New
Specification

cea
Rewarding Learning

General Certificate of Secondary Education
2012–2013

Double Award Science: Physics

Unit P1

Higher Tier

[GSD32]

WEDNESDAY 14 NOVEMBER 2012
1.30 pm–2.30 pm

MARK
SCHEME

1 (a) (i) C [1] **(ii)** A [1] **(iii)** B [1]

(b) (i) Ionisation [1]

(ii) Lose or gain electron/s [1]

(c) e.g. Any two from:
Use tongs/keep distance large [1]
Keep exposure time low [1]
Use shielding/wear protection [1]/safety badge/film badge

(d) Time [1] for activity to halve [1] [dept. marking]

9

2 (a) Find weight (or mass and multiply by 10) [1]
Find total height of stairs [1]
Time to climb stairs [1]
Power = (weight × height)/time; [1]
Any two instruments from scales/metre stick/stop clock [2]
[1 mark each]

Response	Mark
Candidates give **5 or 6** of the above points. They use good spelling, punctuation and grammar. The form and style are of a high standard and specialist terms are used appropriately.	[5–6]
Candidates explain **3 or 4** of the above points. They use satisfactory spelling, punctuation and grammar. The form and style are of a satisfactory standard and they have made use of some specialist terms.	[3–4]
Candidates explain **1 or 2** of the above points. They use limited spelling, punctuation and grammar. The form and style is of a limited standard and they have made no use of specialist terms.	[1–2]
Response not worthy of credit.	[0]

[6]

(b) P = Work done/time taken (no marks)
    = (3800)/5 [1]
    = 760 [1]
    = 0.76 (kW) [1]   [3]

9

2

3 (i)

Depth h in m	0	10	20	30	40	50
W in bar	0	1	2	3	4	5
Total pressure in bar	**1**	**2**	**3**	*4*	*5*	*6*

3 or 4 correct [1]
All correct [2]   [2]

(ii) Vertical axis numbered with uniform scale [1], scale more than half [1]
  3 or 4 correct [1]
  5 or 6 points [2]   [4]

(iii) Best fit line [1]

(iv) Intercept (on vertical axis) OR when h = 0 pressure is 1 bar [1]

(v) 4.5 bar [1]

(vi) Line does not go through origin [1]   10

4 (a) (i) (Same) number of protons or charge   [1]

  (ii) (Different) number of neutrons or mass number   [1]

(b) 14 [1]   0 [1]   7 [1]   −1 [1]   [4]

(c) 3 half-lives 1/8 remains [1]
  Activity = 10 dis/s [1]
  Decrease = 70 (dis/s) [1]   [3]   9

5 (i) Two light or small nuclei [1] (must have)
  form a heavier or new nucleus [1]   [2]

(ii) Enormous fuel supplies (from oceans)
  Or (virtually) no radioactive waste   [1]

(iii) Stars/Sun   [1]   4

AVAILABLE MARKS

6 **(a) (i)** 24 (s) [1]

(ii) Distance $=$ area [1]
$= 14$ [1] $\times 26$ [1] [2]
$= 364$ (m)   e.c.f. from **(a) (i)** [1]

(b) (i) Accelerating, speed increasing [1]

(ii) Constant velocity, constant speed [1]

(c) -6 (m/s) the minus is essential [1] 8

7 **(i)** $a = (v - u)/t$ or equivalent formula or $a = \dfrac{\Delta v}{t}\left(\dfrac{\text{change in v}}{t}\right)$ [1]
$= (0 - 20)/8$ [1]
$= -2.5$ (m/s^2) [1]

(ii) $F = m \times a$ [1]
$= 950 \times 2.5$ allow e.c.f. from **part (i)** [1]
$= 2375$ (N) [1] 6

8 **(i)** Mass $= 0.012$ (kg) [1]
$= 0.12$ (N) [1]

(ii) P.E. $= m\,g\,h$ [1]
$h = \dfrac{0.3}{0.012 \times 10}$ [1]
$= 2.5$ (m) [1]

(iii) PE = KE [1]
$0.3 = \frac{1}{2} \times 0.012 \times v^2$ [1] $v = \sqrt{\dfrac{2KE}{m}}$ [1] $v = \sqrt{2gh}$ [1]

or

$v^2 = \dfrac{0.30}{0.006}$ [1] $= \sqrt{\dfrac{2 \times 0.3}{0.012}}$ [1] [1] $= \sqrt{2 \times 10 \times 2.5}$ [2]

$v = 7.1$ [1] (m/s) [4] 9
or   7.07 $= 7.1$ [1] $= 7.1$

9 **(a)** Object does not rotate about a point
Or body is balanced
Or ACWM $=$ CWM or no resultant moment [1]

(b) (i) ACM = CM or $F_1 d_1 = F_2 d_2$ [1]
40×20 [1] $= R \times 50$ [1] [2]
$R = 16$ (kN) [1]

(ii) (R) decreases [1] 6

Total 70

8332.01   **4**