



Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Forces and Energy

End of Module Test

C

Foundation Tier

[GDC01]

FRIDAY 25 FEBRUARY 2011, MORNING

**MARK
SCHEME**

			AVAILABLE MARKS
1	(i) Sound	[1]	5
	(ii) Chemical [1] Heat [1]	[2]	
	(iii) Chemical [1] Light [1]	[2]	
2	(a) Any two from HEP, tidal, wave	[2]	6
	(b) (i) Geothermal	[1]	
	(ii) Wind	[1]	
	(c) (i) More efficient use (of fuels) or use more renewable sources or use less coal, e.g.	[1]	
	(ii) Renewable	[1]	
3	(i) 2640(m)	[1]	4
	(ii) Average speed = $\frac{\text{distance}}{\text{time}}$ [1]		
	= $\frac{2640}{1200}$ [1] ecf from (i)		
	= 2.2 (m/s) [1]	[3]	
	Allow ecf from part (i)		
4	(a) Moment = force \times distance to pivot [1] = 8×30 [1] = 240 (Ncm) [1]	[3]	4
	(b) Anticlockwise	[1]	
5	(a) 200 (N)	[1]	3
	(b) 4	[1]	
	(c) Newtonmeter	[1]	
6	(a) (i) "is equal to"	[1]	3
	(ii) Friction or air resistance	[1]	
	(b) Accelerates or speeds up	[1]	

		AVAILABLE MARKS
7	<p>(a) $9\text{ cm} = 3\text{ N}$ [1] $3\text{ N} = 9\text{ cm}$ [1] $1\text{ cm} = \frac{1}{3}\text{ N}$ [1] or $1\text{ N} = 3\text{ cm}$ [1] $21\text{ cm} = 7\text{ N}$ [1] $7\text{ N} = 21\text{ cm}$ [1]</p> <p>(b) Permanently deformed</p>	<p>[3]</p> <p>[1] 4</p>
8	<p>(a) Black surfaces are better [1] absorbers of heat [1]</p> <p>(b) Poor radiators of heat [1] or reflects heat back in [1]</p>	<p>[2]</p> <p>[1] 3</p>
9	<p>$P = F/A$ or equivalent [1] $= \frac{650}{0.6}$ [1] $= 1300$ [1] N/m^2 or Pa [1]</p>	<p>[4] 4</p>
10	<p>(a) Contravenes the Law of C of E</p> <p>(b) Efficiency = $\frac{\text{Useful output energy}}{\text{Input energy}}$ [1] $= \frac{240}{600}$ [1] $= 0.4$ or 40% [1]</p>	<p>[1]</p> <p>[3] 4</p>
11	<p>(a) $WD = F \times d$ [1] $= 720 \times 20$ [1] $= 14400$ (J) [1]</p> <p>(b) $P = \frac{WD}{\text{time}}$ [1] $= \frac{14400}{24}$ [1] ecf from (a) $= 600$ (W) [1]</p>	<p>[3]</p> <p>[3] 6</p>
12	<p>(a) Tension/centripetal force</p> <p>(b) Momentum = Mass \times Velocity [1] $= 2.5 \times 8$ [1] $= 20$ (kg m/s) [1]</p>	<p>[1]</p> <p>[3] 4</p>
Total		50