) [6]

Are?

series

(3) [3]

What?

6

(3) [3]

Calculate

$$I = \frac{V}{R} / \frac{6}{6} / 1/6 \text{ divided by incorrect value above}$$

(3)

Amps / A

(3)

[6]

What?

direct / d.c.

(3) [3]

(b) What? degree of hotness / how hot (cold) (3) [3]

Name

mercury / alcohol

(3) [3]

Give

**any one matched:**

**mercury:** easily seen / wide range / does not wet tube (3)  
/ measures higher temperatures **or**

**or**

**alcohol:** cheaper / non-toxic / measures lower (3) [3]  
temperatures

What?

expands / rises

(3) [3]

Why?

human (body)(core) temperature (3)

is 37 °C / between given values (3) [6]

(3) [6]

What?

keep (hold) / give sufficient time (3)

the reading / (3)

**or** **or**

stop (3)

liquid moving (3) [6]

(3)

(3) [6]

## SECTION C - CHEMISTRY (48 marks)

Answer either question 6 or question 7.

### Question 6. (48 marks)

- (a) (i) Name oxygen (3)  
O<sub>2</sub> (3) [6]
- (ii) Name hydrogen (3)  
H<sub>2</sub> (3) [6]  
(names only given but reversed - allow only 3 marks)  
(formulae only given but reversed - allow only 3 marks)  
(names and formulae given but reversed - allow 3 × 3 marks)
- (iii) What? H<sub>2</sub>O / H:O = 2:1 / 2 atoms of H to 1 atom of O (3) [3]
- (iv) Which? X (3)  
connected to positive terminal of battery / positive / oxygen released (3) [6]
- (v) Name graphite / platinum / carbon / nickel / nichrome (3) [3]
- (b) Draw two in orbit nearest nucleus / eight in second orbit (3)  
seven in the third orbit shown (3) [6]  
**[no diagram – deduct 3 marks]**
- What? shared pair (3)  
of electrons (3) [6]
- Describe two chlorine atoms (3)  
one shared pair / two dots / dash (3) [6]  
**[no diagram – deduct 3 marks]**
- Give **any two from:**  
gases / liquids / low melting point / low boiling point/  
poor heat conductors (good heat insulators) / poor electrical conductors (good electrical insulators) / soluble in hexane (non-polar solvent) / insoluble in water etc. (2×3) [6]

### Question 7. (48 marks)

- (a) Name magnesium oxide / MgO (3) [3]
- How? add indicator / Named acid - base indicator/ pH paper/  
litmus paper (6)
- What? Basic / matched colour in base (3) [9]
- What? exothermic (3) [3]
- Write  $\text{Mg} + \text{O}_2 \longrightarrow \text{MgO}$
- all formulae correct, in an equation - allow all marks (3×3) [9]
- (no equation - less 3 marks )
- (b) Define oxidation is the loss (3)  
reduction is the gain (3) [6]
- Name Oxygen / O<sub>2</sub> /O (3)
- Give gained electrons/ combines with a metal (3) [6]
- (c) What? **any one from:** fizzes (gas released) / dissolves /  
heat given off / fast/ clean surface etc. (6)
- Name hydrogen / magnesium sulphate (Epsom salts) (3) [9]
- Name beryllium / calcium / strontium / barium / radium  
(names only) (3) [3]

## SECTION D – BIOLOGY (48 marks)

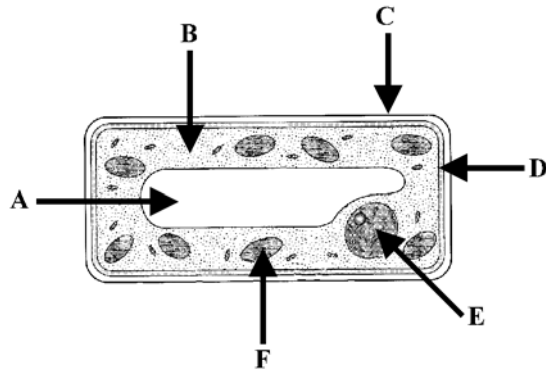
Answer either question 8 or 9.

