Name

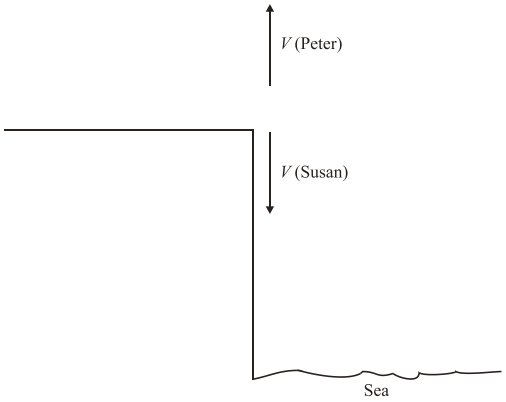
Date

Mr Rawson

ISTANBUL INTERNATIONAL COMMUNITY SCHOOL
IICS SINCE 1911

Acceleration III

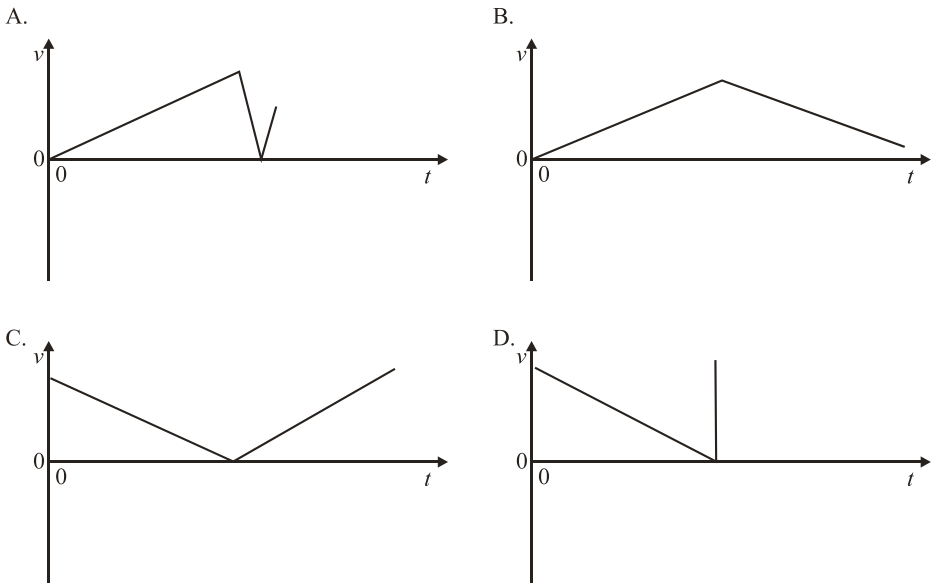
1. Peter and Susan both stand on the edge of a vertical cliff.



Susan throws a stone vertically downwards and, at the same time, Peter throws a stone vertically upwards. The speed V with which both stones are thrown is the same. Neglecting air resistance, which **one** of the following statements is true?

A. The stone thrown by Susan will hit the sea with a greater speed than the stone thrown by Peter.
B. Both stones will hit the sea with the same speed no matter what the height of the cliff.
C. In order to determine which stone hits the sea first, the height of the cliff must be known.
D. In order to determine which stone hits the sea first both the height of the cliff and the mass of each stone must be known.

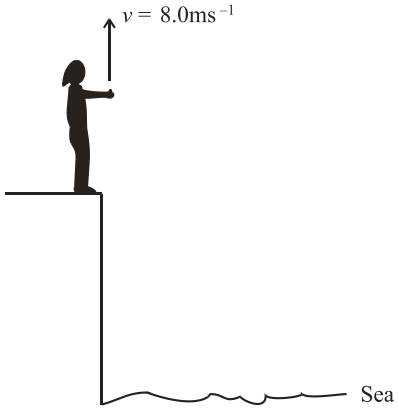
2. A ball is dropped from rest at time t = 0 on to a horizontal surface from which it rebounds. Which one of the following graphs best shows the variation of speed v of the ball with time t from the time t = 0 to the time that the ball leaves the surface?



3. Which one of the following is a true statement concerning the vertical component of the velocity and the acceleration of a projectile when it is at its maximum height? (The acceleration of free fall is g.)

	Vertical component of velocity	**Acceleration**
A.	maximum	zero
B.	maximum	g
C.	zero	maximum
D.	zero	g

4. Antonia stands at the edge of a vertical cliff and throws a stone vertically upwards.



The stone leaves Antonia's hand with a speed $v = 8.0$ m·s^{-1} . The acceleration of free fall g is 10 m·s^{-2} and all distance measurements are taken from the point where the stone leaves Antonia's hand.

A. Ignoring air resistance calculate

i. the maximum height reached by the stone.

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ii. the time taken by the stone to reach its maximum height.

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The time between the stone leaving Antonia's hand and hitting the sea is 3.0 s.

B. Determine the height of the cliff.

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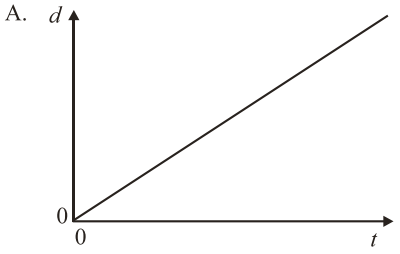
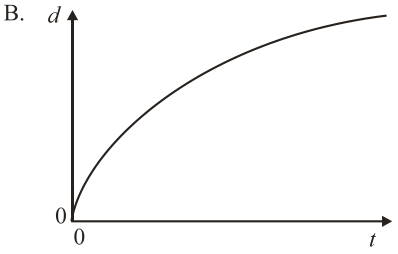
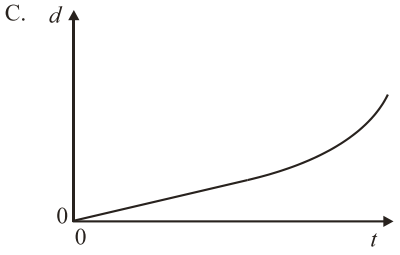
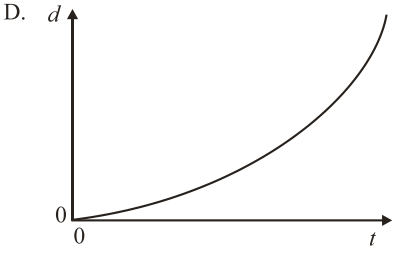
5. A ball is held at rest in air. The ball is then released. Which one of the following graphs best shows the variation with time t of the distance d fallen by the ball?

A.


B.


C.


D.


6. A police car P is stationary by the side of a road. A car S, exceeding the speed limit, passes the police car P at a constant speed of 18 $m \cdot s^{-1}$. The police car P sets off to catch car S just as car S passes the police car P. Car P accelerates at 4.5 $m \cdot s^{-2}$ for a time of 6.0 s and then continues at constant speed. Car P takes a time t seconds to draw level with car S.

A. i. State an expression, in terms of t, for the distance car S travels in t seconds.

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ii. Calculate the distance travelled by the police car P during the first 6.0 seconds of its motion.

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iii. Calculate the speed of the police car P after it has completed its acceleration.

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iv. State an expression, in terms of t, for the distance travelled by the police car P during the time that it is travelling at constant speed.

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B. Using your answers to A., determine the total time t taken for the police car P to draw level with car S.

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