RECOGNISING ACHIEVEMENT

GCSE

Science B

General Certificate of Secondary Education

Unit **B712/01:** Unit 2: Modules B2, C2, P2 (Foundation Tier)

Mark Scheme for June 2012

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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.

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For answers marked by levels of response:

a. **Read through the whole answer from start to finish**

b. **Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor

c. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

d. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Annotations used in scoris

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt **not** given
	error carried forward
	information omitted
	ignore
	reject
	contradiction
	Level 1
	Level 2
	Level 3

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	=	alternative and acceptable answers for the same marking point
(1)	=	separates marking points
allow	=	answers that can be accepted
not	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
( )	=	words which are not essential to gain credit
__	=	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

Question			Answer	Marks	Guidance
1	(a)		**Idea that they have** **any 2 from:** (different) sizes (1) (different) face patterns (1) (different) sized antlers (1)	2	 **allow** (different) height, (different) weight, **allow** (different) markings**, black** patterns **ignore** just skin marking **ignore** just they have horns or they have markings as this is not a variation
	(b)	(i)	actual value is 55.2% (2) **or** (2001 is 250 so) 50% is 125 (1) any number from 110 to 115 is less than 125 / AW (1)	2	**allow** 54-56% (2) **allow** (any number from 135 to 140) ÷ 250 x100 (1) If correct calculations but candidate then says that the conclusion is incorrect then scores max 1 **allow** it has dropped by more than 125 (1) **allow** any number from (135 to 140) is more than half (1) **allow** $\frac{(110 \text{ to } 115)}{250} \times 100 = (44\text{-}48)\%$ therefore conclusion is correct (2)
		(ii)	**any 2 from:** disease that affect the oryx (1) predator or poachers may have got (in over fence) to them AW(1) lack of grass for oryx to eat or lack of water to drink (1) oryx have escaped(1)	2	 **ignore** being hunted unless qualified by idea of getting into the park **allow** higher level answer e.g. death rate greater than birth rate (1) **allow** area reached carrying capacity (1) **ignore** pollution unless qualified e.g. water supply contaminated (1)

Question			Answer	Marks	Guidance
		(iii)	**any 2 from:** because it prevents damage to food chains (1) because it could be used as a human food supply (1) because people could make money from tourism (1)	2	**allow** idea of future medical / research purposes (1) **allow** idea that (left to nature) they might become extinct (1) **ignore** for experimenting
			Total	**8**	

Question			Answer	Marks	Guidance
2	(a)		trophic levels(1)	1	
	(b)		**any 2 from:** idea that (woodlands contain) **dead** leaves / plants / trees (1) idea that mushrooms decay **or** break down dead material / organisms (1) mushrooms make elements / nutrients / chemicals available for reuse **or** recycle elements / chemicals (1)	2	**ignore** mushrooms decompose on its own as in stem of question **allow** are eaten by or food for some animals (1)
	(c)	(i)	**any 1 from:** respiration (1) excretion (1) egestion (1)	1	**allow** heat (energy) / movement (1) **allow** urine (1) **allow** faeces (1) **allow** not all the dead plants are used by mushrooms / energy is lost in spore production / not all parts of mushroom eaten (1) **ignore** references to growth
		(ii)	humans do not rely just on mushrooms / have other food to eat (1)	1	**allow** idea of different food chains being linked to others in a food web (1) **allow** idea that mushrooms are an insignificant part of human diet (1)
			Total	**5**	

Question			Answer	Marks	Guidance
3	(a)		**Level 3: (5 – 6 marks)** Identifies one or more ways the species are similar **and** one or more ways the species are different **and** explains some of the adaptations. Applies understanding equally to both species Quality of written communication does not impede communication of the science at this level. **Level 2: (3 – 4 marks)** Names one or more adaptations for each animal **and** explains one adaptation for each animal **or** makes several comparisons between the two species which in general are accurate. Quality of written communication partly impedes communication of the science at this level. **Level 1: (1 – 2 marks)** Names one adaptation for a lion **and** one adaptation for an eagle **or** makes a comparison between a lion **and** eagle **or** names on adaptation for either the lion or the eagle **and** gives an explanation. Quality of written communication impedes communication of the science at this level. **Level 0: (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**Relevant points include:** **adaptations they both have** • both have eyes at front of head (binocular vision) • both look forward • sharp claws for catching prey **ways they are different** • lion is better camouflaged than eagle • lion has sharp teeth eagle has sharp beak • lion has strong leg muscles eagle has wings • lions hunt in packs but eagles hunt alone • lions have eyes in front eagles have eyes on side **explanations** • (eyes at front / of head / look forward) to judge distance • (camouflage) to hide from prey • (sharp teeth) to catch hold of prey • (sharp beak / teeth) to tear at food • (sharp claws) to catch hold of prey • (hunt in packs) increases chance of catching prey • (strong leg muscles) hold down prey / to run fast • (wings) to fly fast • (eyes at side) for a wider field of view **ignore** sense of smell
	(b)		decreases (1)	1	**allow** antelope numbers decrease
			Total	**7**	

