Edexcel International

London Examinations

IGCSE

IGCSE Science (Double Award) (4437)

Mark Schemes for Specimen Papers

Paper 1F (Foundation Tier)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 1F
FOUNDATION TIER

Symbols used in the Mark Scheme

; indicates separate mark points
/ indicates alternatives
eq allow for correct equivalent

1. (a) C;
(b) B;
(c) C;
(d) C;
(e) B;
(f) B;
(g) C;

(Total 7 marks)

2. (a)(i) smaller / eq; 1
(ii) reference to muscle;
(iris) bigger / eq / (muscle) contracted; 2
(b) damage retina; 1
(c) testosterone; 3
insulin;
oestrogen;

(Total 7 marks)

3. (a) arrow towards or through stomata; 1
(b) absorb light / carry out photosynthesis / eq; 1
(c) correctly labelled;;;; 4

(Total 6 marks)

4. (a) all points correctly plotted;; / error lose 1 mark 2
(b)(i) (the amount of oxygen) fell / dropped / eq; 1
(ii) bacteria (in sewage);
increase / use up oxygen / respire; 2

(Total 5 marks)

5. (a) fermenter; 1
(b) bacteria / fungus; 1
(c) oxygen; 1
(d) keep other microorganisms out / prevent contamination / prevent competition 1

(Total 4 marks)

6.	(a)(i)	10;	1
	(ii)	3;	1
	(b)	glucose; oxygen; carbon dioxide; water;	4
			(Total 6 marks)
7.	(a)	whole;	1
	(b)	skimmed;	1
	(c)	less fat;	
		less chance of blocking blood vessels / eq	2
			(Total 4 marks)
8.	(a)(i)	rabbit(s);	1
	(ii)	correct shape;	
		correct labelling;	2
	(b)(i)	numbers decrease / eq;	1
	(ii)	no food / grass for rabbits / eq;	
		no food / rabbits for foxes / eq;	2
			(Total 6 marks)
9.	(a)(i)	breakdown;	
		large / insoluble (molecules) to small / soluble (molecules);	2
	(ii)	fatty acids / glycerol;	1
	(b)	B; A;	2
			(Total 5 marks)
10.	(a)(i)	anther;	1
	(ii)	stigma;	1
	(b)	insect;	1
	(c)	through style to touch ovule;	1
			(Total 4 marks)
11.		testis / ovary / gonads / eq;	
		liver;	
		lung / placenta;	
		kidney;	
		uterus / womb;	5
			(Total 5 marks)

12. Description could include reference to:
bronchitis;
ciliated cells stop working;
bacteria;
infection;
emphysema;
reduced surface area / fewer alveoli / eq;
white blood cells;
protease;
less gas exchange;
cancer;
mutation / eq;
blocked air tubes / eq; max 5

(Total 5 marks)

13. (a)(i) sheep A / udder cell; 1
(ii) it is diploid / not haploid / contains more / twice the DNA / contains different DNA / genes; 1
(iii) sheep A; 1
(b) uses surrogate mother; / does not need sperm; / eq; 2
(c) can be used to produce useful chemicals / eq;
produce many / that are the same / animals with desired characteristics / eq; 2

(Total 7 marks)

14. B; A; C; B; 4

(Total 4 marks)

TOTAL FOR PAPER: 75 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE in Science (Double Award) (4437)

Mark Scheme for Specimen Paper

Paper 2F (Foundation Tier)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 2F
FOUNDATION TIER

1.	(a)	Any Gp1 element name / symbol	1
	(b)	Copper / Cu	1
	(c)	Any element from boron to neon name / symbol	1
	(d)	Iodine / I or Astatine / At	1
	(e)	Aluminium / Al	1
			(Total 5 marks)

2.	(a)	metals	1
	(b)	allotropes	1
	(c)	alkalis	1
	(d)	ions	1
	(e)	isotopes	1
			(Total 5 marks)

3.	(a)	solid – □ liquid – □ gas – □ (one correct = 1 mark, all correct = 2 marks)	2
	(b)	air – gas	1
		iron – solid	1
		water – liquid	1
	(c)	0	1
		noble gases	1
	(d)(i)	solid to liquid	2
	(ii)	gas to liquid	2
	(iii)	liquid to gas	2
			(Total 13 marks)

4.	(a)	A description to include three from: • fizzes / bubbles • moves about • floats on water • white smoke • burns with **yellow** flame • dissolves / gets smaller	3
	(b)	hydrogen	1
	(c)(i)	alkaline	1
	(ii)	blue	1
	(d)	increases	1
			(Total 7 marks)

