



Rewarding Learning

**General Certificate of Secondary Education
2011–2012**

Double Award Science: Physics

Unit P1

Foundation Tier

[GSD31]

MONDAY 14 NOVEMBER 2011

1.30 pm–2.30 pm

**MARK
SCHEME**

			AVAILABLE MARKS	
1	(a) (i)	Battery/cell	[1]	5
	(ii)	Any two from: Sound, light, microwaves	[2]	
	(b)	Potential [1] – heat [1] or gravitational or thermal	[2]	
2	(i)	distance – e.g. tape measure/trundle wheel time – stopwatch [1 each]	[4]	5
	(ii)	av speed = distance/time	[1]	
3	(a) (i)	Efficiency = (useful) energy out/energy in [1] = 1600/2000 [1] = 0.80 [1] or 80%	[3]	5
	(ii)	No unit	[1]	
	(b)	Better insulation/smaller door	[1]	
4	(a) (i)	Car B	[1]	5
	(ii)	Biggest resultant or unbalanced force <i>dependent marking</i>	[1]	
	(b)	(a =) 2/0.5 [1] = 4 [1] m/s ² [1]	[3]	
5	(a) (i)	Friction	[1]	5
	(ii)	Tension	[1]	
	(b)	momentum = mass × vel [1] = 0.5 × 3 [1] = 1.5 (kgm/s) [1]	[3]	

6 (a) (i) Plum pudding [1]

(ii) Rutherford/Bohr [1]

(b)

Particle	Where found	Charge
proton	<i>nucleus</i>	positive
<i>neutron</i>	nucleus	neutral
electron	in orbit	<i>negative</i>

[1] each

[3]

7 (a) $W = mg$ [1] 0.4×10 [1]
 $= 4$ [1] (N) [3]

(b) (i) Add nails to measuring cylinder containing water [1]
Note initial and final readings [1]
Difference (gives volume) [1] [3]

(ii) density = mass/volume (or symbols) [1]
 $= 150/20$ [1]
 $= 7.5$ [1]
 g/cm^3 [1] [4]

8 (a) (i) Atomic number [1] [1]

(ii) No. of protons [1] [1]

(iii) Mass number [1] [1]

(iv) No. of protons + neutrons OR number of particles
(in the nucleus) [1] [1]

(b) **Indicative Content**

- Absorbs neutron or neutron strikes (U^{235} nucleus)
- Splits nucleus
- (2 or 3) (fission) neutrons produced
- (Possible) chain reaction
- Energy Released

AVAILABLE
MARKS

5

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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 fission in a nuclear reactor using all 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 fission 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 fission shown in the indicative content above. Their spelling, punctuation, grammar, form and style are of limited standard.	1–2
Response not worthy of credit.	0

AVAILABLE
MARKS

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- 9 (a) (i) Unstable nuclei or nuclei disintegrate [1] emit particles or radiation or gamma rays [1] [2]
- (ii) gamma, alpha, beta [1] each [3]
- (b) Any **two** from:
e.g., radon gas from earth's crust, from space/cosmic rays building materials, food (e.g. bananas) etc. [2]
- (c) (i) e.g. avoid cancer, radiation sickness/burns [1]
- (ii) Any **two** from:
keep exposure time to a minimum
work at a distance/use forceps or tools/robots
use shielding/special clothing [2]
- 10 (i) $\frac{1}{2}$ mark each round up [2]
- (ii) v^2 scale must be 0.5 or more of axis. [1]
Plot points: 5 correct [2], 4 correct [1] [3]
- (iii) Best fit line [1] [1]
- (iv) Yes [1]
Graph is a straight line [1] passing thro' origin [1] [3]
- (v) k is the grad [1] [1]

10

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Total

70