

Applied Science Double Award

General Certificate of Secondary Education **J649**

Mark Schemes for the Units

June 2008

J649/MS/R/08

OCR (Oxford, Cambridge and RSA Examinations) is a unitary awarding body, established by the University of Cambridge Local Examinations Syndicate and the RSA Examinations Board in January 1998. OCR provides a full range of GCSE, A level, GNVQ, Key Skills and other qualifications for schools and colleges in the United Kingdom, including those previously provided by MEG and OCEAC. It is also responsible for developing new syllabuses to meet national requirements and the needs of students and teachers.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2008

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 556210
E-mail: publications@ocr.org.uk

CONTENTS

GCSE Applied Science Double Award (J649)

MARK SCHEMES FOR THE UNITS

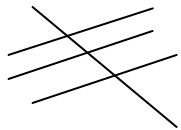
Unit/Content	Page
B482/01 Foundation Tier	1
B482/02 Higher Tier	4
Grade Thresholds	8

B482/01 Foundation Tier

Question				Expected answers	Mks	Additional guidance
1	a	i		diesel oil; sunlight; wind	2	all 3 = 2, 2 correct = 1
		ii		diesel oil;	1	
	b			not sunny / not enough light / cloudy / night time; not always windy / wind in wrong direction;	2	IGNORE rainy
	c			renewable / less named pollutant / less named pollutant effect e.g. global warming / less running or fuel costs	1	IGNORE: 'cheaper', less environmental damage, 'doesn't run out'
	d			light; electrical; movement; heat	4	
	e			microwave	1	
Total					11	

2	a			juniper / grass → rabbits rabbits → owls	1 1	
		b		grass / other food to eat	1	
	c			more rabbits; not eaten / not killed / more survive; more breeding;	any 2	IGNORE owls are predators NOT 'no predators'
	d			heat <u>and</u> light; photosynthesis; glucose	3	Either order
	e	i		sugar carbon dioxide yeast alcohol water	3	all 5 correct = 3 3/4 correct = 2 1/2 correct = 1
			ii		solution	1
Total					12	

Question				Expected Answers	Mks	Additional guidance
3	a	i		65; 67;	2	
	a	ii		3	1	
	b			trachea heart rib diaphragm lung	3	all 5 correct = 3 3/4 correct = 2 1/2 correct = 1
	c	i		glucose; oxygen;	2	
	c	ii		heart pumps <u>blood</u> faster / pumps more <u>blood</u>	1	
	d			37 °C	1	
Total					10	

4	a				3	all correct = 3 3/2 correct = 2 1 correct = 1
	b	i		combines properties of the materials / improves properties / can choose the properties idea / named property e.g. stronger / more hardwearing / waterproof / doesn't need finishing OWTTE;	1	ALLOW reasonable named property
		ii		FFTF	3	all correct = 3 3/2 correct = 2 1 correct = 1
		iii		inventing / improving idea; testing idea / testing properties / testing named property e.g. strength; making other necessary components e.g. glues; designing manufacturing processes; safety; environmental considerations;	any 2	
Total					9	

Question				Expected answers	Mks	Additional guidance
5	a	i		CO ₂ and H ₂ O	1	Letters must be similar sizes and subscripts clear
		ii		contains carbon	1	
	b			availability long term; <u>mains</u> gas availability; example of safety issue /fire / gas leaks; gas boiler may produce CO; cost of conversion to gas; comparison of running cost of gas to electricity;	any 2	IGNORE 'if it's cheaper'
	c	i		spoils landscape / eyesore idea; transport problems; waste disposal; harms habitats idea; noise; dust;	any 3	IGNORE kills plants / animals
		ii		strong / hardwearing idea; malleable; does not corrode / rust;	any 2	
Total					9	

6	a	i		<u>wavelength</u> ; frequency	2	
		ii		light; radio; infra-red; ultraviolet; microwave	any 2	ACCEPT reflector / refractor / Newtonian / Cassegrain
	b			<u>stars</u> are made of balls of (hot) gas; additional detail about stars e.g. emit light / are much bigger than they appear; <u>galaxies</u> are a collection of stars; additional detail about galaxies e.g. spiral-shaped / our galaxy is the milky way <u>the solar system</u> is the sun and planets / star and planets; additional detail about the solar system e.g. planets orbit star / names at least 3 or more planets	any 4	IGNORE Moon NOT starS and planets
	c			unit of distance	1	
Total					9	

B482/02 Higher Tier

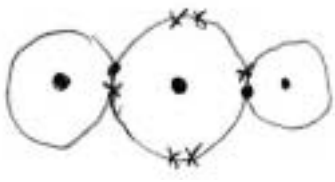
Question				Expected answers	Mks	Additional guidance
1	a	i		CO ₂ and H ₂ O	1	letters must be similar sizes and subscripts clear
		ii		contains carbon	1	
	b			availability long term; <u>mains</u> gas availability; example of safety issue /fire / gas leaks; gas boiler may produce CO; cost of conversion to gas; comparison of running cost of gas to electricity;	any 2	IGNORE 'if it's cheaper'
	c	i		spoils landscape / eyesore idea; transport problems; waste disposal; harms habitats idea; noise; dust;	any 3	IGNORE kills plants / animals
		ii		strong / hardwearing idea; malleable; does not corrode / rust;	any 2	ACCEPT other advantages e.g. availability of supply
Total					9	