5.	(a)	55%	1
	(b)(i)	carbon	1
	(ii)	CO_2	
		(g)	2
	(iii)	D	1
			(Total 5 marks)
6.	(a)(i)	hydrogen	1
	(ii)	ethane	1
	(iii)	hexane	1
	(iv)	propane	1
	(b)(i)	fractional distillation	2
	(ii)	Any two from: • petrol • naphtha • kerosine • diesel (oil) • fuel oil	2
	(c)	oxygen water / steam / hydrogen oxide	2
			(Total 10 marks)
7.	(a)	Nitrogen / N_2 and hydrogen / H_2	1
	(b)(i)	A substance that speeds up a reaction	1
		but is not used up	1
	(ii)	Greater surface area / more room for reacting molecules	1
	(c)	Phosphorus	1
		Any potassium salt	1
	(d)(i)	2	1
	(ii)	80	1
			(Total 8 marks)
8.	(a)	diffusion	1
	(b)	diffuse more quickly	1
	(c)	particles have more energy	1
		so move faster	1
	(d)	movement in short straight lines only	1
		random directions	1
			(Total 6 marks)
9.	(a)	correct covalent bonding shown	1
	(b)(i)	methane + oxygen $\rightarrow$ carbon dioxide + water	1
	(ii)	poor supply of air / oxygen	1
	(iii)	carbon monoxide is poisonous	1
			(Total 4 marks)

10.	(a)(i)	Particle A – electron Particle B – neutron Particle C – proton	3
	(ii)	7	1
	(iii)	one electron in outer shell	1
	(b)(i)	C	1
	(ii)	A	1
	(c)(i)	protons – 17	1
		neutrons – 18	1
		electrons – 18	1
	(ii)	2.8.7	1
	(iii)	2.8.8	1

(Total 12 marks)

TOTAL FOR PAPER: 75 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE in Science (Double Award) (4437)

Mark Scheme for Specimen Paper

Paper 3F (Foundation Tier)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 3F
FOUNDATION TIER

1.	(a)	12(m)	1
	(b)	increases	1
		cyclist moves further in same time interval / each time	1
	(c)	$20 < X < 28$	1
			(Total 4 marks)

2.	(a)(i)	torch **and** lamp (either order)	1
	(ii)	vacuum cleaner	1
	(iii)	vacuum cleaner **and** lamp (either order)	1
	(iv)	torch	1
	(b)(i)	3	1
	(ii)	symbol correct (circle with a V inside only)	1
		position correct (in parallel with battery)	1
	(iii)	would get less bright	1
			(Total 8 marks)

3.	(a)(i)	become compressed / compacted / smaller / squashed / decrease in size / go down / pushed together	1
	(ii)	shortest spring circled	1
	(iii)	most compressed / shortest spring	1
	(b)	use more springs (in the middle) use stiffer / stronger springs (in the middle) sensible use of material more coils in spring ANY TWO	2
	(c)(i)	arrow pointing down (ignore point of action)	1
	(ii)	downward	1
		Earth	1
			(Total 8 marks)

4.	(a)	D	1
	(b)(i)	**I** clearly behind mirror	1
		I in line with the nose and the same distance (by eye) from the mirror	1
	(ii)	same size, upright, virtual (no marks for contradictory answers e.g. real and virtual) deduct one mark for each response in excess of three	3
			(Total 6 marks)

5.	(a)(i)	cooker highest power / most current		2
	(ii)	5A 5A > 4A		2
	(b)	each lamp has its own circuit each lamp can be switched separately each lamp has the same voltage each can operate at own power *accept reasons for rejection of series circuit*	ANY TWO	2
				(Total 6 marks)
6.	(a)(i)	points plotted correctly		3
		smooth curve drawn		1
	(ii)	about 3 (km/h) *depends on candidate's graph*		1
	(iii)	1160 (W)		1
	(iv)	not always windy / variable output / too much land needed		1
	(b)	kinetic		1
		electrical		1
				(Total 9 marks)
7.	(a)	gamma		1
	(b)(i)	beta		1
	(ii)	alpha – will not penetrate foil		1
		gamma – radiation detected will not be affected by thickness of foil		1
				(Total 4 marks)
8.	(a)	(electromagnet) induction – not mutual, magnetic		1
	(b)	greater / larger / increases		1
		reference to number of field lines cut		1
		reference to rate of cutting *dependent on previous mark* (greater motion between field and cable scores 1 out of 2)		1
				(Total 4 marks)
9.	(a)	moving gas particles		1
		hitting container walls		1
	(b)	increases		1
		increases		1
		stays the same		1
		stays the same		1
	(c)(i)	increases / linearly / steady rate		1
	(ii)	correctly indicated – intercept with horizontal axis		1
	(iii)	zero / minimum		1
				(Total 9 marks)

