

Question number	Answer	Notes	Marks
3 (a)	(i) X drawn at the base of the weight arrow;	judge by eye	1
	(ii) weight = mass $\times$ gravitational field strength;	allow standard symbols and rearrangements e.g. $W = m \times g$ ignore 'gravity' for $g$	1
	(iii) substitution; evaluation;  e.g. (W =) $130 \times 10$ (W =) 1300 (N)	-1 for POT error only e.g. from incorrectly converting kg to g  allow $g = 9.8, 9.81$ allow 1274, 1275.3	2
(b)	(i) in equilibrium / when balanced; (sum of) clockwise moment(s) = (sum of) anti-clockwise moment(s);	allow idea that net moment is zero	2
	(ii) correct expression for either moment; correct use of principle of moments; evaluation of distance X;  e.g. $1300 \times 0.30$ OR $520 \times X$ $1300 \times 0.30 = 520 \times X$ $X = 0.75$ (m)	allow ecf from (a)(iii)	3
	(iii) (length of plank =) 1.5 (m);	allow ecf from (b)(ii)	1

Total for Question 3 = 10 marks

Question number	Answer	Notes	Marks
6 (a) (i)	(in solids) particles vibrate only; (in liquids) particles slide over each other; (in gases) particles move freely / randomly;		3
(b) (i)	energy starts in a chemical store (in the fuel); energy is transferred by heating;  to a thermal store (in the water);	allow transfer by convection / radiation allow kinetic store of water allow heat energy for thermal energy	3
(ii)	horizontal line shows the change of state; (because) temperature remains constant during change of state;	can be shown on graph	2

Total for Question 6 = 8 marks

Question number	Answer	Notes	Marks
7 (a)	coil of wire; current in the wire;  iron core;	current may be inferred from diagram	3
(b)	down;	allow force arrow drawn pointing down on diagram	1
(c) (i)	time taken; for {activity / number of (radioactive) nuclei / amount of isotope / count rate} to halve;	allow atoms for nuclei	2
(ii)	any two from: MP1. radiation unlikely to penetrate out of walls; MP2. (more than) two half-lives have passed; MP3. amount of barium-133 remaining is less (than 25%);  MP4. visitors exposed to radiation for very short time;	allow idea that activity / amount of radiation is (much) less than before	2

Total for Question 7 = 8 marks