

Energy, Work and Power

Mark Scheme 9

Level	IGCSE
Subject	Physics
ExamBoard	CIE
Topic	General Physics
Sub-Topic	Energy, Work and Power
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 9

Time Allowed: 55 minutes

Score: /46

Percentage: /100

- 1
- (a) (i)** $(a =) v/t$ **or** 65/26 C1
 2.5 m/s^2 *Unit penalty applies A1
- (ii)** $(F =)ma$ **or** $3.4 \times 10^5 \times 2.5$ ecf from **3(a)(i)** C1
 $8.5 \times 10^5 \text{ N}$ *Unit penalty applies ecf from **3(a)(i)** A1
- (b) (i)** any two of: KE **or** GPE **or** heat/internal energy/thermal energy B2
- (ii)** chemical energy **not** heat B1
- (iii)** thermal energy/sound is lost (to the atmosphere) **or** KE of air B1
- (c)** perpendicular to path **or** towards centre of circle **or** centripetal B1 **[9]**
- *Apply unit penalty once onl
- 2
- (a)** $M = V \times D$ in any form **OR** $10^3 \times 10^{-3}$ C1
1 kg A1
- (b)** mgh **OR** his **(a)** $\times 10 \times 0.8$ C1
8 J (Nm) **OR** 7.85 J **OR** 7.84 J e.c.f. from **(a)** A1
- (c)** $P = E/t$ **OR** (his 8×90) / 60 e.c.f. from **(b)** C1
12 W (J/s or Nm/s) **OR** 11.77 W **OR** 11.76 W A1
- (d)** pgh in any form, words, letters, numbers C1
8000 Pa (N/m^2) **OR** 7850 Pa **OR** 7840 Pa A1 **[8]**

3	(a)	750 N	A1	1
	(b)	p.e. lost / converted = mgh or weight x height 750 x 15 or 75 x 10 x 15 = 11250 (J) p.e. lost = k.e. gained = 11250 (J)	C1 C1 A1	3
	(c)	Any 3 of: heat in water / rock (kinetic) energy of (moved) water / to make water move/ make waves some k.e. still in (sinking) rock sound energy on impact / of splash (just heat and sound C1)	B3	3
				[7]
4	(a)	attempt to use triangle or parallelogram of forces stated scale used 950 N and 1220 N in correct relative directions correct resultant drawn in weight = 1785 N [limits 1700 N to 1850 N]	M1 A1 C1 C1 A1	5
	(b)	(i) work = force x distance or 1500 x 3.0 work = 4500 J (ii) power = work/time or 4500/2.5 power = 1800 W	C1 A1 C1 A1	4
				[9]

5

Accept D & E
marked on Time
axis

No labels -1

- 5 a BD correct, (straight line i.e. constant acceleration) B1
 DE correct, (constant speed or slightly reducing speed only) B1
 EF correct, (speed reduced to zero, gradient steeper than BD) 3 B1 3
- b(i) force = 2 (N) C1
 work = $(2 \times 0.6) = 1.2 \text{ J}^*$ 2 A1 ~~3~~
- (ii) k.e. = $0.5mv^2$ C1
 $= 0.5 \times 0.2 \times 2.5 \times 2.5$ C1
 $= 0.625 \text{ J}^*$ 3 A1 5
- c velocity - vector, speed scalar B1
 direction changes so velocity changes 2 B1 2
- d work done against friction B1
 (more) friction on EF B1
 (k)e. changed to heat B1
less k.e. changed to p.e. 3 B1 M3*