10.	(a)(i)	65%	1
	(ii)	door – draught excluder / curtains	1
		floor – carpets / wooden floors	1
		(damp proofing scores 1 out of 2)	
	(b)(i)	108	1
	(ii)	224 × 60 (or 224 × 1 i.e. energy × time)	1
		× 60	1
		= 806 400 (J)	1

(Total 7 marks)

11.	(a)	(gravitational) potential to kinetic	1
		kinetic to electrical	1
	(b)	1440 / 2000	1
		= 72% or 0.72	1
		(70 or 0.7% scores 1 out of 2)	
	(c)	friction in the (generator / wheel) / heat due to friction	1
		water missing the blades OR	
		resistance in the generator wires OR	
		converted / changed to heat energy (ignore sound)	
		heat lost surroundings (0)	
		air resistance (0)	
		water stays on wheels (0)	

(Total 5 marks)

12.	(a)	similarity – number of protons / proton number / atomic number	1
		difference – number of neutrons / atomic mass (number) nucleon number	1
	(b)(i)	number of neutrons and protons are the same	1
	(ii)	X marked at (7,8)	1
	(iii)	unstable	1

(Total 5 marks)

TOTAL FOR PAPER: 75 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE Science (Double Award) (4437)

Mark Schemes for Specimen Papers

Paper 4H (Higher Tier)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 4H
HIGHER TIER

Symbols used in the Mark Scheme
; indicates separate mark points
/ indicates alternatives
eq allow for correct equivalent

1. (a)(i) breakdown; large / insoluble (molecules) to small / soluble (molecules); 2
(ii) fatty acids / glycerol; 1
(b) B; A; 2
(Total 5 marks)

2. (a)(i) anther; 1
(ii) stigma; 1
(b) insect; 1
(c) through style to touch ovule; 1
(Total 4 marks)

3. testis / ovary / gonad / eq;
liver;
lung;
kidney;
uterus / womb; 5
(Total 5 marks)

4. Description could include reference to:
bronchitis;
ciliated cells stop working;
bacteria;
infection;
emphysema;
reduced surface area / fewer alveoli / eq;
white blood cells;
protease;
less gas exchange;
cancer;
mutation / eq;
blocked air tubes / eq; max 5
(Total 5 marks)

5. (a)(i) sheep A / udder cell; 1
(ii) it is diploid / not haploid / contains more / twice the DNA / contains different DNA / genes; 1
(iii) sheep A; 1
(b) uses surrogate mother; / does not need sperm; / eq; 2
(c) can be used to produce useful chemicals / eq;
produce many / that are the same / animals with desired characteristics / eq; 2

(Total 7 marks)

6. B; A; C; B; 4

(Total 4 marks)

7. (a)(i) 2880 kJ; 1
(ii) respiration / heat / movement / urine / faeces / eq; 1
(b) 4%; 1
(c) eaten by other organisms / decomposed / broken down by other organisms / eq; 1

(Total 4 marks)

8. (a) both J and K half shaded; 1
(b) do not have cystic fibrosis / abnormal mucus / disease;
have the cystic / recessive allele;
can be passed on / eq; max 2
(c) 3; 1
(d) female with cystic fibrosis; 1
(e) 1 in 4 / $\frac{1}{4}$ / 0.25 / 25% / 1:3; (reject 1:4) 1
(f) 1 in 8 / 1/8 / 0.125 / 12.5% / 1:7; (reject 1:8) 1

(Total 7 marks)

9. (a) A – sensory; 1
(b) reflex / reflex arc; 1
(c) less time (to respond) / less distance / does not need to go to brain / no need to think / less damage / eq; 1
(d) D;
C / motor;
A / sensory; 3

(Total 6 marks)

10. (a) X – ciliary muscle / body;
Y – retina; 2
(b)(i) bend / refract light; 1
(ii) needs to be clear / transparent / to let light through / eq; 1
(c) diffusion;
from air / from aqueous humour; 2
(d) lactic acid; 1
(e) mitosis; 1
(f) converted to glucose;
for respiration; 2

(Total 10 marks)

