New Specification

Rewarding Learning

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]	
	(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 *any* 2 for 2 marks		[2]	7

2 **(i)** 5 [1] [1]

(ii) Efficiency $= \dfrac{\text{(Useful) Energy Output}}{\text{Input Energy}}$ [1]

$= \dfrac{25}{100}$ [1]

$= 0.25$ or 25% [1] [3] 4

3 **(a)** Weight/(Force of) gravity [1] [1]

(b) Balanced forces/No resultant force [1] [1]

(c) **(i)** 8 (N) [1] [1]

(ii) Accelerates/or moves faster [1] to the right [1]   Independent marking   [2]   5

4 **(a)** **(i)** Electron, proton, neutron [1] each [3]

(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] 10

5 (a) $a = \dfrac{v - u}{t}$ or $v = u + at$ [1] [1]

$= \dfrac{15 - 0}{20}$ [1]   if $\dfrac{0 - 15}{20}$ then loses   subs mark [1]
                                                            &   answer mark

$= 0.75$ (m/s^2) [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] [1]
Both have distance and time.

AVAILABLE MARKS

5

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]
$= \dfrac{42}{4}$ [1] allow e.c.f. from (b)(ii)
$= 10.5$ (g/cm^3) [1] [3]

(iv) Silver [1] allow e.c.f. from (b)(iii) [1] 9

7 (a) (i) At rest [1] [1]

(ii) Bigger or steeper gradient [1] [1]

(b) Distance = 8 (m) [1]

(c) Average Speed = Gradient [1]
$= \dfrac{18}{12}$ [1]
$= 1.5$ (m/s) [1] [3] 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]

<div align="right">8</div>

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]

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**

AVAILABLE MARKS

6

10 (a) 1.2, 2.6
2 correct = [2], 1 correct = [1] [2]

(b) Scale > half of axis [1] ⎫ if non linear scale
Deduct [1] for each incorrect point ⎭ then 0/4 [4]
within ± 1 square

(c) (i) Straight line [1], including origin [1] dependent marking [2]
± 1 square

(ii) Yes [1]
Straight line thro' origin [1] allow e.c.f. from (c) (i) [2] 10

Total **70**