

New
Specification



Rewarding Learning

**General Certificate of Secondary Education
2012–2013**

Science: Single Award

Unit 3 (Physics)

Foundation Tier

[GSS31]

WEDNESDAY 29 FEBRUARY, 2012

9.30 am–10.30 am

**MARK
SCHEME**

			AVAILABLE MARKS	
1	(a) (i)	Mars	[1]	7
	(ii)	asteroids	[1]	
	(b)	heliocentric – Sun at the centre [1] geocentric – Earth at the centre [1]	[2]	
	(c) (i)	increases/gets longer	[1]	
	(ii)	Uranus; furthest from Sun	[2]	
2	(a) (i)	4/town	[1]	7
	(ii)	1/power station	[1]	
	(b) (i)	electrical	[1]	
	(ii)	heat	[1]	
	(c) (i)	10 am–4 pm	[1]	
	(ii)	1500 watts	[1]	
	(iii)	all in bed	[1]	
3	(a) (i)	uses less electrical energy/lasts longer/lower running cost/ more efficient/wastes less energy] do not allow cheaper <i>(any 2 = 1 mark each)</i>	[2]	5
	(ii)	cheaper to buy	[1]	
	(b)	$\frac{3}{15}$ [1] $0.2(\frac{1}{5})$ [2] 20%	[2]	
4	(a) (i)	series	[1]	7
	(ii)	parallel	[1]	
	(b) (i)	the other bulb goes out/ref. to current flow	[1]	
	(ii)	the other bulb stays lit/gets brighter/ref. to current flow do not allow dimmer	[1]	
	(c) (i)	2	[1]	
	(ii)	$\frac{8}{2}$ [1] 4 [2] e.c.f from [1]	[2]	

			AVAILABLE MARKS		
5	(a)	1. steady speed	[1]	10	
		2. stopped/stationary	[1]		
	(b)	gets faster	[1]		
	(c)	$\frac{120}{40}$ [1] 3 m/s [2]	[2]		
	(d)	crumple zones/air bags/seat belts/side impact bars (any 2 = 1 mark each)	[2]		
	(e)	(i)	slows cars down [1] less serious injuries/accidents [1]		[2]
(ii)		slows emergency response time/uses more fuel accelerating and decelerating between them	[1]		
6	(a)	(i) 2.5 m	[1]	6	
		(ii) 8 m	[1]		
	(b)	2 Hz	[1]		
	(c)	(i)	vibrations at right angles/up and down [1] to wave travel [1]		[2]
		(ii)	any electromagnetic wave		[1]
7	(a)	braking	[1]	9	
	(b)	(i)	3 points correct [1] correct line [1] $\pm \frac{1}{2}$ square		[2]
		(ii)	as speed increases, thinking distance increases		[1]
		(iii)	no change		[1]
	(c)	(i)	the shorter distance the stick falls [1] the quicker her reactions are [1]		[2]
		(ii)	repeat/average [1] 0 cm on ruler to be held just above hand [1]/implied		[2]

8 (a) Indicative Content

- Amount of beta going through will change with thickness of aluminium
- Thicker aluminium the less beta radiation detected (or vice versa)
- Alpha would be stopped by aluminium/paper/air
- Gamma would go straight through aluminium/stopped by lead
- Beta stopped by aluminium

Band	Response	Mark
A	Candidates use 4 or 5 of the above points in a logical sequence to explain fully why beta is best. They use good spelling, punctuation and grammar and the form and style are of a high standard.	5–6
B	Candidates use 3 of the above in a logical sequence to partially explain why beta is best. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	3–4
C	Candidates explain why beta is best using some 1 or 2 of the above points. However these are not presented in a logical sequence. They use limited spelling, punctuation and grammar.	1–2
D	Response not worthy of credit	0

[6]

(b) cobalt 60

Gamma; has most penetrating power/kills bacteria

Half-life is longest/doesn't need to be replaced often [1]

[1]

[2]

9

Total

60

AVAILABLE
MARKS