### Question 8. (48 marks)

- (a) Name A: uterus (womb) (3)  
B: vagina (birth canal) (3)  
C: ovary (3)  
D: fallopian tube / oviduct (3) [12]
- Give A: implantation / growth (development) (holds)  
foetus (baby) / menstruation (3)  
B: holds penis / intercourse / receives semen (sperm)  
/ birth canal (if not given above)/ discharge (3)  
C: produces eggs / hormones / named hormone /  
ovulation (3)  
D: fertilisation occurs here / transports zygote  
(ovum) (egg) to uterus (womb) (3) [12]
- (b) Give **any two from:** support / protection / shape / makes  
blood cells (2×3) [6]
- Name hinge / synovial / moveable (3) [3]
- Name P: ligament / capsule (3)  
Q: cartilage / gristle (3) [6]
- Explain **any one from:** reduce friction (wear) / shock  
absorber (3) [3]
- What? **show or state**  
Pairs / biceps relax (contract) (3)  
move in opposite directions (against each other) /  
triceps contract (relax) (3) [6]
- ( named example - allow 3 marks only)

**Question 9. (48 marks)**

(a) Copy & Name



**any three named and labelled correctly:** A vacuole / B cytoplasm / C wall / D membrane / E nucleus / F starch grain (chloroplasts)

(3×3) [9]

Explain

(i) cell: unit of life / smallest part of living thing  
(ii) tissue: group of cells

(3)

(3) [6]

Name

**any two from:** cambium / phloem / xylem (vascular) / epidermis / cortex / storage / photosynthetic etc

(2×3)

Give

**any one function matched to tissue named:**  
cell division / growth *for* cambium  
transport *for* phloem  
transport / minerals *for* xylem

(3)

[9]

(b) What?

feeding relationships

(3)

[3]

Name

(i) green plant / any named garden plant  
(ii) aphid / any named garden herbivore  
(iii) **any one from:** ladybird / sparrow / hawk / any named garden carnivore

(3)

(3)

(3)

[9]

Explain

numbers greater at the bottom / more producers / many green plants  
smaller number at the top / fewer consumers / few hawks

(3)

(3)

[6]

Give

**any one example with both 'sides' stated for six marks:**  
**e.g.**  
plants give out oxygen / take in carbon dioxide  
animals give out carbon dioxide / take in oxygen  
**or**  
animals eat fruit  
distribute plant seeds  
**or any correct example**

(3)

(3)

(3)

(3)

[6]

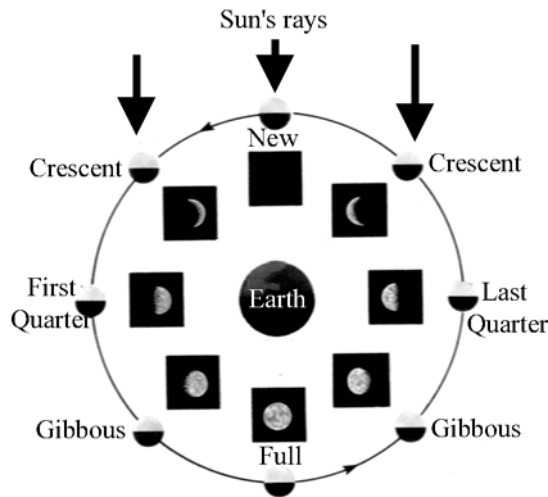
**SECTION E – APPLIED SCIENCE (72 marks)**

Answer two questions from this section.

**Question 10 – Earth Science (36 marks). Answer any *two* of (a), (b), (c).**

- (a) Explain planet: orbits a star (sun) (3)  
 moons: orbits (satellite of) a planet (3) [6]

Explain



- Sun's rays shown correctly / position of Sun (3)  
 Moon orbits Earth (3)  
**any two** phases shown (named) correctly in the diagram (2×3) [12]  
**[no diagram – deduct 3 marks]**

- (b) Name cumulus / cumulonimbus / cumulostratus (3) [3]

Explain moist air (water vapour) rises (3)  
 cools (3)  
 condenses (3) [9]

What? amount (3)  
 of water vapour (moisture) (3) [6]

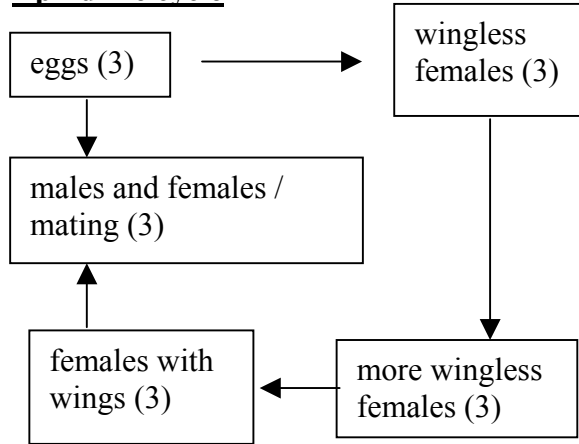
- (c) Give **Measurements:** measure volume on ruler (3)  
 Measure temperature on thermometer (3) [6]  
**show or state** (3)  
**Graph:** two correctly labelled axes (3) [6]

