



Mark Scheme (Results)

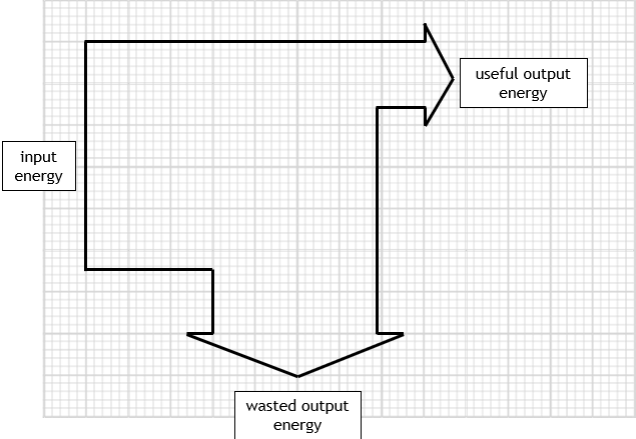
Summer 2023

Pearson Edexcel International GCSE
In Physics (4PH1) Paper 1PR

Question number	Answer	Notes	Marks														
1 (a)	<div>3 correct ticks;;;</div> <div>2 correct ticks;;</div> <div>1 correct tick;</div> <table><thead><tr><th>Statement</th><th>Correct</th></tr></thead><tbody><tr><td>all electromagnetic waves are longitudinal</td><td></td></tr><tr><td>all electromagnetic waves travel at the same speed in free space</td><td>✓</td></tr><tr><td>radio waves have the longest wavelength in the electromagnetic spectrum</td><td>✓</td></tr><tr><td>x-rays have the highest frequency in the electromagnetic spectrum</td><td></td></tr><tr><td>all electromagnetic waves transfer energy</td><td>✓</td></tr><tr><td>all electromagnetic waves can cause cancer</td><td></td></tr></tbody></table>	Statement	Correct	all electromagnetic waves are longitudinal		all electromagnetic waves travel at the same speed in free space	✓	radio waves have the longest wavelength in the electromagnetic spectrum	✓	x-rays have the highest frequency in the electromagnetic spectrum		all electromagnetic waves transfer energy	✓	all electromagnetic waves can cause cancer		-1 for each additional tick if more than three ticks shown	3
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(b) (i)	<div>microwaves:</div> <div>one valid use;</div> <div><ul style="list-style-type: none">communication /eqheating food /eq</div> <div>one valid harmful effect;</div> <div><ul style="list-style-type: none">internal heating (of body tissue) / eq</div>	<div>allow other valid uses e.g. radar, locating rain clouds etc.</div> <div>reject "cancer" apply "list principle"</div>	2														
(ii)	<div>gamma rays:</div> <div>one valid use;</div> <div><ul style="list-style-type: none">sterilising {food / medical equipment}kill microbes or bacteria;treating cancer / radiotherapy;medical tracing</div> <div>one valid harmful effect;</div> <div><ul style="list-style-type: none">ionisation / mutation of cells /eqrisk of cancer</div>	<div>allow other valid uses e.g. gamma photography, identifying cancer etc.</div> <div>condone damages or kills cells or tissues</div>	2														

Total for Question 1 = 7 marks

Question number	Answer	Notes	Marks
3 (a) (i)	GPE = mass \times g \times height;	allow standard symbols and rearrangements e.g. $h = \text{GPE} / m \times g$ ignore 'gravity' for g	1
(ii)	substitution; rearrangement; evaluation; e.g. $3.2 = 0.40 \times 10 \times h$ $h = 3.2 / 0.40 \times 10$ ($h =$) 0.80 (m)	in either order -1 for POT error due to not converting g to kg but not if due to physics error such as missing g accept use of $g = 9.8(1)$ accept 1sf answer i.e. 0.8 (m) 0.815 or 0.816 or 0.82 if g used is 9.8(1) and then rounded	3
(iii)	3.2 (J);	this answer only	1
(b)	downward arrow labelled "weight"/"W"/"mg"; vertically downward arrow drawn equal in length to lifting force arrow;	ignore starting position of arrow ignore 'gravity/g/gravitational field strength' allow 'gravitational force' reject if both gravity force and weight force shown mark independently by eye reject any other labelled arrows for second mark	2
(c) (i)	recall of efficiency formula; substitution; evaluation; e.g. efficiency = $\frac{\text{useful energy output}}{\text{total energy output}}$ efficiency = $3.2 / 11.0 (\times 100\%)$ efficiency = 0.29 or 29%	may be implied from substitution allow 0.29, 0.2909..., 29%, 29.09...% 29 without % is PoT 2 marks	3
(ii)	idea that energy must be conserved; demonstration that $7.8 + 3.2 = 11(.0)$;	comparison in words e.g. total = useful + wasted /eq allow $11(.0) - 3.2 = 7.8$	2

(iii)	<p>only one additional arrow drawn pointing to the right; labelled “useful output (energy)”</p> <p>width of arrow drawn = 8 small squares;</p> <p>e.g.</p> 	<p>allow “gravitational (potential energy)”, “GPE” etc. reject reference to power</p> <p>by eye</p>	3
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Total for question 3 = 15 marks