

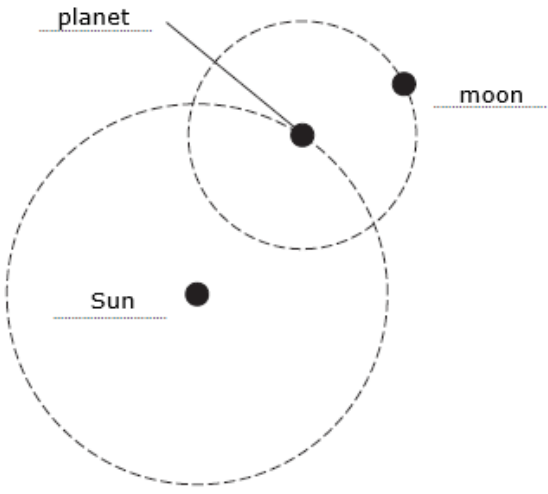


Mark Scheme (Results)

January 2019

Pearson Edexcel International GCSE

In Physics (4PH0) Paper 2P

Question number	Answer	Notes	Marks
1 (a)	gravitational (force);	allow gravity, gravitational pull, gravity pull ignore centripetal force reject gravitational potential, gravitational field strength	1
(b) (i)	 any 1 correct label; all three correct;;	allow Earth for planet allow star for Sun	2
	(ii) time period of moon is shorter; idea that it travels a shorter distance / orbital radius is smaller;	however expressed allow RA ignore 'moon travels faster' allow RA allow 'orbit of moon is smaller' ignore unqualified 'smaller circumference', 'smaller radius/diameter'	2

Total for question 1 = 5 marks

Question number	Answer	Notes	Marks																				
2 (a)	a quantity with magnitude / size; (and) direction;	allow 'amount' for magnitude	2																				
(b)	<table><thead><tr><th>Quantity</th><th>Scalar</th><th>Vector</th></tr></thead><tbody><tr><td>energy</td><td>✓</td><td></td></tr><tr><td>speed</td><td>✓</td><td></td></tr><tr><td>weight</td><td></td><td>✓</td></tr><tr><td>acceleration</td><td></td><td>✓</td></tr><tr><td>charge</td><td>✓</td><td></td></tr><tr><td>moment</td><td></td><td>✓</td></tr></tbody></table> one or two correct ticks = 1 mark ; three or four correct ticks = 2 marks;; all five correct ticks = 3 marks;;;	Quantity	Scalar	Vector	energy	✓		speed	✓		weight		✓	acceleration		✓	charge	✓		moment		✓	 <
Quantity	Scalar	Vector																					
energy	✓																						
speed	✓																						
weight		✓																					
acceleration		✓																					
charge	✓																						
moment		✓																					

Total for question 2 = 5 marks

Question number	Answer	Notes	Marks
3 (a)	B; C;	reject if more than one letter given reject if more than one letter given	2
(b)	substitution; rearrangement; evaluation; e.g. $380\,000 = m \times 10 \times 45$ (m =) $380\,000 / (10 \times 45)$ (m =) 840 (kg)	-1 for POT error allow 844, 844.4...(kg) 862 (kg) if $g=9.8$ 861 (kg) if $g=9.81$	3

Total for question 3 = 5 marks

Question number	Answer	Notes	Marks
4 (a)	(i) 0.717; N;	allow 0.7, 0.72, 0.70, 0.703... allow newton(s) condone n marks are independent	2
	(ii) density = mass / volume;	allow symbols, e.g. $\rho = m/V$, $d = m/V$ or rearrangements	1
	(iii) substitution OR rearrangement; evaluation; e.g. $8960 = 0.0717 / V$ OR $V = m / \rho$ ($V =$) $8.00 \times 10^{-6} \text{ (m}^3\text{)}$	-1 for POT error allow 8×10^{-6} , $8.002... \times 10^{-6}$ answer does not need to be in standard form e.g. $0.000008 \text{ (m}^3\text{)}$ gets both marks	2
(b)	(i) bar chart / bar graph;	accept column graph condone histogram	1
	(ii) steel is more dense; OR granite is less dense; steel is (approximately) $3\times$ denser;	allow ratio of densities in range 2.8-3.1 ignore comparison of masses accept correct values of both densities for 2 marks e.g. steel = 7900 kg/m^3 granite = 2700 kg/m^3 tolerance ± 100 on each	2

