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) $(R)F = m \times a$ [1]
$3000 = 750 \times a$ [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**