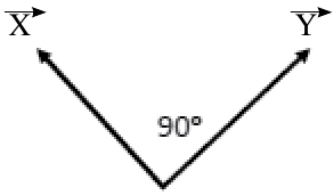
Physics

1- The given figure represents two vectors $\vec{X}$ and $\vec{Y}$ equal in magnitude and the angle between them is 90°.

Which of the following mathematical operations produces a result = zero?



a- Their sum $\vec{X} + \vec{Y}$

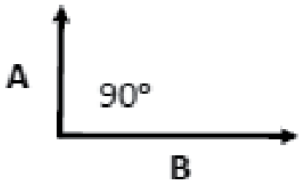
b- Their difference $\vec{X} - \vec{Y}$

c- Their Dot product $\vec{X} . \vec{Y}$

d- Their Vector product $\vec{X} \wedge \vec{Y}$

2- If a dimensional formula for a physical quantity is $M^X L^Y T^Z$ and it matches the dimensional formula of force. What is the value of (X + Y + Z)?

3- The given figure represents two vectors, where magnitude of A = 3 and magnitude of B = 4. Find their:



a- Vector product

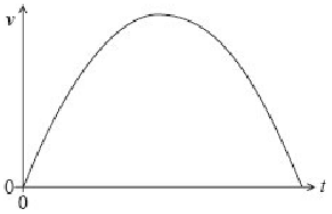
b- Scalar product

4- Someone suggests that kinetic energy (E) of a moving car depends on its mass (m) and velocity (v), he write the following relation E = mv.

Use the dimensional formula of each quantity to decide whether this relation is true or false.

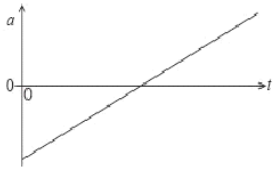
5- Mazen walked at a uniform velocity 1 m/s for 10 min, them he ran at a uniform velocity 4 m/s for 5 min. Find his average speed through 15 min.

6- The given graph shows the change of velocity of object (v) move in straight line with time (t).

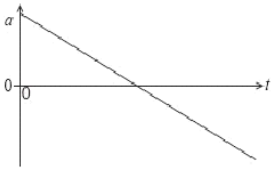


Which graph represents the change in acceleration of this object (a) and time (t)?

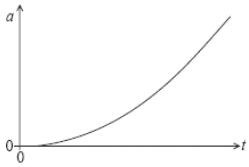
a.



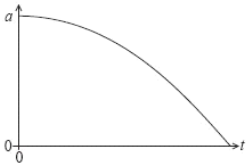
b.



c.



d.



7- An object falls freely from rest. If the velocity of the object reaches (v) after time (t). What would be the speed of object after time (2t) since it starts falling?

8- Ahmed and Fady stood on the edge of a cliff above a lake. Ahmed threw a ball vertically upward. At the same time, Fady threw another ball vertically downward with the same initial velocity. If you were in a boat just down of the cliff watching what was happening.

Which ball collided with water surface at a higher velocity?

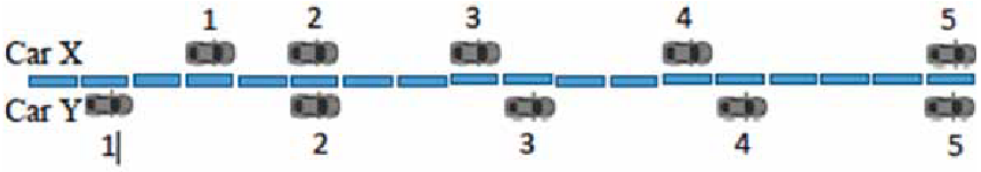
a- Ahmed's ball

b- Fady's ball

c- Both balls reached the water surface at the same velocity

d- Data given is not sufficient to answer.

9- The positions of two cars X and Y are represented at equal successive intervals, each interval is of one second. These positions are marked by numbers in the diagram below. The two cars move rightwards.



Which statement describes correctly the movement of the two cars?

a- The two cars move at non-uniform velocity.

b- The car (X) moves at uniform velocity while the car (Y) moves at uniform acceleration.

c- The car (X) moves at non-uniform acceleration while the car (Y) moves at uniform velocity.

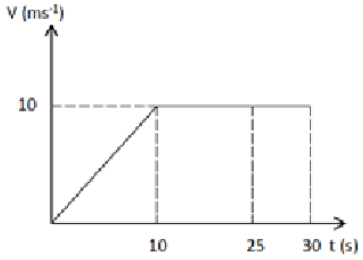
d- The car (X) moves at uniform acceleration while the car (Y) moves at uniform velocity.

10- Sarah was running in a straight track. The given graph represents the change of her velocity (v) versus time (t). After 25 seconds Sarah covered a distance of 200m.

Which of the data below are correct at the 25th second?

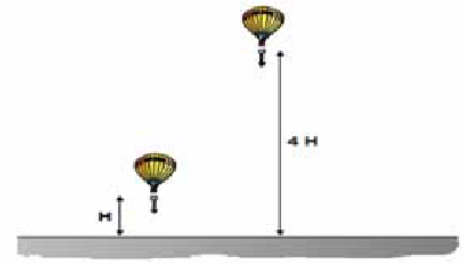
Instantaneous

	Instantaneous velocity	**Average velocity**
a	8 ms^{-1}	8 ms^{-1}
b	8 ms^{-1}	10 ms^{-1}
c	10 ms^{-1}	8 ms^{-1}
d	10 ms^{-1}	10 ms^{-1}



11- A parachutist has mass 80 kg falls vertically at a uniform velocity of 50 ms-1 . So, the force acting on him upward approximately equals ……..

12- A box is dropped from a parachute twice. In the first case the distance between the box and the Earth's surface is (H). In the second case this distance is (4H). **The time taken by the box in the second case relative to that taken by the first case**:



a- The time is the same in both cases since it does not depend on height.

b- The time in the second case is double that in the first case.

c- The time in the second case is three times that in the first case.

d- The time in the second case is four times that in the first case.