Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Forces and Energy
End of Module Test
Foundation Tier

C

[GDC01]

THURSDAY 24 MAY 2012
9.15 am–10.00 am

MARK SCHEME

			AVAILABLE MARKS
1	**(a)** Heat **or** Thermal	[1]	
	(b) Chemical [1] Electrical [1]	[2]	
	(c) Sound [1] Light [1]	[2]	5
2	**(a)** **(i)** Coal **or** oil **or** nuclear	[1]	
	(ii) Limited supply **or** used quicker than replaced **or** will run out	[1]	
	(b) **(i)** Solar **or** Wind	[1]	
	(ii) Limitless **or** will never run out **or** equivalent	[1]	4
3	Av. Speed $=\frac{\text{distance}}{\text{time}}$ [1] $=\frac{5040}{1200}$ [1] $=$ 4.2 (m/s) [1]	[3]	3
4	**(i)** Trap air [1] so is a (good) insulator [1]	[2]	
	(ii) Urea formaldehyde in cavity **or** Cavity Wall Insulation Double glazing Carpets, Draught proofing Any **two** [1] each	[2]	4
5	**(a)** **(i)** Vertically upwards at X [1] Vertically down at Y [1]	[2]	
	(ii) Convection	[1]	
	(b) Radiation	[1]	4
6	**(a)** **(i)** "is equal to" – middle box ☑	[1]	
	(ii) Friction **or** Air Resistance **or** Drag	[1]	
	(b) Increases **or** accelerates	[1]	3

			AVAILABLE MARKS
7	**(a)** Arrow tangentially upwards	[1]	
	(b) Momentum = Mass × Velocity **or** p = mv [1] = 0.6 × 3.0 [1] = 1.8 (kg m/s) [1]	[3]	4
8	**(a)** 2 N ≡ 6 cm [1] 1 N ≡ 3 cm [1] 5 N ≡ 15 cm [1]	[3]	
	(b) Permanently deformed **or** Plastically deformed **or** It will not return to its original dimensions	[1]	4
9	Pressure = $\frac{\text{Force}}{\text{Area}}$ **or** P = F/A [1] = $\frac{650}{0.02}$ [1] = 32 500 [1] Pa **or** N/m^2 [1]	[4]	5
10	**(a)** 5 or 6 points correct [1] Straight line through (0,0) [1]	[2]	
	(b) e.g. Grad. = Velocity [1] = $\frac{300}{10}$ or any suitable pair of coordinates [1] = 30 (m/s) [1]	[3]	5
11	**(a)** Efficiency = $\frac{\text{Useful output energy}}{\text{Input energy}}$ [1] = $\frac{240}{1500}$ [1] = 0.16 or 16% [1]	[3]	
	(b) 1260 (J)	[1]	4
12	**(a)** WD = F × d [1] = 120 × 1.5 [1] = 180 (J) [1]	[3]	
	(b) Power = $\frac{WD}{t}$ [1] = $\frac{180}{15}$ [1] allow e.c.f. from **(a)** = 12 (W) [1]	[3]	6
		Total	**50**