

Mark Scheme for June 2010

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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.

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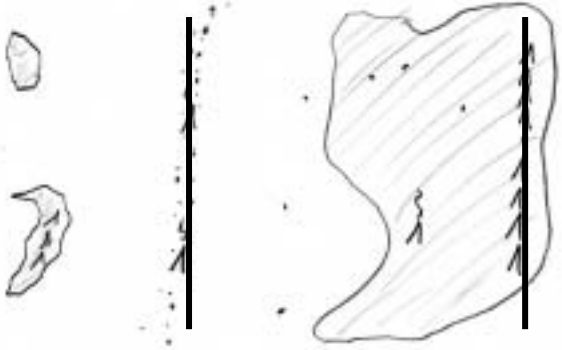

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Question		Expected Answers	Marks	Additional Guidance
1	a	A (1) C (1) E (1)	[3]	any order
	b	B (1)	[1]	
		Total	[4]	

Question		Expected Answers	Marks	Additional Guidance
2	a	<p>distance increases speed increases <input checked="" type="checkbox"/> (1)</p> <p>distance decrease speed increases <input type="checkbox"/></p> <p>...inversely related. <input type="checkbox"/></p> <p>Galaxies are moving. <input checked="" type="checkbox"/> (1)</p> <p>distance increases speed decreases <input type="checkbox"/></p>	[2]	
	b	<p>Gravity is acting... <input type="checkbox"/></p> <p>Space is expanding. <input checked="" type="checkbox"/> (1)</p> <p>Hubble discovered... <input type="checkbox"/></p> <p>...too many galaxies... <input type="checkbox"/></p>	[1]	
	c	<p>Life must exist on other planets <input type="checkbox"/></p> <p>Galaxies are made up of stars. <input type="checkbox"/></p> <p>The universe is orbiting our galaxy <input type="checkbox"/></p> <p>Stars have a life cycle. <input type="checkbox"/></p> <p>The universe started with a 'big bang'. <input checked="" type="checkbox"/> (1)</p>	[1]	
	d	14 thousand million (1)	[1]	
Total			[5]	

Question		Expected Answers	Marks	Additional Guidance
3	a	fossils (1) rock types (1)	[2]	
	b	The theory linked... <input checked="" type="checkbox"/> (1) Mountains formed... <input type="checkbox"/> ...could not be replicated... <input type="checkbox"/> The evidence... <input checked="" type="checkbox"/> (1) ...pattern of magnetism... <input type="checkbox"/>	[2]	
	c i		[2]	one mark for identifying rows of mountains as a boundary and one mark for identifying earthquakes as a boundary list principle applies if extra lines drawn
	ii		[1]	any one arrow in the correct direction perpendicular to boundary or horizontal by eye list principle applies

			Total	[7]	
Question	Expected Answers		Marks	Additional Guidance	
4	a			[3]	
		Microwaves heat by... <input checked="" type="checkbox"/> (1)			
		Microwaves are ionising... <input type="checkbox"/>			
		The screen on a... <input checked="" type="checkbox"/> (1)			
		Mobile phones produce... <input checked="" type="checkbox"/> (1)			
		Microwaves are blocked... <input type="checkbox"/>			
		The higher the intensity... <input type="checkbox"/>			
	b			[1]	
		...skin from getting hot. <input type="checkbox"/>			
		...reflect or absorb... <input checked="" type="checkbox"/> (1)			
		...transmit... <input type="checkbox"/>			
		...skin from getting cold. <input type="checkbox"/>			
			Total	[4]	

Question		Expected Answers				Marks	Additional Guidance
5	a		green-house effect	holes in the ozone layer	both	[3]	allow ticks in both greenhouse and ozone layer for 'electromagnetic radiation' mark
		skin cancers		✓			
		electromagnetic radiation	(✓)	(✓)	✓		
		reversible chemical changes in the atmosphere		✓			
	b	photosynthesis (1) respiration/respiring (1)				[2]	either order allow phonetic spellings not breathing/ventilation
		Total				[5]	

Question		Expected Answers	Marks	Additional Guidance
6		<p>an example of a correlation given – the example must be related to (em) radiation exposure or global warming for this mark (1)</p> <p>the example does not have a causal link (1)</p> <p>correlation explained – e.g. There is a relationship/link between two variables, (But there is not necessarily a causal link between the variables) (1)</p> <p>cause explained – e.g. one variable depends upon another, one variable always follows the other (1)</p>	[4]	<p>if more than one example given apply list principle</p> <p>we are looking for an explanation of the meaning of ‘correlation’ not a description of their chosen correlation</p> <p>again we are looking for the meaning of ‘cause’</p>
		Total	[4]	
7	a	<p>sensible comparison consistent with choice on efficiency; (1)</p> <p>sensible comparison consistent with choice on cost; (1)</p> <p>sensible comment consistent with choice on environmental factors (1)</p>	[3]	<p>marks may only be awarded for points based on information from the table</p> <p>e.g. coal most efficient (1) relatively cheap (1) and does not produce radioactive waste (1)</p> <p>a sensible comment may be explaining why a feature is less important than another e.g. wind is not the most efficient, but is still quite efficient</p>
	b	idea that it is produced/made from another energy source (1)	[1]	allow named energy sources or ‘primary source’
		Total	[4]	

Question		Expected Answers	Marks	Additional Guidance
8	a	produces ions / ionising radiation (1)	[2]	ignore 'ionise cells' and heating effects arguments accept causes mutation
		which disrupt chemical reactions / damages DNA (1)		
	b	(damaged) cells killing themselves (1)	[1]	
	c	government officials (1)	[1]	
		Total	[4]	

9	a	i	3 (1)	[1]	
		ii	4.46 billion years (1)	[1]	must include units accept 4.5 billion for 4.46 billion accept 4 460 000 000 years accept 4.46×10^9 years ecf if $\frac{1}{4}$ for part ai 53.52 billion years for one mark if $\frac{7}{8}$ for part ai 15.29 billion years for one mark if 7 for part ai 1.91 billion years for one mark if 8 for part ai 1.67 billion years for one mark
	b		protons – 90 (1) neutrons – 144 (1) electrons – 0/none (1)	[3]	
			Total	[5]	

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