Question			Answer	Marks	Guidance
4	(a)	(i)	both adapted to get more food **or** both able to get more food **or** more likely to survive (1)	1	
		(ii)	one born with a long neck or inherited long neck **and** other neck became longer during life time (or by stretching) (1)	1	
	(b)	(i)	Darwin (1)	1	**mark** answer line first **if** no answer on answer line allow correct answer underlined or circled
		(ii)	explains a wide range of observations (1) Idea that other scientists agree with the findings by **testing or monitoring or research** (1)	2	**allow** evidence from genetics / fossil record / anatomy (1) **ignore** just 'more evidence'
			Total	**5**	

Question			Answer	Marks	Guidance
5	(a)		steel (1)	1	
	(b)		glass (1) transparent and strong or transparent and cheap (1)	2	**if any other answer than glass** is given then 0 **if no answer is given** the second mark can be given **allow** see through for transparent **ignore** mention of density **ignore** melting point
	(c)		aluminium (1) **any two from:** because it is least dense or low density (1) because it is attractive to look at or shiny (1) because it is strong (1)	3	**if choice is neither steel or aluminium scores zero** **allow** because aluminium does not rust or corrode(1) **allow** lightweight but ignore light **allow** steel (1) because it is cheap(est) (1) because it is strong(est) (1) **ignore** references to melting point
			Total	**6**	

Question			Answer	Marks	Guidance
6	(a)		reaction that goes both ways / you can change it back to what it was before / AW (1)	1	**allow** idea that you can get the reactants back, this may be in the form of a word equation **ignore** 'a reaction that can be reversed' **not** can get elements back
	(b)	(i)	increases / goes up / AW (1)	1	
		(ii)	decreases / goes down / AW (1)	1	
		(iii)	100(atm) and 250(^{o}C) (1)	1	must be in that order units not needed
		(iv)	higher pressure costs more to generate (1) catalyst increases rate of reaction (1)	2	**allow** rate too slow at 250^{o}C (1) **allow** high pressure requires more expensive equipment / more safety equipment
			Total	**6**	

Question			Answer	Marks	Guidance
7			**Level 3: (5 – 6 marks)** Two chemicals **must** be identified **and** a comprehensive description of benefits **and** problems is included. Quality of written communication does not impede communication of the science at this level. **Level 2: (3 – 4 marks)** One correct chemical **must** be identified **and** at least one benefit **or** one problem is correctly described. Quality of written communication partly impedes communication of the science at this level. **Level 1: (1 – 2 marks)** One correct chemical is identified **or** a limited description of either a benefit **or** problem of using fertilisers is offered. Quality of written communication impedes communication of the science at this level. **Level 0: (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**Relevant points include:** • alkali is potassium hydroxide • acid is nitric acid • fertilisers increase world food supply • fertilisers increase crop yield • fertilisers make crops grow more quickly • fertilisers provide plants with essential chemical elements • world population is growing so more food needed • fertilisers can kill aquatic organisms • eutrophication occurs • fertilisers can pollute water supplies **accept** higher level answers referring to fertilisers replacing essential elements or providing nitrogen to build plant protein **accept** correct descriptions of the process of eutrophication
			Total	**6**	

Question			Answer	Marks	Guidance
8	(a)		moist litmus paper (1) bleached / lose colour (1)	2	**allow** moist universal indicator paper (1)
	(b)		hydrogen (1)	1	**allow** H_2 / H (1)
	(c)		**any two from:** preservative (1) flavouring (1) dishwashers / water softeners (1) making sodium hydroxide (1) making plastics (1) making disinfectants (1) to melt ice or on roads in winter (1)	2	**allow** on food or in food(lowest limit of acceptability) **ignore** for food **ignore** idea of cleaning wounds or body piercings
	(d)		the sea / salt deposits (1)	1	**allow** Cheshire / Northwich / underground rocks / quarries / mines
	(e)		12 / twelve (1)	1	
			Total	**7**	

Question			Answer	Marks	Guidance
9	(a)		(planet P is) Mercury (1) (planet R is) Earth (1)	2	
	(b)		**any two from:** less weight / no passengers / no food / no water / no oxygen (1) (idea that) no need to plan / no need to bring the spacecraft back to Earth (1) (idea that) no need for equipment to maintain safe living conditions such as suitable temperature / shielding from radiation (1)	2	**allow** less payload **allow** no need to limit the time or distance of the mission /AW **allow** no need to worry about the safety of the crew / AW can take more risks / no one can die / no need to train astronaut **allow** reverse arguments for all of these
	(c)		**any two from:** both models have orbits/circles (1) Ptolemy model had Earth at the centre (1) Ptolemy model had Sun orbiting Earth (1) Ptolemy model has the moon as one of the orbits (1) Ptolemy had planets in a different order (1)	2	 because sun and moon now included
			Total	**6**	