**Result / conclusion:** straight-line graph  
 volume depends absolute temperature  
 volume is proportional to temperature (6) [6]

**Question 11 – Horticulture (36 marks). Answer any two of (a), (b), (c).**

(a) Give

**Aphid life cycle**

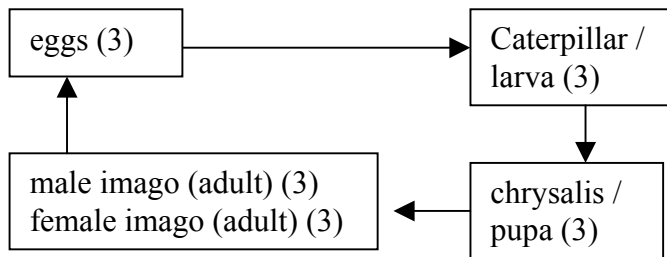


(5×3)

**or**

**or**

**Butterfly lifecycle**



(5×3) [15]

What?

damaged plant gets diseases (fungus) (virus)

(3) [3]

(b) Give

**any two from:** respiration / drainage / root growth / room for soil organisms etc.

(2×3) [6]

Describe

Two graduated cylinders / measure volume of can  
 Soil in one, water in the other / make hole in bottom of can, push can into soil  
 Pour water into soil / tape hole, lift can filled with soil, fill can with water  
 Volume decrease is volume of air / volume of water added equals volume of air in soil

(3)  
 (3)  
 (3)  
 (3) [12]

(c) Explain

growth  
 into a new plant

(3)  
 (3) [6]

Name

**any one from:** lettuce / carrot (named root crop) / cress / cabbage (named brassica) / viola (spring bedding plant) / rye grass (amenity grass) etc.

(3)

Outline

A seed / mark out 10×10 spaces on compost in seed tray  
 In compost / sow one seed per space  
 Measure height each day / count the number of seeds that germinate

(3)  
 (3)  
 (3) [12]

**Question 12 – Materials Science (36 marks). Answer both parts, (a) and (b).**

- (a) Name **any two from:** aluminium / chromium (chrome) / steel / enamel / leather / plastic (named plastic) / rubber / glass / paint etc. (2×3) [6]
- Give **any two *matched* from:** for aluminium light (low density) / does not rust etc.; for chromium does not rust / looks nice etc.; for steel strong / hard wearing etc. for enamel prevents rust / hard wearing / attractive finish etc.; for leather friction / heat insulation / hard wearing / looks nice etc.; for plastic friction / heat insulation etc.; for rubber friction / shock absorption etc. (2×3) [6]
- Give **any two from:** wash (clean) / polish / lubricate (oil) (grease) / paint (touch-up) etc (2×3) [6]

**(b) Answer any one of the following (i), (ii), (iii), (iv).**

**(i) Plastics**

- Give **first stage:** small molecules / monomers / fractionation / refining / separate (3) [6]
- second stage:** big molecules / polymers (3)
- Describe **show or state**
- wrap a metal can with plastic, leave a second can unwrapped (3)
- fill each can with boiling (at same temperature) water (3)
- record final temperatures (3)
- smallest drop in temperature for can covered with plastic (3) [12]
- accept equivalent experiments**

**(ii) Metals**

- What? natural (mineral) (rock) (compound) containing metal (3)
- Name **any one from:** copper / lead / silver / zinc (3) [6]
- Describe **show or state**
- |                                     |           |                  |          |
|-------------------------------------|-----------|------------------|----------|
| try to scratch metal A with metal B | <b>OR</b> | Two metals       | (3)      |
| repeat for B on A                   |           | Nail             | (3)      |
| harder metal less worn              |           | Scratch each     | (3)      |
|                                     |           | harder scratches |          |
|                                     |           | least            | (3) [12] |
- accept equivalent experiments**



**(iii) Textiles**

Name    **plant, any *one* from:** coconut / cotton / flax / hemp /  
jute / sisal / nettle (3)  
**animal, any *one* from:** alpacas / camel / caterpillar  
(silkworm) / goat / llama / sheep / rabbit / horse (3)    **[6]**

Describe    **show or state**  
weigh two pieces of different fabrics (3)  
soak pieces in water (3)  
remove fabrics from water and allow to drip for a short  
time (3)  
reweigh, one with greatest increase in weight has  
greatest absorbency (3)    **[12]**  
**accept equivalent experiments**

**(iv) Timber**

What?    **hardwoods any *one* from:** broad / fall in autumn (3)  
(deciduous)  
**softwoods any *one* from:** needle / fall year-round  
(evergreen) (3)    **[6]**

