Rewarding Learning

General Certificate of Secondary Education
2011

Science: Physics

Paper 2
Foundation Tier

[G7603]

WEDNESDAY 15 JUNE, MORNING

MARK SCHEME

					AVAILABLE MARKS
1	**(a)**	**(i)**	The coils touch/spring cannot be compressed further	[1]	
		(ii)	6 (cm)	[1]	
		(iii)	Load 0 2 4 8 Compression 0 1 2 4 ½ each round down	[3]	
		(iv)	Compression proportional to load/they are proportional	[1]	
			Double the load doubles the compression/ $\frac{\text{compression}}{\text{load}}$ = 0.5 or constant	[1]	
	(b)	**(i)**	Pivot P at centre of wheel	[1]	
			X at the end of arrow showing weight/directly above arrow	[1]	
			Effort at handles acting upwards through the handle	[1]	
		(ii)	Effort is further from pivot than the load/ Load is closer to pivot than effort	[1]	
	(c)	**(i)**	Moment = force × distance		
			= 15 × 0.4 or 15 × 40	[1]	
			= 6 600	[1]	
			Nm or Ncm if work in cm	[1]	
			Direction – clockwise or ↻ [not down]	[1]	
		(ii)	Upward force at the biceps/within the upper arm	[1]	
		(iii)	They are equal/balanced/in equilibrium	[1]	
	(d)	**(i)**	A	[1]	
		(ii)	Tension	[1]	
		(iii)	B	[1]	20

					AVAILABLE MARKS
2	**(a)**	**(i)**	Bunsen burner chemical to heat [1] Catapult strain (elastic) to kinetic [1] Microphone sound to electricity [1]		
		(ii)	Energy cannot be created or destroyed [1] It can only change its form/be converted [1]		
	(b)	**(i)**	Plants/vegetation absorb sunlight [1] Plants are buried/over a long time, $\geqslant 10^6$ yrs, many years [1] High temperature/pressure convert them to coal [1]		
		(ii)	Oil/gas/turf Two needed – [1] mark each	[2]	
		(iii)	Solar radiation heats up the surface or short λ radiation gets through the atmosphere [1] Heat re-radiated from surface/ absorbed by atmosphere [1]	[3]	
		(iv)	Climate change/flooding	[1]	
		(v)	Gases such as carbon dioxide/sulphur dioxide not released	[1]	
		(vi)	Radioactive waste products/nuclear waste products or possibility of nuclear accident/radiation release	[1]	
	(c)		Work done = force × distance [1] = 200 × 3 [1] = 600 (J) [1]		
	(d)	**(i)**	Efficiency = useful output energy/total input energy [1] = 30/40 [1] = 0.75 or 75% not 0.75% not 0.75J [1]		
		(ii)	Power = work done/time taken [1] = 30 (kJ)/12 [1] = 2.5 kW unit needed or 2500W or 2500J/S [1]		25

					AVAILABLE MARKS
3	**(a)**	**(i)**	Transverse – examples water, on a string, em waves or a named em Longitudinal – example – sound/ultrasound	[2]	
		(ii)	Transverse – atoms move perpendicular to direction of wave travel Longitudinal – atoms move along direction of wave travel If "vibrate" used give [1] mark	[3]	
	(b)	**(i)**	Wavelength in deep water = 2 cm	[1]	
		(ii)	20/5 – [1] = 4 [1] Hz [1] indep mark	[3]	
		(iii)	v = fλ = 4 × 2.0 allow ecf for wavelength from (c) (i) = 8 (cm/s)	[1] [2] [1]	
		(iv)	Wavefronts refracted towards the boundary Straight and parallel Shorter wavelength only if refraction is correct Refracted wavefronts continuous with incident waves.	[1] [1] [1] [1]	
		(v)	Refraction	[1]	
		(vi)	Wave slows down [2] change of speed only give 1	[2]	20

				AVAILABLE MARKS
4	**(a)**	**(i)**	Clockwise Springy metal strip [1] Make and break contact [1] Soft iron core [1]	
		(ii)	Current flows [1] Electromagnet energised/IRON CORE MAGNETIZED [1] Soft iron bar /ARMATURE attracted [1]	
		(iii)	Circuit is broken/current stops/contact broken [1] Springy metal strip pulls it back [1] QWC [1]	
		(iv)	The contact closed/circuit is complete again/current flows again [1]	
	(b)	**(i)**	Direct current flows in one direction [1] Alternating current reverses direction [1]	
		(ii)	a.c. waveform [1] d.c. any line/curve that does not cross the zero [1]	
		(iii)	battery – d.c. [1] mains – a.c. [1]	
	(c)	**(i)**	1000 (J) [1]	
		(ii)	1 × 3 = 3kWh [1]	
		(iii)	3 × 13 = 39 pence [1] ecf from (ii)	
	(d)		Wire moves out of the page [1]	20

		AVAILABLE MARKS
5 **(a)**	Ticks at 1, 2, 5, 7 and 8 [5] 1 mark each	
(b) **(i)**	The Moon [1]	
(ii)	Communications Sat nav, Weather [2]	
(c) **(i)**	The distance [1] Light travels in a year [1]	
(ii)	Take too long/insufficient fuel/food/life support [1]	
(d) **(i)**	(Gas) particles are drawn closer together/contract/condenses [1] Due to gravity (independent marks) [1]	
(ii)	The gas needs to heat up/temperature has to rise/be compressed [1]	
(iii)	Nuclear Fusion [1]	15
	Total	**100**