

New  
Specification



*Rewarding Learning*

General Certificate of Secondary Education  
2011–2012

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**Double Award Science: Physics**

Unit P1

Higher Tier

[GSD32]

MONDAY 14 NOVEMBER 2011

1.30 pm–2.30 pm

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**MARK  
SCHEME**

- 1 (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  
use shielding/special clothing [2]
- 2 (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 [6]

AVAILABLE  
MARKS

10

| 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 <b>all</b> 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. | <b>[5–6]</b> |
| Candidates use some appropriate specialist scientific terms to partially describe, in a logical sequence, <b>3 or 4</b> 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.                              | <b>[3–4]</b> |
| Candidates use limited specialist scientific terms to describe <b>1 or 2</b> of the points relating to fission shown in the indicative content above. Their spelling, punctuation, grammar, form and style are of a limited standard.   | <b>[1–2]</b> |
| Response not worthy of credit.  | <b>0</b>     |

10



|              |   | AVAILABLE MARKS |
|--------------|---|-----------------|
| 8            | <p>(a) (i) Towards the centre (of the curve) [1]</p> <p>(ii) Keeps the car going in a curve (circle) [1]</p> <p>(iii) INCREASE [1]</p> <p>(iv) DECREASE [1]</p> | [4]             |
| (b)          | <p>Mom = mass <math>\times</math> velocity [1]</p> <p>Mom = <math>1500 \times 22</math> [1]</p> <p>Mom = <math>33\,000</math> [1] kgm/s [1]</p>                 | [4]             |
| 9            | <p>CWM = ACWM [1]</p> <p><math>3 \times 50</math> [1] = <math>W \times 20</math> [1]</p> <p><math>W = 7.5(N)</math> [1]</p>                                     | [4]             |
| 10           | <p>pe = mgh [1]</p> <p><math>30</math> [1] = <math>0.2 \times 10 \times h</math> [1]</p> <p><math>h = 15(m)</math> [1]</p>                                      | [4]             |
| <b>Total</b> |   | <b>70</b>       |