

## Forces Homework

**Name & Set**

1 Performance data for the Jaguar XJ6

Top speed	70 m/s
Acceleration	0 to 16 m/s in 6.6 s

Using the data in the table above calculate

(a) the Jaguar's acceleration.

---



---

[3]

(b) How long it will take the car to reach its top speed from rest if the car continues to accelerate at this rate?

---



---



---

[3]

(c) Why doesn't the car continue to get faster indefinitely. In other words, why does it have a top speed? Explain in words, and with free-body diagrams, what is happening

(i) when the car is accelerating




---



---



---

[3]



(ii) when it has reached its maximum velocity.

---



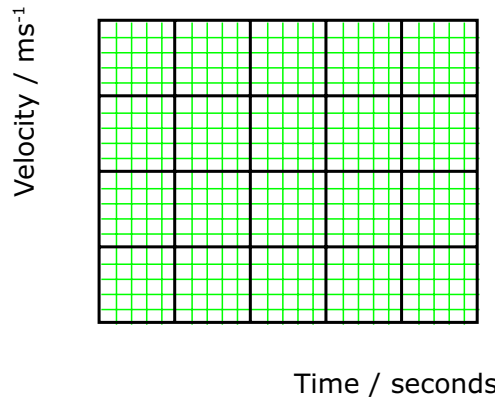
---



---

[3]

(d) Sketch a velocity/time graph for the car from rest to maximum velocity.



(e) Give another example in which a body reaches a top speed that it does not exceed.

\_\_\_\_\_ [3]

(f) Calculate the average force that must act upon the car to cause it to accelerate from rest to 16 m/s in 6.6 s if the mass of the car is 1700 kg.

\_\_\_\_\_ [3]

2 Give an example of inertia. Explain in what way the situation you describe is due to inertia. Illustrate your answer with a diagram.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]