11. (a) ladybirds eat insects / potato plants produce insecticide; 1
(b) not all killed / 50% survive / eq; 1
(c) fields that contain normal potato plants; 1
(d) resistant insects will increase in number / ladybird numbers will fall; 1
(e) potato DNA cut;
specific sites / eq;
restriction enzyme;
gene for (natural) insecticide;
inserted / put in / eq;
ligase;
vector / plasmid / virus; max 5
(Total 9 marks)

12. (a)(i) scale – more than half of each axis used;
points – all plotted accurately;;
line – neatly drawn through all points / line of best fit; 4
(ii) 150 (kg per hectare); 1
(b) amino acids / protein; 1
(c) more / increased algae / (water) plants grow (at surface) / eq;
light blocked / eq;
plants lower cannot photosynthesise / no photosynthesis;
die / algae die / eq;
bacteria / decomposers / fungi rot them down / eq;
use oxygen / less oxygen (must be linked to bacteria or decay) / eq;
fish / animals die / suffocate / cannot breathe / respire / eq;
food chain consequences / eq;
eutrophication; max 5
(Total 11 marks)

13. (a) dancing generates heat / eq;
heat transferred out of body / eq;
cools / prevents overheating / eq;
avoids enzyme denaturation / eq; max 3
(b)(i) pituitary; 1
(ii) kidney; 1
(Total 5 marks)

14. (a) transpiration; 1
(b) potometer; 1
(c) increased kinetic energy / molecules diffuse / move faster / eq;
stomata open; 2
(Total 4 marks)

15. (a) water entered;
by osmosis;
from high water concentration to low water concentration / eq; 3

(b)

Mass of water absorbed in g	Percentage increase in mass	Tick
More	Lower	✓;
Less	Lower	
Less	Higher	
More	Higher	

1

(Total 4 marks)

TOTAL FOR PAPER: 90 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE in Science (Double Award) (4437)

Mark Scheme for Specimen Paper

Paper 5H (Higher Tier)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 5H
HIGHER TIER

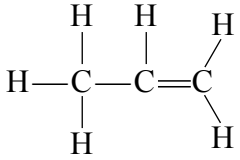
1.	(a)	Nitrogen / N_2 and hydrogen / H_2	1
	(b)(i)	A substance that speeds up a reaction	1
		but is not used up	1
	(ii)	Greater surface area / more room for reacting molecules	1
	(c)	Phosphorus	1
		Any potassium salt	1
	(d)(i)	2	1
	(ii)	80	1
			(Total 8 marks)
2.	(a)	diffusion	1
	(b)	diffuse more quickly	1
	(c)	particles have more energy	1
		so move faster	1
	(d)	movement in short straight lines only	1
		random directions	1
			(Total 6 marks)
3.	(a)	correct covalent bonding shown	1
	(b)(i)	methane + oxygen $\rightarrow$ carbon dioxide + water	1
	(ii)	poor supply of air / oxygen	1
	(iii)	carbon monoxide is poisonous	1
			(Total 4 marks)
4.	(a)(i)	Particle A – electron Particle B – neutron Particle C – proton	3
	(ii)	7	1
	(iii)	one electron in outer shell	1
	(b)(i)	C	1
	(ii)	A	1
	(c)(i)	protons – 17	1
		neutrons – 18	1
		electrons – 18	1
	(ii)	2.8.7	1
	(iii)	2.8.8	1
			(Total 12 marks)

5. (a) An explanation to include:
- the more carbon atoms, the higher the boiling point
- more energy needed to separate larger molecules 2

(b)(i) A description to include two from:
- high temperature
- catalyst
- absence of air 2

(ii) A description to include:
- bromine (water)
- is decolourised 2

(c)(i)

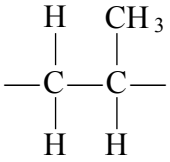


[Allow one mark for C═C] 2

(ii) $C_{10}H_{22} \rightarrow 2C_3H_6 + C_4H_{10}$ 2
[Allow one mark for $C_{10}H_{22} \rightarrow C_3H_6 + C_7H_{16}$]

(d)(i) double bond 1

(ii)



2

(iii) poly(propene) stronger 1

(Total 14 marks)

6. (a)(i) copper (chloride); 1

(ii) transition metal (compound); 1

(b)(i) Name – aluminium (chloride);
Equation – $3Mg(s) + 2AlCl_3(aq) \rightarrow 3MgCl_2(aq) + 2Al(s)$
correct formulae;
balancing;
correct state symbols;
[If Ca chloride:
formulae **and** balancing;
state symbols;] 4

