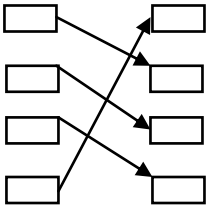
GCSE SCIENCE - PHYSICS 2

FOUNDATION TIER

Question			Marking details	Mark
1.	(a)		All correct - 3 marks 2 or 3 correct – 2 marks 1 correct – 1 mark 	3
	(b)	(i)	fission OR chain [reaction]	1
		(ii)	krypton or barium (accept Kr or Ba)	1
	(c)		Any 2 x (1): - they have <u>long half- lives</u> - <u>highly/very</u> <u>radioactive</u> - prevents leaks / getting into the environment or food chain or water supply - <u>harmful/poisonous/toxic/dangerous to living things</u> or <u>ionises cells / mutates cells</u> or <u>risk to health/cancer</u> - prevent theft/use as weapons/use by terrorists If 2 correct answers given on 1 line only then award 2 marks. If 2 correct answers given on 1 line and then on the 2nd line an incorrect answer is given award 1 mark only. If 1 correct answer and 1 incorrect answer are given on the same line then no mark awarded.	2
			Question total	**[7]**
2.	(a)	(i)	3 [A]	1
		(ii)	Point at coordinates (9, 3) ± ½ small square division (ignore any other points that are plotted.	1
		(iii)	Straight(ish) line from origin through (9,3) ± ½ small square division (allow **ecf**)	1
	(b)	(i)	$\frac{9}{3}$ (1) = 3 (1) Ohms or Ω (1) If 3/9 written no marks for substitution and answer can be awarded.	3
		(ii)	9 x 3 (1) = 27 (1) Watts or W or J/s (1)	3
			Question total	**[9]**

Question			Marking details	Mark
3.	(a)		$^{12}_{6}C$	1
	(b)		14 (1), 1 (1) N.B. must look like a subscript	2
	(c)		6 (1), 8 (1), 0 (1)	3
			Question total	**[6]**
4.	(a)	(i)	15 [m/s]	1
		(ii)	16 [m] **ecf** must be applied from (i)	1
	(b)	(i)	$\frac{15(1)}{25} = 0.6$ [s] (1)	2
		(ii)	50(1)**+ 15(1)** = [65 m] If 65 only award 2 marks. Do not accept 50 or 15 on the answer line.	2
		(iii)	any factor that reduces the braking distance of the car e.g. - improved/good tread on tyres, - rougher road surface, - good/better brakes, - good/better weather conditions, - correct tyre pressure, - good/better/newer tyres etc. Accept converse arguments if explained.	1
			Question total	**[7]**
5.	(a)	(i)	0.15 x 20 (1 for substitution) = 3 [kg m/s] (1)	2
		(ii)	$\frac{3}{0.5}$ (1) allow **ecf** from (i) = 6 [N] (1)	2
		(iii)	3 [N] allow **ecf** from (i) which gives the same answer as in (i) **or** allow **ecf** from (ii) which gives half the answer to (ii)	1
	(b)	(i) (ii)	e.g. car crash / emergency stop / sudden braking / landing on ground Stretchy seat belt / air bag / crumple zone to achieve it/ bending legs on landing **Mark parts (i) and (ii) together.**	2
			Question total	**[7]**

Question			Marking details	Mark
6.	(a)	(i)	The time/how long it takes/it takes 6 000 years for half of the undecayed atoms/mass/amount/activity/count rate to fall by half.	1
		(ii)	The **nucleus** emits/loses (1) an **electron** (1) OR identifies the nucleus (1) in which neutron splits into proton and electron (1) **Either mark can be awarded on its own but only award 2 marks if they are linked.**	2
	(b)	(i)	plots correct (2) [lose 1 for each incorrect plot allow ± ½ small square division up to a maximum of 2 marks] reasonable curve through the points (1)	3
		(ii)	Value to be taken from candidate's graph ±10 [About 130]. Credit an answer of between 120-140 when no line is drawn.	1
		(iii)	10 (1) **x 6 000** (1) = [60 000 years]	2
	(c)	(i)	7 400 years (value to be taken from candidate's graph)	1
		(ii)	reduce activities from the graph by a factor of 10 (1), line from 320 on graph to find time (1) or converse, (or reference to) lines drawn on graph at 320 (and down to the time axis). **Alternative** - for an extended graph and lines drawn at 80 (1) and "32" drawn on an extended line (1), award both marks for method either explained or drawn. N.B. **No marks can be awarded for the age** because of the uncertainty in this method.	2
			Question total	**[12]**

Question			Marking details	Mark
7.		(i)	Indicative content: The initial velocity of the bus is 5 m/s. It continues at this velocity for 10 s. Then it accelerates at a constant rate of 1.5 m/s^2 for 10 s to 20 m/s. It travels at a constant velocity of 20 m/s for 20 s. At 40 s, it decelerates at a decreasing rate until it comes to a rest at 70 s. The mean deceleration is 0.67 m/s^2. **5 – 6 marks** The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar. **3 – 4 marks** The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar. **1 – 2 marks** The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar. **0 marks** The candidate does not make any attempt or give a relevant answer worthy of credit.	6
		(ii)	Scales using at least half of each axis [at least one intermediate point required and a sensible scale] (1) point (10,50) [point may not be clear but award if line ends at this point. Ignore intermediate points]. (1) Straight(ish) line to that point and **mus**t be from (0,0) [Do not award this mark for an obvious curve] (1). Any line that goes past (10,50) is penalised 1 mark. Straight line to wrongly plotted point gets the line mark.	3
		(iii)	20 (1) $\underline{\text{x } 20}$ (1) = 400 [m] (1) Repeated multiplications e.g. **20** x 20, **20** x 40, **20** x 5 [1 only]	3
			Question total	**[12]**
			Foundation Tier Paper Total	**[60]**