

New
Specification



General Certificate of Secondary Education
2012–2013

Double Award Science: Physics

Unit P1

Foundation Tier

[GSD31]

WEDNESDAY 29 FEBRUARY 2012
9.30 am–10.30 am

**MARK
SCHEME**

			AVAILABLE MARKS
1	(i) Kinetic [1], Electric(al) [1]	[2]	7
	(ii) Heat [1], Sound [1]	[2]	
	(iii) Visual pollution/unreliable/noise pollution Dangers to birds/animals or destroys habitats [1]	[1]	
	(iv) No pollution/saves fossil fuels/energy is free/renewable <i>any 2 for 2 marks</i>	[2]	
2	(i) 5 [1]	[1]	4
	(ii) Efficiency = $\frac{\text{(Useful) Energy Output}}{\text{Input Energy}}$ [1]		
	= $\frac{25}{100}$ [1]		
	= 0.25 or 25% [1]	[3]	
3	(a) Weight/(Force of) gravity [1]	[1]	5
	(b) Balanced forces/No resultant force [1]	[1]	
	(c) (i) 8 (N) [1]	[1]	
	(ii) Accelerates/or moves faster [1] to the right [1]	[2]	
	Independent marking		
4	(a) (i) Electron, proton, neutron [1] each	[3]	10
	(ii) 3 protons [1], 4 neutrons [1]	[2]	
	(b) (i) Fast moving electrons [1]	[1]	
	(ii) Nucleus [1]	[1]	
	(iii) Alpha [1], Gamma [1]	[2]	
	(iv) Alpha [1]	[1]	

			AVAILABLE MARKS
5	(a)	$a = \frac{v-u}{t}$ or $v = u + at$ [1]	[1]
		$= \frac{15-0}{20}$ [1] if $\frac{0-15}{20}$ then loses subs mark & answer mark	[1]
		$= 0.75 \text{ (m/s}^2\text{)}$ [1]	[1]
	(b)	Velocity has direction/vel. is a vector Speed has no direction/speed is a scalar [1]	[1]
	(c)	Rates of change/same units [1] Both have distance and time.	[1]
6	(a) (i)	Mass is amount of material [1]	[1]
	(ii)	Weight is force (due to gravity) [1]	[1]
	(b) (i)	24.6 (cm ³) [1]	[1]
	(ii)	28.6 [1] allow e.c.f. from (i). 4.0 (cm ³) [1]	[2]
	(iii)	Density = Mass/Volume [1] $= \frac{42}{4}$ [1] allow e.c.f. from (b)(ii) $= 10.5 \text{ (g/cm}^3\text{)}$ [1]	[3]
	(iv)	Silver [1] allow e.c.f. from (b)(iii)	[1]
7	(a) (i)	At rest [1]	[1]
	(ii)	Bigger or steeper gradient [1]	[1]
	(b)	Distance = 8(m)	[1]
	(c)	Average Speed = Gradient [1] $= \frac{18}{12}$ [1] $= 1.5 \text{ (m/s)}$ [1]	[3]
			5
			9
			6

- 8 (i) $KE = \frac{1}{2}mv^2$ [1] Full formula required [1]
- (ii) $= \frac{1}{2} \times 7500 \times 20^2$ [1]
 $= 1500000$ (J) [1] [2]
- (iii) Work = 1500000 (J) [1] allow e.c.f. from (ii) [1]
- (iv) Power = Work done/time [1]
 $= 1500000/20$ [1]
 $= 75000$ (W) [1] [3]
 Allow e.c.f. from (ii) or (iii)
- (v) 75(kW) allow e.c.f. from (iv) [1] [1]
- 9
- Two (light) nuclei [1]
 - Join together [1] or combine or fuse
 - To form a different nucleus [1] or a heavier nucleus or new nucleus
 - Energy is released [1]
 - Decrease in mass [1]
 - High temperature [1]

AVAILABLE
MARKS

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Response	Mark
Candidates must use appropriate specialist scientific terms throughout to describe fully and in a logical sequence the process of fusion in a nuclear reactor using 5 or 6 the points shown in the indicative content above. They use good spelling, punctuation and grammar throughout and the form and style are of a high standard.	[5-6]
Candidates use some appropriate specialist scientific terms to partially describe, in a logical sequence, 3 or 4 points relating to nuclear fusion shown in the indicative content above. They use satisfactory spelling, punctuation and grammar and the form and style are of satisfactory standard.	[3-4]
Candidates use limited specialist scientific terms to describe 1 or 2 of the points relating to fusion shown in the indicative content above. Their spelling, punctuation, grammar, form and style are of a limited standard.	[1-2]
Response not worthy of credit.	0

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			AVAILABLE MARKS
10 (a)	1.2, 2.6 2 correct = [2], 1 correct = [1]	[2]	
(b)	Scale > half of axis [1] Deduct [1] for each incorrect point within ± 1 square	} if non linear scale } then 0/4 [4]	
(c) (i)	Straight line [1], including origin [1] dependent marking ± 1 square	[2]	
(ii)	Yes [1] Straight line thro' origin [1] allow e.c.f. from (c) (i)	[2]	10
		Total	70