

2(a)	change in velocity per unit time OR rate of change of velocity OR ($a =$) $\Delta v / \Delta t$
2(b)(i)	12 s
	$(\Delta t =) \Delta v / a$ OR 13 / 1.1
2(b)(ii)	570 000 N
	$F = ma$ OR ($F =$) ma OR ($F =$) $520\,000 \times 1.1$
2(b)(iii)	(additional force is needed to overcome) friction OR air resistance OR drag

Multiple Choice Answers

Q2: B

Q6: D

1(a)	constant speed
	constant / uniform deceleration
	stationary
1(b)(i)	7.1×10^5 J OR 710 000 J OR 710 kJ
	$E_k = \frac{1}{2}mv^2$ OR ($E_k =$) $\frac{1}{2}mv^2$ OR $\frac{1}{2} \times 18\,000 \times (8.9)^2$
1(b)(ii)	31 000 N OR 31 kN
	$W = Fd$ OR ($F =$) W / d OR $710\,000 / 23$
	$F = 710\,000 / 23$
2(a)	(Impulse =) force $\times$ time (for which force acts)
2(b)(i)	$F\Delta t = \Delta\{mv\}$ OR ($F =$) $\Delta\{mv\} / \Delta t$ OR ($F =$) $\Delta p / t$
	$\{2800 \times 1400\} / (1) = 3\,920\,000$ N OR $\{2800 \times 1400\} / (1) = 3920$ kN
2(b)(ii)	4.0×10^5 kg OR 400 000 kg
	(at maximum mass) force = weight of rocket OR $F = mg$
	$(m =) F / g$ OR $3.9 \times 10^6 / 9.8$ OR $4(.0) \times 10^6$ (kg)