2	a	i		<u>wavelength</u> ; frequency	2	
		ii		light; radio; infra-red; ultraviolet; microwave	any 2	ACCEPT reflector / refractor / Newtonian / Casegrain
	b			<u>stars</u> are made of balls of (hot) gas; additional detail about stars e.g. emit light / are much bigger than they appear; <u>galaxies</u> are a collection of stars; additional detail about galaxies e.g. spiral-shaped / our galaxy is the milky way <u>the solar system</u> is the sun and planets / star and planets; additional detail about the solar system e.g. planets orbit star / names at least 3 or more planets	any 4	IGNORE Moon NOT starS and planets
	c			unit of distance	1	
Total					9	

Question				Expected answers	Mks	Additional guidance
3	a			A - eating; B – exercise	1 1	B - ACCEPT insulation injecting
	b	i		(control) diet	1	IGNORE tablet, exercises
		ii		glucose converted (to glycogen); in the liver; ideas of reduces (blood) sugar (when too high); OR increased permeability (to sugar); of cells; reduces blood sugar	1 1 1	IGNORE pancreas
	c			keeping constant; internal environment;	1 1	IGNORE 'control'
	d			F before A; A before E; E before D	1 1 1	F A E D
Total					11	

Question				Expected answers	Mks	Additional guidance
4	a	i		wind diesel / oil / (fossil) fuel solar/light	1	all 3 needed IGNORE battery
		ii		diesel	1	ecf from (i) ie coal incorrect in (i) gains mark in (ii)
	b			(provides power) when not enough light / sun and/or wind	1 1	ACCEPT idea of insufficient power/not enough electricity / concentrated / high density source
	c	i		efficiency = power out ÷ power in x 100; 120÷1000x100 gains 2; 12	1 1 1	correct numerical answer gains full marks ALLOW 120 / 100 for 1 mark ALLOW 0.12 for 2 marks
		ii		production related problem e.g. high cost, produces hazardous waste, high C emission; disposal related problem e.g. contains toxic materials, not biodegradable; lifetime problems e.g. payback time too long, total energy cost negative.	any 2	
		d		P=IV; rearrange I=P÷V or I=360÷12 30	1 1 1	correct numerical answer gains full marks
Total					12	

Question				Expected answers	Mks	Additional guidance
5	a	i		selection of parents with suitable characteristics/can survive in dry conditions; breed parents; selection of offspring with suitable characteristics; repeat process/several generations	any 3	
		ii		reduction in variation; accumulation of harmful recessives; additional detail e.g. example of effect such as more vulnerable to (new) diseases; lost valuable characteristics;	any 2	ACCEPT either references to bean plants or other animals/plants
	b			C before A; A before D; D before B	1 1 1	CADB = 3
	c			max 2 from 1 advantage e.g. greater yield; more resistance to disease/pests; grows in dry conditions, max 2 from 1 disadvantage e.g. disrupt food webs; escape into wild; disease resistant weeds; genes spread to other plants,	max 3	total is 3, can have 1 adv and 2 disadv or 2 adv and 1adv
Total					11	

6	a	i		covalent	1	
		ii		2H with 1 electron and 1O with 6 electrons; shells overlap; cross and dot on overlap section; 	1 1	
		iii		$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ correct formulae in equation; balanced;	1 1	
	b			electron transferred from one atom to another; forms ions / or becomes positive / negative /becomes charged; attraction between ions; full outer shells;	any 3	NOT shared marks may be on diagram
Total					8	

Grade Thresholds

General Certificate of Secondary Education
Applied Science (Double Award) J649

June 2008 Assessment Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B481	Raw	50	46	42	38	34	28	22	16	10	0
	UMS	100	90	80	70	60	50	40	30	20	0
B482/1	Raw	60				33	27	21	16	11	0
	UMS	69				60	50	40	30	20	0
B482/2	Raw	60	38	30	22	15	11	9			0
	UMS	100	90	80	70	60	50	40			0
B483	Raw	50	46	42	38	34	28	22	16	10	0
	UMS	100	90	80	70	60	50	40	30	20	0

Entry Information

Unit	Total Entry
B481	7991
B482/1	5403
B482/2	1978
B483	9259

Specification Aggregation Results

	A*A*	A*A	AA	AB	BB	BC	CC	CD	DD	DE	EE	EF	FF	FG	GG
UMS	270	255	240	225	210	195	180	165	150	135	120	105	90	75	60
Cum %	0.1	0.6	1.6	3.9	9.2	19.9	37.8	52.5	65.0	76.1	84.9	91.8	95.9	98.2	99.3

9286 candidates were entered for aggregation this series.

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity



OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553