(ii) loses electron(s); 1

(iii)
- calcium is higher in reactivity series/more reactive than magnesium
- cannot be displaced (from its salts by magnesium); 2

(Total 9 marks)

7. (a)(i) difficult to see the exact end point 1
(ii) methyl orange 1
(iii) start = yellow, end = pink/peach/orange 2
(b) $2NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$
species 1
balanced 1
state symbols 1
(c)(i) a gelatinous blue precipitate 1
(ii) $Cu^{2+}(aq) + 2OH^-(aq) \rightarrow Cu(OH)_2(s)$
reactant ions 1
product 1
(Total 10 marks)

8. (a)(i) No current flowing in diagram A 1
(ii) C 1
(b) electrolysis 1
(c) bromine 1
$2e^-$ 1
(Total 5 marks)

9. (a) A calculation to include:
either
1. $2 \times 31 \rightarrow 2 \times 137.5$;
2. $0.93\text{ g} \rightarrow \frac{2 \times 137.5}{2 \times 31} \times 0.93$;
3. 4.125 (g)
or
1. $\frac{0.93}{31} = 0.03$;
2. $PCl_3 = 137.5$
3. $137.5 \times 0.03 = 4.125$ (g); 3

(b)(i) less;
right to left reaction is endothermic/takes in heat energy 2
(ii) more;
fewer molecules on right hand side 2
(c) A calculation to include:
1. $Cl = 4.62 - 0.36 = 4.26$ g;
2. $\frac{0.36}{12} = 0.03$ $\frac{4.26}{35.5} = 0.12$;
3. 1:4;
4. CCl_4 **deduced**; 4
[CCl_4 formula **without** any working out shown scores no marks]
(Total 11 marks)

10.	(a)(i)	35, 44	1
		35, 46	1
	(ii)	around 50% each	1
	(b)(i)	$2Br^- + Cl_2 \rightarrow Br_2 + 2Cl^-$	
		all symbols correct	1
		equation balanced	1
	(ii)	iodine is less reactive than bromine so it would not displace bromide ions	1
	(c)(i)	sodium iodide/potassium iodide/any soluble metal iodide	1
	(ii)	(colourless) solution would go red-brown	1
	(iii)	each bromine atom gains an electron	1
	(iv)	2	1
		$2e^-$	1

(Total 11 marks)

TOTAL FOR PAPER: 90 MARKS

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IGCSE in Science (Double Award) (4437)

Mark Scheme for Specimen Paper

Paper 6H (Higher Tier)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 6H
HIGHER TIER

1.	(a)	(electromagnet) induction – not mutual, magnetic	1
	(b)	greater / larger / increases	1
		reference to number of field lines cut	1
		reference to weight of cutting	1
		dependent on previous mark	
		(greater motion between field and cable scores 1 out of 2)	
		(Total 4 marks)	

2.	(a)	moving gas particles	1
		hitting container walls	1
	(b)	increases	1
		increases	1
		stays the same	1
		stays the same	1
	(c)(i)	increases linearly / steady rate	1
	(ii)	correctly indicated – intercept with horizontal axis	1
	(iii)	zero / minimum	1
		(Total 9 marks)	

3.	(a)(i)	65%	1
	(ii)	door – draught excluder / curtains	1
		floor – carpets / wooden floors	1
		(damp proofing scores 1 out of 2)	
	(b)(i)	108	1
	(ii)	224×60 (or 224×1 i.e. energy $\times$ time)	1
		$\times 60$	1
		$= 806\,400$ (J)	1
		(Total 7 marks)	

4.	(a)	(gravitational) potential to kinetic	1
		kinetic to electrical	1
	(b)	1440 / 2000	1
		= 72% or 0.72	1
		(70 or 0.7% scores 1 out of 2)	
	(c)	friction in the (generator / wheel) / heat due to friction	1
		water missing the blades OR	
		resistance in the generator wires OR	
		converted / changed to heat energy (ignore sound)	
		heat lost surroundings (0)	
		air resistance (0)	
		water stays on wheels (0)	
		(Total 5 marks)	