Question			Answer	Marks	Guidance
10			**Level 3: (5 – 6 marks)** Interpret the data to give balanced arguments of the advantages **and** disadvantages of each lamp to include delay with fluorescent. LED or filament suggested as the best lamp with a reasoned argument. Quality of written communication does not impede communication of the science at this level. **Level 2: (3 – 4 marks)** Interpret the data to give some balanced arguments of the advantages **and** disadvantages of at least two lamps. A reasoned suggestion of the best lamp given (not necessarily LED or filament) Quality of written communication partly impedes communication of the science at this level. **Level 1: (1 – 2 marks)** Interpret the data to give advantages **and / or** disadvantages of any of the lamps. Quality of written communication impedes communication of the science at this level. **Level 0: (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to grade C** **LED:** **advantages** • has long(est) lifetime • comes on immediately • uses least power **disadvantages** • most expensive • gives out least light **Filament:** **advantages** • comes on immediately • gives out most light • cheap(est) **disadvantages** • has short(est) lifetime • takes most power (would need too many photocell panels) **Fluorescent:** **advantages** • gives out most light • reasonable lifetime • uses small amount of power **disadvantages** • delay in coming on • reasonably expensive
			Total	**6**	

Question			Answer	Marks	
11	(a)		power station produces electricity (1) National Grid takes electricity to homes (1)	2	**allow** higher level answers e.g. coal heats water or steam drives turbine or turbine drives generator (1) **assume** it relates to coal if not stated eg it burns in a power station **allow** descriptions for National Grid e.g. power cables on pylons, transformers etc
	(b)		0.25 (2) **but** **if incorrect** 600 (1) 2400	2	**allow** 25% (2) 0.25% scores (1) 25 scores (1)
			Total	**4**	

Question			Answer	Marks	Guidance
12	(a)		**any 3 from:** correct identification of the tracer being Y (1) idea that only Y (or gamma rays) can penetrate far enough through soil (1) put tracer into the oil in the pipeline (1) idea that detector moves along surface and leak is where there is a build up of nuclear radiation (1)	3	 **allow** gamma rays instead of Y **ignore** penetration through air or oil or just repeating numbers from the table
	(b)	(i)	damages cells / causes cancer / causes mutations (1)	1	**ignore** just harmful
		(ii)	**any one from:** limit exposure (1) shield with lead or concrete (1) operate from a distance (1) store radioactive materials safely (1) dispose of waste safely (1)	1	 **allow** monitor exposure e.g. film badges **ignore** protective clothing unless correctly specified i.e. lead apron
			Total	**5**	

Question			Answer	Marks	Guidance
13	(a)		2530 (W) (2) **but** **if incorrect** 230 x 11 (1)	2	**allow** 2500(W) (2) because all the other values in the table have been rounded.
	(b)		no (no mark) (idea that) cost depends not only on the power (1) also on the amount of time the appliance is used (1) but cost depends on power x time (2)	2	correct response needed to gain marks **allow** electric fire would cost most if qualified by high power and long time of use (2) only uses kettle for 1 hour / fire is used much longer (than 1 hour) (1) fire = 60000, Kettle = 3000 is power x time = 2 marks
			Total	**4**	

Question			Answer	Marks	Guidance
14	(a)	(i)	wind – increase (1) hydro-electric – (up between 2005 and 2006) then the same (1)	2	
		(ii)	likely that wind power will continue to increase (1) likely that other sources will continue to increase (1) likely that hydro–electric will stay the same (1)	3	if no other mark scored, the idea of an overall increase in use of renewables scores (1)
	(b)	(i)	increasing (1)	1	
		(ii)	use of fossil fuels could drop (1)	1	**allow** no change as number of cars likely to increase (1) **allow** increases as overall energy needs are increasing (1) **allow** will remain the same as bio-fuels will increase as the population increases (1)
	(c)	(i)	St. Mawgan (1) has highest (average) wind speed for **most** (months) of the year (1)	2	2nd mark is dependent on St Mawgan being chosen **allow** the **yearly** average wind speed is the highest or shown by calculations that it is higher on average than the others **ignore** wind speed higher in **all** months of the year
		(ii)	population size in the area / ease of connection to the National Grid / environmental lobby / residents objections / (1)	1	**allow** type of landscape(1) **allow** enough space (1) **allow** whether to build on land or at sea (1) **allow** noise or eyesore or visual pollution (1) **allow** affects habitats or wildlife (1) **ignore** any reference to cost ignore references to weather as this is in the stem of the question
			Total	**10**	

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