

Acceleration calculations.

initial velocity	u	} ($v - u$) = change in velocity = Δv	acceleration	a
final velocity	v		$a = \frac{\Delta v}{t}$	time

- (1.) If a car, starting from rest, accelerates away from a set of traffic lights for 5 seconds before reaching a steady speed of 20 m/s calculate it's acceleration. [2]
- (2.) The same car, still travelling at 20 m/s then brakes to a stop at a junction in a further 4 s. Calculate this acceleration. What does the negative sign indicate ? [3]
- (3.) A motorbike speeds up from 25 m/s to 40 m/s in order to overtake a bus in a time of 3 seconds. What is it's acceleration ? [2]
- (4.) A ball is released from the leaning tower of Pisa and hits the ground 3 seconds later at a speed of 30 m/s. What is the acceleration due to gravity on Earth ? [2]
- (5.) A racing car accelerates away from the start line at 4.5 m/s^2 for 5 seconds. What is it's final speed ? [2]
- (6.) A runner travelling at 5 m/s accelerates at 0.8 m/s^2 for 5 seconds to finish the race as she sprints for the finish line. At what speed does she cross the line? [2]
- (7.) Sophie wants to compare a Nissan Pulsar Q with a Ford Mustang Cobra. She has found the following performance figures in a car magazine. The Pulsar takes 4.2 seconds to reach 60 km/hr, whereas the Cobra takes only 3.3 seconds to reach 60 km/hr. Show which of the two vehicles has the greatest acceleration. [4]
- (8.) Calculate the average acceleration of a drag racing car that reaches a speed of 506 km/hr in 4.6 seconds. [2]
- (9.) A train moves from rest with a uniform acceleration of 0.2 m/s^2 . After what time will its final velocity be 4.4 m/s? [3]
- (10.) A train leaves a station at 9:11am and at 9:19am it is travelling at 24 m/s. What is the acceleration of the train? [3]

[Total marks 25]