5.	(a)	similarity – number of protons / proton number / atomic number	1
		difference – number of neutrons / atomic mass (number) / nucleon number	1
	(b)(i)	number of neutrons and protons are the same	1
	(ii)	X marked at (7,8)	1
	(iii)	unstable	1
		(Total 5 marks)	
6.	(a)	0.39(s)	1
	(b)	use area below graph	1
		$\frac{1}{2} \times 3.8 \times 0.39$	1
		$= 0.74$(m)	1
	(c)(i)	use $a = (v - u)/t$	1
		correct substitution	1
		$= 9.7$	1
		m/s^2	1
	(ii)	downwards	1
		negative gradient / backwards slope / slowing down / retardation / deceleration	1
	(d)	use $F = ma$	1
		65×9.7 ecf	1
		$= 630$ N	1
	(e)	downward pull of Earth / gravitational pull / weight	1
		(Total 14 marks)	
7.	(a)	gpe (or pe)	1
	(b)	use of mgh	1
		$6.0 \times 1.5 \times 10$	1
		$= 90$ J	1
	(c)	kinetic	1
		(Total 5 marks)	
8.	(a)(i)	use $pV =$ constant	1
		$100\,000 \times 18 = p \times 6$	1
		$p = 300\,000$ Pa	1
	(ii)	constant mass / no gas escapes	1
		constant temperature	1
	(b)	no change	1
		(Total 6 marks)	

9.	(a)	(nuclear) fission	1
	(b)	kinetic / heat / thermal	1
	(c)	neutrons released cause further fissions more neutrons released rate of fission increases MAX THREE	3
	(d)	component: control rod OR moderator	1
		function: control rod: stop the neutrons moderator: slow down the neutrons	1
			(Total 7 marks)
10.	(a)(i)	moves to the left	1
	(ii)	the wire is carrying a current in a magnetic field	1
		the direction of the current is perpendicular to direction of the magnetic field	1
	(b)	to left and right alternately at the same frequency as the a.c.	1
			(Total 4 marks)
11.	(a)(i)	voltage has both + and – values	1
	(ii)	±2.6 V	1
		accept 0.023 s, 0.024 s or 0.025 s	1
	(iii)	f = 1/T = 1/0.023 or 1/00.024 or 1/0.025	1
		= 43.5 or 41.7 or 40 Hz	1
	(b)	conduct in one direction / create dc	1
		prevent discharge of battery	1
			(Total 7 marks)
12.	(a)	slowed / stopped by air particles	1
		so they reach gold foil	1
	(b)	prevent alpha going behind / through sides absorbs stray alphas direct alpha (particles) at (thin gold) foil ANY TWO	2
	(c)	kinetic to light	1 1
	(d)(i)	some large angle deflections	1
		some particles undeviated	1
	(ii)	nuclear model of atom	1
			(Total 9 marks)

13.	(a)(i)	electron / negative particle	1
		ONE OF high speed / emitted from nucleus	1
	(ii)	14	1
		7	1
	(b)(i)	5100–5600 years	1
	(ii)	$\frac{1}{4}$ / 25%	1
	(iii)	starts at 200 Bq	1
		less steep than first curve	1

(Total 8 marks)

TOTAL FOR PAPER: 90 MARKS

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London Examinations

IGCSE

IGCSE Science (Double Award) (4437)

Mark Schemes for Specimen Papers

Paper 7 (Common to both tiers)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 7 (COMMON TO BOTH TIERS)

Symbols used in the Mark Scheme
; indicates separate mark points
/ indicates alternatives
eq allow for correct equivalent

1. (a) beaker correct;
flask correct; 2
(b) A = 28 °C;
B = 21 °C; 2
(c) Flask A;
respiration releases energy / releases heat; 2
(Total 6 marks)

2. (a)

Step		Why carried out
1	Place plant in dark for 24 hours	**Removes all starch present / destarches plant;**
2	**Place plant in bright sunshine for 12 hours;**	Photosynthesis can occur
3	Remove leaf from plant	**Allows starch test to be performed;**
4	**Immerse leaf in boiling water for 1 minute;**	Kill leaf
5	**Heat leaf in boiling ethanol;**	**Removes chlorophyll / green colour;**
6	**Add iodine solution;**	Shows presence of starch

7
(b) don't heat directly / use water bath at 70 °C; 1
(Total 8 marks)

3. (a) <u>show on diagram / described</u>
one plant inside box with hole;
lamp on same side as hole;
reference to time using clock;
named control variable test; 4 max
(b) box with no hole / plant in 'normal' light; 1
(Total 5 marks)

4. (a) counting squares and summing part squares;
leaf area = 48–52 cm^2; 2

(b) length = 10 (if leaf stalk ignored)
12 (if leaf stalk etc included); 1
width = 7; 1
estimate = $7 \times 10 \times \frac{2}{3} = 6.67\ cm^2$ / $7 \times 12 \times \frac{2}{3} = 56\ cm^2$; 1

(c)(i) points × 2;;
correct leaf areas; 3

(ii) mode = 41 to 50; 1

(d)(i)

