Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Forces and Energy
End of Module Test

Foundation Tier

[GDC01]

FRIDAY 20 MAY 2011, AFTERNOON

MARK SCHEME

			AVAILABLE MARKS
1	**(a)** Electrical [1] to Heat/Thermal [1]	[2]	
	(b) Sound [1] to Electrical [1]	[2]	
	(c) Sound/Light	[1]	5
2	**(a)** **(i)** Limitless or cannot be used faster than it is made Never run out	[1]	
	(ii) Solar/Geothermal/Tidal/Biomass/HEP/wind Any two [1] each	[2]	
	(b) Coal, (Natural) gas, Peat/Turf any two	[2]	5
3	(Average) speed $= \frac{\text{distance}}{\text{time}}$ or equivalent [1]		
	$= \frac{90}{6}$ [1]		
	$= 15$ [1]	[3]	3
4	**(a)** **(i)** Friction or Air resistance or Drag	[1]	
	(ii) …. "is equal to" ….	[1]	
	(b) Accelerates/(Velocity) increases/faster	[1]	3
5	Pressure $= \frac{\text{Force}}{\text{Area}}$ or $\frac{F}{A}$ or equivalent [1]		
	$= \frac{300}{0.02}$ [1]		
	$= 15\,000$ [1] N/m^2 or Pa [1]	[4]	4
6	**(a)** **(i)** Inward arrow	[1]	
	(ii) Tension	[1]	
	(b) Momentum $=$ m $\times$ v or equivalent [1]		
	$= 1.2 \times 8$ [1]		
	$= 9.6$ [1] (kg m/s)	[3]	5

			AVAILABLE MARKS
7	**(a)** Air is trapped [1] which is a good insulator [1]	[2]	
	(b) **(i)** Metal	[1]	
	(ii) Best conductor of heat	[1]	4
8	**(i)** C	[1]	
	(ii) All bodies fall at the same rate under gravity	[1]	
	(iii) Feather	[1]	3
9	**(a)** Efficiency $= \frac{\text{useful output energy}}{\text{input energy}}$ [1]		
	$= \frac{1200}{3000}$ [1]		
	$= 0.4$ or 40% [1]	[3]	
	(b) $\frac{3}{5}$ or 60% or 0.6 [1] allow e.c.f. from **(a)**	[1]	4
10	**(a)** 20 (m)	[1]	
	(b) Speed $=$ Gradient $= \frac{\text{distance}}{\text{time}}$ [1]		
	$= \frac{60}{8}$ [1]		
	$= 7.5$ [1] (m/s)	[3]	4
11	**(a)** **(i)** 6 (mm)	[1]	
	(ii) Extension	[1]	
	(b) Extended length $=$ 16 [1] (mm) or from graph		
	Load $=$ 4 [1] (N)	[2]	4

		AVAILABLE MARKS
12 **(a)** Work done = Force × distance or equivalent [1]		
= 25 000 × 1.5 [1]		
= 37 500 [1] (J)	[3]	
(b) Power = $\frac{\text{Work done}}{\text{Time taken}}$ [1]		
= $\frac{42000}{30}$ [1]		
= 1400 [1] (W)	[3]	6
	Total	**50**