RECOGNISING ACHIEVEMENT

Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

PHYSICS

1982/6

PAPER 6
HIGHER TIER

MARK SCHEME

Specimen Paper 2003

Qn	Expected answer	Marks	Additional guidance
1 (a)	0.1	1	
(b)	76 (kg)	1	
(c)	bigger density so bigger mass in the same space (1) a bigger mass, so would store more energy (1) bigger shc, so <u>stores</u> more energy (1) bigger shc so retains energy longer (1)	2	any **two**.
(d)	energy = 5 x 3400 x 50 (1) = 850 000 (J) (1)	2	use of 220 kg = 1 mark maximum gives 37 400 000 J
(e)	bigger temperature drop than rise (1) smaller temperature change with block of larger mass / energy change is equal for both blocks (1)	2	
(f)	idea of packets of energy transferring both ways (1) idea of block losing packet /energy gets colder or block gaining packet / energy gets hotter (1) large temperature difference big rate of energy transfer (1) initially more packets go hot → cold than cold → hot (1) thus net transfer hot → cold (1) eventually rate hot ↔ cold same (1) so no net transfer (1) **QWC = 1**. This mark should only be awarded if the answer given attempts to address the question and the quality of the description makes the meaning clear.	4 1 **(13)**	any **four**.

Qn	Expected answer	Marks	Additional guidance
2 (a)	proportional	1	
(b) (i)	spring constant = gradient or k = F/x (1) = 4 (N/cm) (1)	2	
(ii)	400 (N/m)	1	allow ecf
(c)	area / ½ Fx / ½ kx^2 implied (1) use of 0.05 (1) ½ x 0.05 x 20 (1) 0.5 (J) (1)	4	missing ½ , 3 max use of 5cm, 2 max
(d) (i)	0.8 (1) Hz (1)	2	
(ii)	resonance (1) bump frequency = natural frequency (1) large energy transfer (1)	3 **(13)**	

3 (a) (i)	draw line back to temperature axis (1) value from graph ± 5°C (1)	2	
(ii)	absolute zero / °K	1	
(iii)	particles are not moving	1	
(b)	particles move / have energy (1) particles hit surface of <u>liquid</u> (1) particles exert force / pressure on liquid (1) forces balance weight of liquid (1) **QWC = 1**. This mark should only be awarded if the answer given attempts to address the question and the quality of the description makes the meaning clear.	4 1 **(9)**	

Qn	Expected answer	Marks	Additional guidance
4 (a)	convert sound to an electrical signal	1	
(b)	amplifier	1	
(c)	audio wave: longer wavelength than carrier wave (1) reshaped wave: good attempt at change in amplitude of carrier wave (1)	2	
(d)	each station broadcasts on a different frequency (1) radio receiver has tuning circuit to pick up correct signal / reference to tuning circuit resonates at required signal (1)	2	
(e) (i)	Internet/books/speeches at conferences/scientific magazines/journals.	1	
(ii)	Any **two** from: provide information to other scientists (1) provides information to government (1) provides information to the general public (1) evaluation by other scientists/AW (1) review by other scientist/AW (1) so they get their work checked (1)	2 **(9)**	

5 (a)	(v = u + at given) = 0 + 17.5 x 480 (1) = 8400 (m/s) (1)	2	(if use 8 min,1 max)
(b)	(s = ut + ½ at^2 given) = ½ x 17.5 x 480^2 (1) = 2 0016 000 (m) (1)	2	or use s =av.speed x t (if use 8 min, 1 max)
(c)	reason: mass of rocket decreases as fuel is burned off / thrust increases during flight (1) explanation related to F = ma (1)	2 **(6)**	allow g decreases as it goes up / air resistance gets less as atmosphere gets thinner
		Total = 50	