



Speed, Distance & Time

2005

- 14 A pulse of frequency 100 kHz is emitted from an ultrasound scanner, and is reflected from a fetus 10 cm below the transmitter placed on the mother's abdomen. The speed of sound within the mother's body is 500 m/s.

How long does it take for the pulse to reach the receiver which is adjacent to the transmitter?

- A 0.2 ms
- B 0.4 ms
- C 0.5 ms
- D 1.0 ms

- 22 When a 1 kg mass is dropped from the top of a building 20 m high it hits the Earth with a speed of 20 m/s.

What would be its speed if the same experiment was carried out on a planet where the acceleration due to gravity is $\frac{1}{4}$ that on Earth?

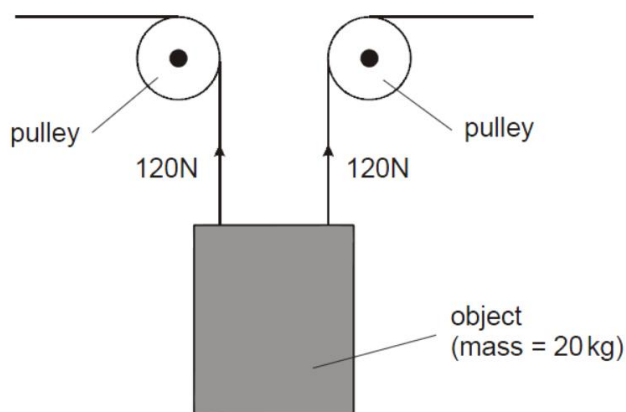
- A 1.25 m/s
- B 2.5 m/s
- C 5.0 m/s
- D 10.0 m/s



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2006

- 16 An object with a mass of 20 kg is lifted by the arrangement shown in the diagram. Air resistance (drag) can be ignored, and the gravitational field strength (acceleration due to gravity) can be taken as 10 N/kg.



What is the acceleration of the object, in m/s^2 ?


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2007

23 An artery has a length x mm and blood flows steadily through it at V ml per second.

If, on average, a given red blood cell takes T seconds to travel the length of the artery, what is the cross-sectional area of the artery in mm^2 ?

A $\frac{VT}{x} \times 10^{-6}$

B $\frac{Vx}{T} \times 10^{-6}$

C $\frac{VT}{x}$

D $\frac{Vx}{T}$

E $\frac{VT}{x} \times 10^3$

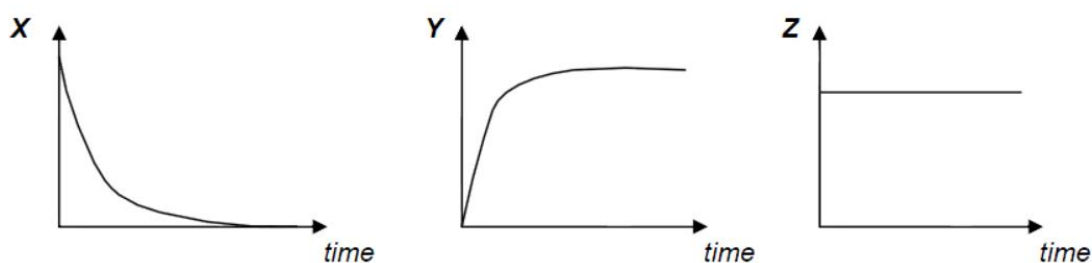
F $\frac{Vx}{T} \times 10^3$



Speed, Distance & Time

2003

- 15 A car is accelerated from rest along a horizontal road by a constant thrust force produced by the engine. The car eventually reaches a terminal speed, and the graphs below show the variation with time of three quantities (**X**, **Y** and **Z**) for the car:



Which line in the table could correctly identify the quantities **X**, **Y** and **Z**?

	X	Y	Z
A	acceleration	drag force	kinetic energy
B	acceleration	mass	weight
C	potential energy	velocity	kinetic energy
D	potential energy	drag force	weight
E	resultant force	mass	kinetic energy
F	resultant force	velocity	weight



Speed, Distance & Time

- 23 A lorry of mass m , and travelling initially at speed v along a horizontal road, is brought to rest by an average braking force F in time t .

Ignoring any other resistive forces, what distance is travelled by the lorry during this time?

A $\frac{F}{mg}$

B $\frac{mgv}{F}$

C $\frac{mv^2}{2F}$

D $\frac{v^2}{2g}$

E vt

F $2vt$