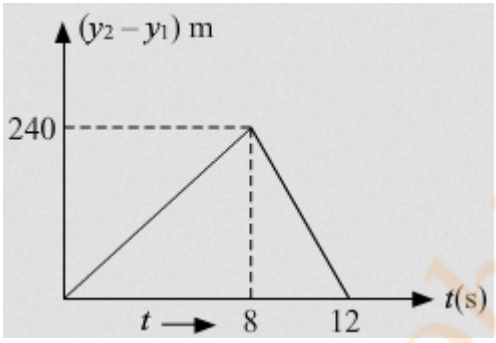
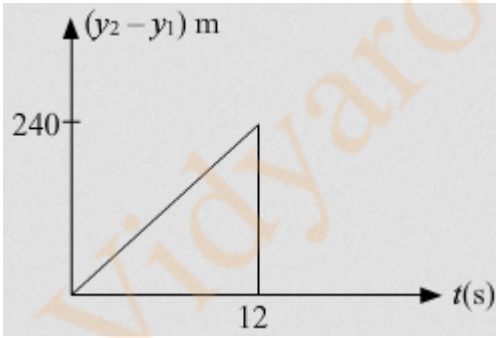
Motion In a Straight Line

Q.No.1: Two stones are thrown up simultaneously from the edge of a cliff 240 m high with initial speed of 10 m s^{-1} and 40 m s^{-1} respectively. Which of the following graph best represents the time variation of relative position of the second stone with respect to the first?
(Assume stones do not rebound after hitting the ground and neglect air resistance, take g = 10 m s^{-2}). (The figures are schematic and not drawn to scale) **JEE 2015**

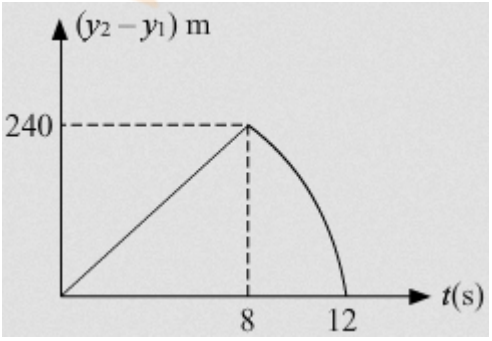
A.



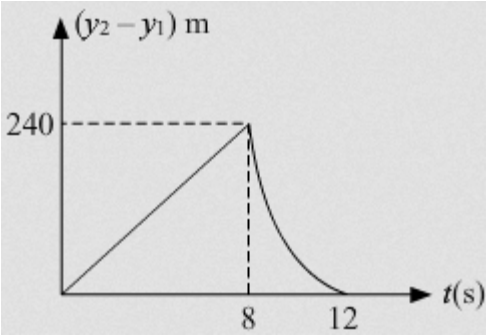
B.



C.

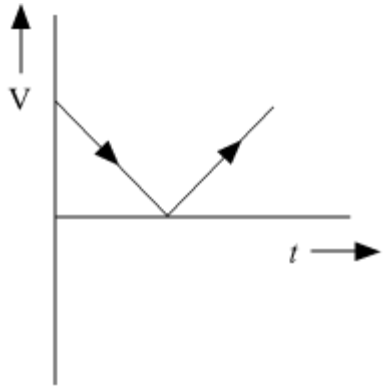


D.

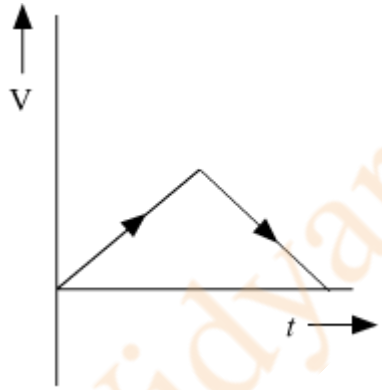


Q.No.2: A body is thrown vertically upwards. Which one of the following graphs correctly represent the velocity vs time? **JEE 2017**

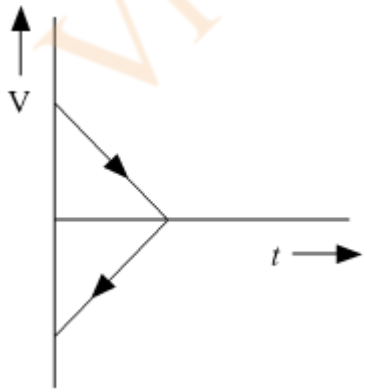
A.



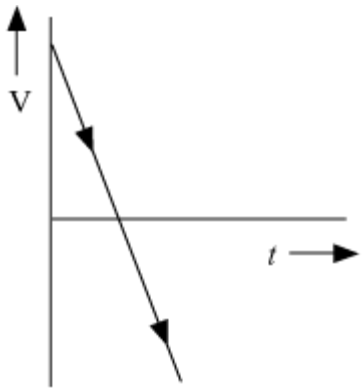
B.



C.

