Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Road Safety, Radioactivity and Earth in Space

Module 6

Higher Tier

[GSC62]

WEDNESDAY 29 FEBRUARY 2012
11.00 am–11.45 am

MARK SCHEME

			AVAILABLE MARKS
1	**(a)** Heat/thermal/sound [1]		
	(b) **(i)** 600/2400; 0.25/25%/¼ [2]		
	(ii) Engines use less fossil fuels; less carbon dioxide produced/less greenhouse gases [2]		5
2	**(a)** Hydrogen gas; Pulled together by gravity: Fusion begins [3]		
	(b) Radio telescopes/light telescopes/satellites/probes *any 1* [1]		
	(c) The distance: travelled by light in 1 year [2]		
	(d) Minimum 24 year round trip; large supply of food/water would be difficult to carry; large supply of oxygen required; difficult to cope with major illnesses over such a distance; larger spacecraft so more fuel technical failure/astronauts stranded (any three) [3]		9
3	**(a)** There are more children in residential areas; slower speed means less chance of serious injury if a child is hit [2]		
	(b) less friction; increased braking distance/stopping distance [2]		
	(c) **(i)** 4 units [1]		
	(ii) 60 mg [1]		
	(iii) Increased reaction time; increase in thinking distance/stopping distance [2]		
	(iv) At 75 mg you are 3.5 times as likely to have a crash/or other appropriate comparison from table [1]		
	(d) **(i)** The forces are balanced; moving at a steady speed [2]		
	(ii) The car would decelerate if it was moving at a steady speed [1]		12

					AVAILABLE MARKS
4	**(a)**	**(i)**	5 points correct – 2 marks 4 points correct – 1 mark smooth curve – 1 mark	[3]	
		(ii)	The time it takes; the radioactivity/radiation count to fall by half	[2]	
		(iii)	5700–5900 years	[1]	
		(iv)	2000–2200 years	[1]	7
5	**(a)**	**(i)**	Universe started as a single point/singularity; Universe was created from a large explosion After millions of years gravity pulled this matter together to eventually form stars and galaxies universe still expanding today (any three)	[3]	
		(ii)	Steady State theory	[1]	
	(b)	**(i)**	Heliocentric	[1]	
		(ii)	Earth is at the centre of the Solar System	[1]	
	(c)		Homberg 11; furthest from our galaxy	[2]	8
6	**(a)**		mass $= 1 + 0.01 = 1.01$ momentum $= 3.0 \times 1.01$ $3 \times 1 = 1$ mark 3.03 kgm/s	[3]	
	(b)		Increase the velocity of bullet	[1]	4
				Total	**45**