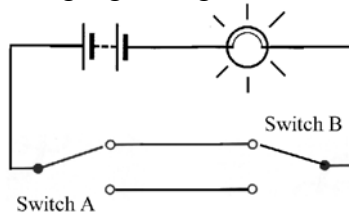
Describe    **show or state**  
clamp (support) wood at one (both) ends (3)  
add weights to opposite end (middle) (3)  
repeat for opposite grain direction (3)  
cross-grain bends more (breaks more easily) (3)    **[12]**  
**accept equivalent experiments**

**Question 13 – Food (36 marks). Answer any *two* of (a), (b), (c).**

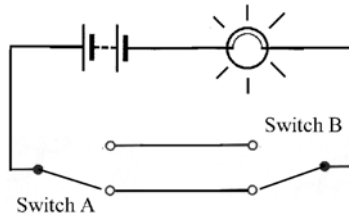
- (a) Which? (i) carrots / cheese cake (3)  
(ii) cheese cake / trout (3)  
(iii) carrots (3) [9]
- Describe add sodium hydroxide solution (3)  
add copper sulphate solution (3)  
(accept Biuret Test for 6 marks)  
violet (purple) (lilac) colour (3) [9]
- (b) Name **any two from:** distance / terrain / weather/  
perishability/ cost/ war (2×3) [6]  
poor infrastructure / banditry etc.
- Name **any two from:** drought / erosion / war / AIDS / (2×3) [6]  
cash crops / deforestation / floods etc.
- Give **any two from:** death / disease / collapse of society (2×3) [6]  
/ migration / poverty / illness etc.
- (c) What? bacteria (3)
- Give **any one from:** increase in acidity (lower pH) / (3) [6]  
new smell / new taste (sours)/ greater viscosity  
(thicker) (creamier) etc.
- Describe heat milk to 90° C (87 to 93 degrees Celsius) (3)  
cool (3)  
add culture (bacteria) (natural yoghurt) (3)  
keep at 40°C (37 to 43 degrees Celsius) / store in a (3) [12]  
thermos flask

**Question 14 – Electronics (36 marks). Answer both parts (a) and (b).**

- (a) Draw *switch position gets the marks in both diagrams*  
the lines indicating a glowing bulb are not required.

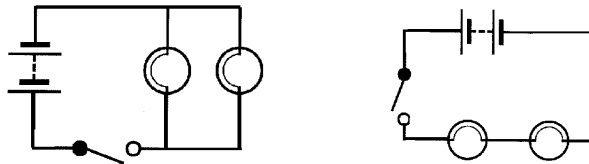


(6)



(6) [12]

Draw **either diagram**, marks for items shown  
ignore battery polarity and orientation of diagram



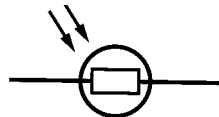
bulbs in parallel shown  
switch in position shown

bulbs in series shown  
switch in any position in series

(3)

(3) [6]

- (b) Give



(3) [3]

What?

- (i) LED glows  
(ii) LED does not glow

(3)

(3)

Give

LDR has low resistance in bright light  
LDR has high resistance in darkness

(3)

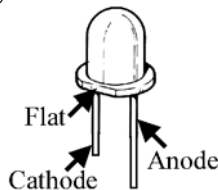
(3) [12]

How?

cathode wire shorter / flat on plastic lens at cathode/  
LED glowing means the cathode is connected to  
negative of battery

(3)

[3]



(where (i) and (ii) are reversed allow 2×3 marks if  
the reasons are matched correctly)

**Question 15 – Energy Conversions (36 marks). Answer both parts (a) and (b).**

(a) Write electrical to motion (kinetic) (3)  
 electrical to heat (3) [6]

Give **any two from: electricity** to **any** of the following:  
 chemical / microwaves / sound / light / infra red  
 (IR) / ultra violet (UV) / radio waves etc. (2×3) [6]

(if energy changes in a hairdryer are incorrect or omitted then accept them in this list)

Name **any two matched from:** battery charger /  
 microwave cooker (mobile ‘phone) / radio (TV)  
 (stereo) (speaker) (door bell) / lamp (bulb) (torch)  
 (TV) / remote control / sun ray (tanning) lamp /  
 cordless ‘phone etc. (2×3) [6]

(accept other domestic appliances e.g. gas with matching energy changes)

(b) Name A: magnet / magnetic (north) pole (3)  
 B: coil / conductor / copper wire (3) [6]

Outline Current / conductor (3)  
 in a magnetic field (3)  
 has a force act on it (3) [9]

What? runs in the reverse direction (3) [3]