Total for question 4 = 8 marks

Question number	Answer	Notes	Marks
5 (a)	MP1. measure time for a set distance; MP2. realistic values suggested for experiment to work; MP3. suitable measuring instrument named; MP4. further detail of setup; MP5. idea of repeats and average; MP6. reference to $\text{speed} = \text{distance} / \text{time}$;	allow measuring wavelength for a known frequency e.g. • greater than 1m for microphones and oscilloscope method • greater than 100m for seeing and hearing a clap method • greater than 50m for wall and echo method • wavelength measured greater than 10cm e.g. stop clock, stopwatch, ruler, tape measure, oscilloscope e.g. • two microphones on bench connected to oscilloscope • start timing when see a clap and stop when hear it • clap by wall and time how long for clap to come back • moving a microphone until waveforms line up on oscilloscope allow $\text{speed} = \text{frequency} \times \text{wavelength}$	6

(b)	(i)	straight line of best fit drawn within indicated area;	line does not need to be extended beyond data range for this mark 1
	(ii)	line of best fit extended as a straight line to 20°C; student's own value from graph $\pm$ half a square;	condone straight line extension of dot to dot line allow range of 342-345 (m/s) allow ecf from line drawn in (i) 2
	(iii)	speed (of sound) decreases (with temperature); so wavelength decreases (with temperature);	allow 'sound slows down' ignore references to particle speed allow λ is smaller 2

Total for question 5 = 11 marks

Question number	Answer	Notes	Marks	
6	any two advantages: MP1. idea that fuel will last for a long time; MP2. high energy density of fuel; MP3. no CO₂ emissions / no greenhouse gases / does not contribute to global warming / does not produce acid rain; MP4. reliable electricity output / does not depend on weather; any two disadvantages: MP5. waste products are radioactive / difficult to dispose of; MP6. chance of nuclear accident; MP7. high security risk; MP8. high construction / decommissioning cost;	ignore idea that fuel is limitless / will not run out allow idea that a small amount of fuel yields a lot of energy allow idea that it can supply electricity / energy constantly ignore unqualified 'it is reliable' e.g. nuclear meltdown, risk from tsunamis etc. ignore unqualified 'it is expensive'	4	exp

Total for question 6 = 4 marks

Question number	Answer	Notes	Marks
7 (a)	fewer turns on the secondary;	allow RA	1
(b) (i)	word equation or $V_p I_p = V_s I_s$;	$V_p/V_s = I_s/I_p$ or $V_s/V_p = I_p/I_s$ or $I_1 V_1 = I_2 V_2$	1
(ii)	correct equation substituted OR rearranged; evaluation; e.g. $230 \times I_p = 5.5 \times 1.0$ OR $I_p = V_s I_s / V_p$ ($I_p =$) 0.024 (A)	 allow 0.0239...(A) allow 0.02 (A) if supported by working	2
(c)	any two from: MP1. input power increases; MP2. (input) voltage remains the same; MP3. (input) current increases;	allow energy for power	2

Total for question 7 = 6 marks

Question number	Answer	Notes	Marks
9 (a)	(i) momentum = mass $\times$ velocity;	allow rearrangements and standard symbols e.g. $p = m \times v$ reject m for momentum	1
	(ii) substitution and evaluation; e.g. ($p =$) 0.039×0.56 ($p =$) 0.022 (kgm/s)	0.02184 (kgm/s) allow 0.02 (kgm/s) if supported by working	1
	(iii) use of conservation of momentum; evaluation of total mass; evaluation of mass of truck; e.g. $0.022 = m \times 0.26$ total mass = 0.084 mass of truck = $(0.084 - 0.039 =) 0.045 \text{ (kg)}$	allow 'momentum before = momentum after' seen anywhere can also be implied from calculation allow ecf from (ii) allow $0.0846... \text{ (kg)}$ allow $0.0456... \text{ (kg)}$	3
(b)	total mass (of system) is now greater; total momentum is the same as before; velocity will be lower than before;	allow "momentum is conserved" calculation of new velocity = $0.169... \text{ m/s}$ scores all 3 marks	3

Total for question 9 = 8 marks