Leaf area in cm^2	Tally	Total number of leaves
11 to 20	\\\\	4
21 to 30	\\\\\	**5**
31 to 40	\\\	**3**
41 to 50	\\\\	**4**
51 to 60	\	**1**
61 to 70	\\	**2**
71 to 80	\	**1**

all tallies correct = 3 marks (minus 1 for each error);;;
all leaf numbers match tallies = 2 marks (minus 1 for each error, but allow transfer error from incorrect tally count);; 5

(ii) yes, more smaller leaves in full sunlight;
ref to lower mode / mean / or range;
or
not possible to conclude;
samples too small / not enough leaves measured; 2 max

(Total 16 marks)

5. (a) 33.3; 1

(b)(i) temperature / light intensity; 1

(ii) water bath / keep beaker set distance from lamp; 1

(c)(i) as concentration of carbon dioxide increases so does rate of photosynthesis; 1

(ii) carbon dioxide required for photosynthesis; 1

(iii) the results confirm her prediction; 1

(d) the first minute's reading for 2 g of hydrogencarbonate / eq is higher than others; 1

(e)(i) use measuring cylinder / graduated tube to collect volume of gas evolved;
allows quantitative estimate of rate of photosynthesis; 2

(ii) e.g. continue to increase the amount of hydrogencarbonate / eq available; to see if it is a limiting factor / eq; 2

(Total 11 marks)

6. range of exercise levels;
people same size / sex / age;
several people used;
(how breathing measured) breaths per minute;
other variable(s) controlled e.g. temperature;

(Total 4 max marks)

TOTAL FOR PAPER: 50 MARKS

Edexcel International

London Examinations

IGCSE

IGCSE in Science (Double Award) (4437)

Mark Scheme for Specimen Paper

Paper 8 (Common to both tiers)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 8 (COMMON TO BOTH TIERS)

1.	(a)(i)	**A** – Conical flask	1
	(ii)	**B** – Pipette	1
	(iii)	**C** – Measuring cylinder	1
	(iv)	**D** – (Filter) funnel	1
	(b)(i)	Measuring cylinder	1
	(ii)	Pipette	1
	(iii)	(Filter) funnel	1
			(Total 7 marks)

2.	(a)	Lines joined to correct boxes. Deduct one mark for an error (hydrogen – "pops", acid turns UI red, carbon dioxide turns lime water cloudy)	2
	(b)(i)	to clean the wire	1
	(ii)	sodium	1
	(iii)	sodium sulphate	1
			(Total 5 marks)

3.	(a)(i)	Hydrogen	1
	(ii)	75 cm^3 (+/– 1 cm^3)	1
	(b)(i)	graph 1	1
	(ii)	Any two from: Use same mass / length of magnesium ribbon Use same acid Use same volume of acid Use same concentration of acid Use same temperature for all three tests.	2
	(c)(i)	Columns for time and volume shown in two tables	1
		Correct units shown for both time and volume	1
	(ii)	1 mark for each graph (points plotted correctly, smooth curves)	2
	(iii)	Both go to same max volume / Both are curves	1
	(iv)	Same mass and volume of reagents used / Reaction starts quick and then slows down as reagents are used up	1
	(v)	Curve is steeper but horizontal at 60 cm^3	1
	(vi)	Anomalous result is circled	1
	(vii)	Checked by repeating them	1
			(Total 14 marks)

4. (a)(i) Correct diagram = 2 marks
Deduct 1 for any piece wrongly placed (min = 0) 2
(ii) 3-2-4-1 1
(iii) Take water temperature at the start of each test 1
(iv) Any two from:
Wear safety spectacles
Take care not to break thermometer
Care with flammable liquid
Care with hot water 2
(v) Any two from:
Use same volume of water each time
Use same start temperature
Make sure beaker is same distance above crucible each time
Use same mass of alcohol each time
Stir equally each time
Use same position in lab (i.e. to avoid draughts) 2
(vi) Lack of heat shielding 1
(b)(i) More carbon atoms in the molecule = more heat released (1)
Energy released is not directly proportional to number of carbon atoms (1) 2
(ii) Reasonable placing for pentanol (graph continues rising, but less steep) 1

(Total 12 marks)

5. (a)(i) C 1
(ii) Use a pipette filler / don't blow out / eye level when reading 1
(b) 34.4 1
(c)(i) 19.8, 19.6 2
(ii) 19.7 (cm^3) 1

(Total 6 marks)

