



Rewarding Learning

**General Certificate of Secondary Education
2012**

Science: Double Award (Non-Modular)

Paper 3
Foundation Tier

[G8403]

FRIDAY 15 JUNE, AFTERNOON

**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 or String	[1]	
	(c) Lack of sufficient fuel or food or time required (any two)	[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 or poor conductor [1]	[2]	
	(d) Conduction and convection – marked separately	[2]	

		AVAILABLE MARKS
7	(a) Radiation	[1]
	(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]
	(b) Extension = 5 cm [1] 5 cm for partial credit ∴ Load = 10 (N) [1]	[2]
9	(i) Pivot labelled	[1]
	(ii) Moment = $F \times d$ [1] = 15×30 [1] = 450 (N cm) [1]	[3]
10	(a) A is weight/gravity or gravitational force [1] B is air resistance/drag/friction [1] not "Wind resistance"	[2]
	(b) Accelerates	[1]
	(c) Constant velocity/speed	[1]
11	Speed = Distance/time or speed = grad [1] = 48/16 [1] = 3 (m/s) [1]	[3]
12	(a) No units	[1]
	(b) Efficiency = $\frac{\text{Energy out}}{\text{Energy in}}$ [1] Efficiency = $\frac{840}{1200}$ [1] Efficiency = 0.7 [1]	[3]

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

- (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]

(e) (i) Gamma or γ	[1]	AVAILABLE MARKS
(ii) Infrared or IR	[1]	
(iii) Gamma or γ	[1]	
(iv) Ultraviolet or UV	[1]	
(v) Radio waves	[1]	20
Total		110