



Rewarding Learning

**General Certificate of Secondary Education
2010–2011**

Science: Single Award (Modular)

Road Safety, Radioactivity
and Earth in Space

Module 6

Higher Tier

[GSC62]

FRIDAY 25 FEBRUARY 2011, MORNING

**MARK
SCHEME**

		AVAILABLE MARKS
1	(a) speed = $140/14$ or $20/2$; 10 m/s	[2]
	(b) Increasing ; the dots are further apart.	[2]
2	(a) Radiation that is always around us.	[1]
	(b) The combinations of neutrons and protons; are unstable.	[2]
	(c) (i) Test more houses	[1]
	(ii) Derry + Fermanagh	[1]
	(iii) Radiation can harm/damage/change/kill living tissue/cell; which causes cancer (allow only lung cancer).	[2]
	(d) Measure the radioactivity levels when sheets of thick lead, aluminium and paper are placed consecutively in front of source; Lead stops alpha, beta and gamma; Aluminium stops alpha and beta; Paper stops alpha. Any three [1] each, maximum [3]	[3]
	Same distance from source → sheet/source → detector materials same thickness	[1]
		11
3	(a) The time it takes; for the radiation count to fall by half.	[2]
	(b) Working out [1] 7 seconds [2]	[2]
		4
4	(a) 1. Hydrogen should be petrol 2. Oxygen should be carbon dioxide 3. Fossil fuels last for 1000 years should be 100's years (less than 1000). [1] each, maximum [3]	[3]
	(b) (i) energy output = 0.25×2500 [1] 625 J [1]	[2]
	(ii) How good a machine is at transferring energy.	[1]
		6

			AVAILABLE MARKS	
5	(a)	(i) [2] for correct points, [-1] for each incorrect [1] for smooth curve not dot-dot Maximum [3]	[3]	9
		(ii) The greater the distance of the galaxy is from Earth the faster it is moving.	[1]	
	(b)	(i) heliocentric model [1]	[1]	
		(ii) 1. There are only six planets 2. The Earth is at the centre, not the Sun [1] each, maximum [2]	[2]	
	(c)	(i) galaxies are moving apart/red shift/background radiation	[1]	
(ii) Steady state theory		[1]		
6	(a)	(i) Start speed at A; final speed at B are measured by sensors. Time for trolley to move between sensors A and B is measured. [1] each, maximum [3]	[3]	11
		(ii) Gravity pulls trolley down; overcoming friction; providing an unbalanced force making trolley accelerate. [1] each, maximum [3]	[3]	
	(b)	(i) Average speed camera maintains 20 mph for longer distance/time [1] Fixed camera 20 mph just at that point [1] Reference to children's safety in this locality [1]	[3]	
		(ii) Infringement against personal liberty; Government raise money. [1] each, maximum [2]	[2]	
	Total			