6. Apparatus used:
Conical flask / or other suitable container 1
Pipette / Measuring cylinder 1
Burette 1
Method – Any three points from the following:
Use pipette / cylinder to place a known volume of acid (e.g. 0.1 M HCl) in flask / or similar
Fill burette with first indigestion liquid
Add suitable indicator (e.g. universal / screened methyl orange)
Titrate into acid until end point / neutralization
Record volume of acid used
Rinse out flask / similar container, and repeat with liquid 2
Strongest indigestion liquid is the one which needed least volume of liquid to neutralise the acid 3

(Total 6 marks)

TOTAL FOR PAPER: 50 MARKS

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IGCSE

IGCSE in Science (Double Award) (4437)

Mark Scheme for Specimen Paper

Paper 9 (Common to both tiers)

MARK SCHEME FOR
LONDON EXAMINATIONS IGCSE IN SCIENCE
(DOUBLE AWARD) (4437)
SPECIMEN PAPER 9 (COMMON TO BOTH TIERS)

1.	(a)(i)	30 cm		1F	O
	(ii)	48 cm		1F	O
	(iii)	18 cm		1C	A
	(iv)	safety	concerning pin e.g. cover when not in use large mass falling goggles in case spring breaks spring secured at the top ANY TWO	2C	DD
	(b)(i)	show w on diagram		1F	O
	(ii)	h = 2.1 cm		1F	O
	(iii)	amplitude × 2 (twice the amplitude)		1C	A
				(Total 8 marks)	

2.	(a)(i)	straight line		1F	D
		line through A and B		1F	D
		AB continued to meet XY		1F	D
		C correctly labelled		1F	D
	(ii)	straight line drawn from C to D		1F	D
	(iii)	ACY = 37 ± 1°		1C	O
		DCX = 49 ±1°		1C	O
	(b)(i)	axes labelled		1C	A
		plotting		2C	AA
	(ii)	smooth curve		1A	D
	(iii)	Point plotted and labelled P		1C	A
	(iv)	No because		1F	E
		point is not / near curve (OR No because point is not near curve)		1F	E
				(Total 14 marks)	

3.	(a)	attach string to object water in measuring cylinder sufficient to cover object record volume 1 lower object into cylinder using thread record final volume 2 volume of object A = volume 2 – volume 1 object on balance mass from scale ANY FOUR	4C	4D
	(b)(i)	formula	1C	A
		correct 3.3 / 3.26 / 3.261	1C	A
		to 2 or 3 s.f.	1C	A
	(ii)	mass to 2 s.f. volume to 2 s.f.	1A	E
		density to 2 or 3 s.f.	1C	E
	(c)(i)	A and C same densities B and D same densities	1C	A
		A and C same materials B and D same materials	1C	A
	(ii)	student wrong – different from each other	1C	E
	(d)	density = 8.6 ÷ 2.1	1C	A
		= 4.1	1C	A
		similar value to A (4)	1A	E
			(Total 15 marks)	

4. (a) place mass / weight in pan
current in coil / turn on current
vary current (using variable resistance)
note or add masses until balance is restored and note current value when balance is restored
change mass
repeat for more masses MAX 4 MARKS 4A 4P

(b)(i) table – mass / current values inserted 1C O
with units A and g (or kg) 1C O

mass in g	current in A
2	0.3
4	0.7
6	1.1
8	1.5
10	1.9

(ii) Axes labelled (with units) 1C A
Sketch straight line graph – current against mass 1C P

(c) place unknown mass / weight on pan 1F P
note current 1A P
read mass off from graph 1A P

(d)	State	move coil upwards	1A	E
	Explain	more attraction	1A	E
	State	move pan towards centre or pivot towards pan		
	Explain	smaller clockwise moment		
	State	use (soft) iron core (in coil)		
	Explain	increase magnetic field (of electromagnet)		
	State	use stronger magnet		
	Explain	stronger force		
	State	use heavier magnet		
	Explain	need larger mass on pan to balance		

ANY PAIR FOR 2 MARKS

(Total 13 marks)

TOTAL FOR PAPER: 50 MARKS

Allocation of marks targeted at grades A, C and F on Paper 3

Question	F	C	A	Total
1	4	4		8
2	7	6	1	14
3		13	2	15
4	1	4	8	13
Total	12	27	11	50

Allocation of marks for experimental and investigational skills on Paper 3

Question	P	D	O	A	E	Total
1		2	4	2		8
2		6	2	4	2	14
3		4	0	7	4	15
4	8	0	2	1	2	13
Total	8	12	8	14	8	50

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