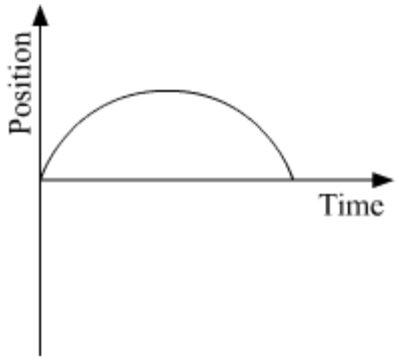


D.

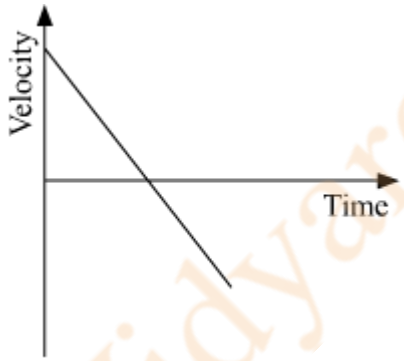


Q.No.3: All the graphs below are intended to represent the same motion. One of them does it incorrectly. Pick it up. **JEE 2018**

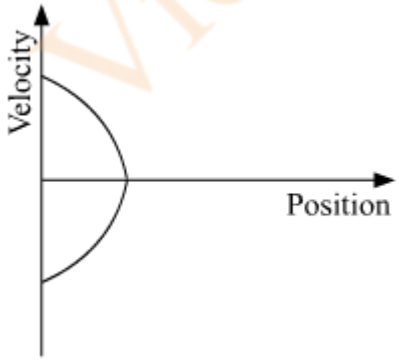
A.



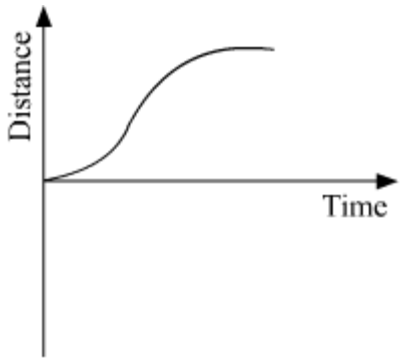
B.



C.



D.



Q.No.4: A particle is moving with a velocity $\overrightarrow{v} = K\left(y\hat{i} + x\hat{j}\right)$, where K is a constant. The general equation for its path is: **JEE 2019**

A. $y = x^2$ + constant

B. $y^2 = x$ + constant

C. $y^2 = x^2$ + constant

D. xy = constant

Q.No.5: The top of a water tank is open to air and its water level is maintained. It is giving out 0.74 m^3 water per minute through a circular opening of 2 cm radius in its wall. The depth of the centre of the opening from the level of water in the tank is close to: **JEE 2019**

A. 6.0 m

B. 4.8 m

C. 9.6 m

D. 2.9 m

Q.No.6: In a car race on straight road, car A takes a time t less than car B at the finish and passes finishing point with a speed 'v' more than that of car B. Both the cars start from rest and travel with constant acceleration a_1 and a_2 respectively. Then 'v' is equal to: **JEE 2019**

A. $\frac{2a_1a_2}{a_1+a_2}t$

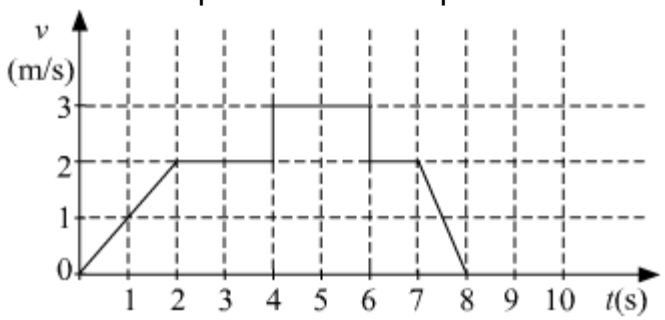
B. $\sqrt{2a_1a_2}t$

C. $\sqrt{a_1a_2}t$

D. $\frac{a_1+a_2}{2}t$

Q.No.7: A particle starts from the origin at time $t = 0$ and moves along the positive x-axis. The graph of velocity with respect to time is shown in figure. What is the position of the particle at time $t = 5$s?

JEE 2019



A. 10 m

B. 6 m

C. 3 m

D. 9 m

Q.No.8: A passenger train of length 60 m travels at a speed of 80 km/h. Another freight train of length 120 m travels at a speed of 30 km/h. The ratio of times taken by the passenger train to completely cross the freight train when: (i) they are moving in the same direction, and (ii) in the opposite directions is

JEE 2019

A. $\frac{11}{5}$

B. $\frac{5}{2}$

C. $\frac{3}{2}$

D. $\frac{25}{11}$

Q.No.9: A person standing on an open ground hears the sound of a jet aeroplane, coming from north at an angle 60° with ground level. But he finds the aeroplane right vertically above his position. If v is the speed of sound, speed of the plane is :

JEE 2019

A. $\frac{\sqrt{3}}{2}v$

B. $\frac{2v}{\sqrt{3}}$

C. v

D. $\frac{v}{2}$

Q.No.10: A ball is dropped from the to of a 100 m high tower on a planet. In the last $\frac{1}{2}$s before hitting the ground, it covers a distance of 19 m. Acceleration due to gravity (in ms^{-2}) near the surface on that planet is _____. **JEE 2020**