



*Rewarding Learning*

**General Certificate of Secondary Education**

**2012**

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**Science: Double Award (Non-Modular)**

Paper 3

Foundation Tier

[G8403]

**FRIDAY 15 JUNE, AFTERNOON**

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**MARK  
SCHEME**

			AVAILABLE MARKS
1	(i) Chemical	[1]	3
	(ii) Elastic/Strain	[1]	
	(iii) Kinetic/Wind	[1]	
2	(a) Non-renewable [1] Renewable [1] Non-renewable [1]	[3]	4
	(b) Gas	[1]	
3	(i) Car B	[1]	3
	(ii) 1. Wider base (dependent marking from (i))	[1]	
	2. Lower c of g	[1]	
4	(a) Venus, Mars, Jupiter, Neptune [ $\frac{1}{2}$ ] each (round up)	[2]	5
	(b) Sun	[1]	
	(c) A collection of stars	[1]	
	(d) Milky Way	[1]	
5	(a) Universe has a starting point	[1]	5
	(b) Steady State <b>or</b> String	[1]	
	(c) Lack of sufficient fuel <b>or</b> food <b>or</b> time required (any <b>two</b> )	[2]	
	(d) Fusion	[1]	
6	(a) 54% [1] 46% [1]	[2]	7
	(b) Conduction	[1]	
	(c) It traps air [1] which is a good insulator <b>or</b> poor conductor [1]	[2]	
	(d) Conduction and convection – marked separately	[2]	

			AVAILABLE MARKS
7	(a) Radiation	[1]	4
	(b) To reflect radiation (back to the bread)	[1]	
	(c) Silver colour is a poor emitter (of radiation) [2] or [0] or black is a good emitter [2] or [0]	[2]	
8	(a) Extension and load (directly) proportional [1] up to (elastic) limit [1]	[2]	4
	(b) Extension = 5 cm [1]    5 cm for partial credit ∴ Load = 10 (N) [1]	[2]	
9	(i) Pivot labelled	[1]	4
	(ii) Moment = $F \times d$ [1] = $15 \times 30$ [1] = 450 (N cm) [1]	[3]	
10	(a) A is weight/gravity or gravitational force [1] B is air resistance/drag/friction [1] <b>not</b> "Wind resistance"	[2]	
	(b) Accelerates	[1]	4
	(c) Constant velocity/speed	[1]	
11	Speed = Distance/time or speed = grad [1] = 48/16 [1] = 3 (m/s) [1]	[3]	3
12	(a) No units	[1]	4
	(b) Efficiency = $\frac{\text{Energy out}}{\text{Energy in}}$ [1] Efficiency = $\frac{840}{1200}$ [1] Efficiency = 0.7 [1]	[3]	

			AVAILABLE MARKS
<b>13 (a) (i)</b>	Electrons move [1] due to friction/rubbing [1]	[2]	
	Quality of written communication	[1]	
<b>(ii)</b>	Charges are similar	[1]	
<b>(iii)</b>	Similar charges repel	[1]	
<b>(b)</b>	10 [1] 40 [1] 30 [1]	[3]	
<b>(c) (i)</b>	Electric energy = 3 (kWh)	[1]	
<b>(ii)</b>	Cost = 39 (p) e.c.f. from (i)	[1]	
<b>(d)</b>	Ammeter [1] and voltmeter [1] correctly labelled	[2]	
<b>(e) (i)</b>	5 correct points ( $\pm \frac{1}{2}$ square)	[1]	
<b>(ii)</b>	Straight line through (0, 0) ( $\pm \frac{1}{2}$ square)	[1]	
<b>(iii)</b>	Current = 0.06 (A)	[1]	
<b>(iv)</b>	$R = V/I$ [1] <b>or</b> equivalent = $2.4/0.06$ [1] = $40 \Omega$ [1] Allow e.c.f. from (iii)	[3]	
<b>(f)</b>	Curve with positive increasing gradient [1] through (0, 0) [1]	[2]	20
<b>14 (a) (i)</b>	Energy	[1]	
<b>(ii)</b>	$\longleftrightarrow$	[1]	
<b>(iii)</b>	3	[1]	
<b>(iv)</b>	3 Allow e.c.f. from (iii)	[1]	
<b>(v)</b>	0.5 (m)	[1]	
<b>(vi)</b>	$v$ (or speed) = $f \times \lambda$ [1] = $3 \times 0.5$ [1] = 1.5 (m/s) [1] Allow e.c.f. from (iv) and (v)	[3]	
<b>(vii)</b>	Sound <b>or</b> Ultrasound	[1]	
<b>(b) (i)</b>	Vibrations are at right angles/perpendicular	[1]	
<b>(ii)</b>	Light <b>or</b> (any named member of e.m.s.) <b>or</b> water waves	[1]	

- (c) (i) (The gong) vibrates [1]  
(ii) It decreases [1]  
(iii) Sound waves require a medium  
or Sound waves do not travel through a vacuum [1]  
(iv) Vibrations/sound will travel through the glass [1]
- (d) (i) 20 (Hz) [1]  
(ii) 20 000 (Hz) or 20 kHz [1]  
(iii) It decreases [1]  
(iv) Damage to eardrums [1]  
(v) Use ear protection/ear plugs/defenders [1]

AVAILABLE  
MARKS

20

15 (a) (i)

Object	Luminous	Non-Luminous
Star	✓	
Moon		✓
Planet		✓
White paper		✓

[1] each [4]

- (ii) A [1]
- (b) (i) Normal, correctly drawn [1]  
(ii) 50° [1]
- (c) (i) Undeviated ray at first interface [1]  
refracted [1]  
correctly [1] [3]  
(ii) Slows down [1]
- (d) (i) Dispersion [1]  
(ii) Violet, Indigo, Blue, Green, Yellow, Orange, Red  
Deduct [1] if correct but reversed [2]  
(iii) Spectrum [1]

<b>(e) (i)</b> Gamma or $\gamma$	[1]	<b>AVAILABLE MARKS</b>
<b>(ii)</b> Infrared or IR	[1]	
<b>(iii)</b> Gamma or $\gamma$	[1]	
<b>(iv)</b> Ultraviolet or UV	[1]	
<b>(v)</b> Radio waves	[1]	
<b>Total</b>		<b>20</b>
		<b>110</b>