Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Forces and Energy

End of Module Test

Higher Tier

C

[GDC02]

WEDNESDAY 29 FEBRUARY 2012

9.30 am–10.15 am

MARK SCHEME

			AVAILABLE MARKS
1	**(a)** **(i)** conduction	[1]	
	(ii) electron	[1]	
	(b) **(i)** conduction	[1]	
	(ii) atom/molecule	[1]	4
2	E = useful energy output/energy input [1] = 80/200 [1] = 0.4 (40%) [1]	[3]	3
3	**(i)** horizontal line from (50, 200) to (100, 200) [1] line from (100, 200) to (200, 0) [1]	[2]	
	(ii) 400 (m) [1]	[1]	3
4	**(a)** 16 (mm)	[1]	
	(b) line is straight	[1]	
	(c) **(i)** Extension	[1]	
	(ii) Total length = 36 mm (or 20 + 16) [1] Load = 7 (N) [1]	[2]	5
5	**(a)** momentum = mass × vel [1] = 2000 × 7 [1] = 14 000 (kgm/s) [1]	[3]	
	(b) friction [1]	[1]	
	(c) towards the centre (of the curve) [1]	[1]	5
6	**(a)** 500 (N)	[1]	
	(b) Power = work done/time [1]	[1]	
	= (500 × 2)/1.5 [2] ecf from (a)	[2]	
	= 666.7 [1] W [1]	[2]	6

			AVAILABLE MARKS
7	**(a)**	Kinetic to electrical Both for [1] [1]	
	(b)	**(i)** Unreliable, requires a lot of area, visual pollution, remote from population Any 1 for [1] [1]	
		(ii) Non polluting, conserves fossil fuels, Any 1 for [1] [1]	3
8		More [1] warm air rises [1] or more [1] convection at A [1] or warm air rises [1] and cold air falls [1] [dependent marking]	2
9		Displacement = Area Under [1] or Disp. = Av. Vel × time $= (\frac{1}{2} \times 10 \times 10) + (10 \times 20)$ [2] = 250 [1] (m) [4]	4
10	**(a)**	Forwards force > backwards force or Unbalanced forces or because there is a resultant force [1]	
	(b)	(R)F = m × a [1] 3000 = 750 × a [1] a = 4 [1] (m/s^2) [3]	4
11	**(a)**	moment = F × d or moment = 200 × 1.20 } [1] = 240 (Nm) [1] [2]	
	(b)	ACM = CM [1] Load × 0.40 = 240 [1] allow ecf from (a) Load = 600 (N) [1] [3]	5
12	**(a)**	KE = $\frac{1}{2}mv^2$ [1] KE = $\frac{1}{2} \times 1.5 \times (40)^2$ [1] KE = 1200 (J) [1] [3]	
	(b)	PE = KE [1] 1.5 × g × h = 1200 [1] allow ecf from (a) h = 80 [1] (m) [3]	6
		Total	**50**