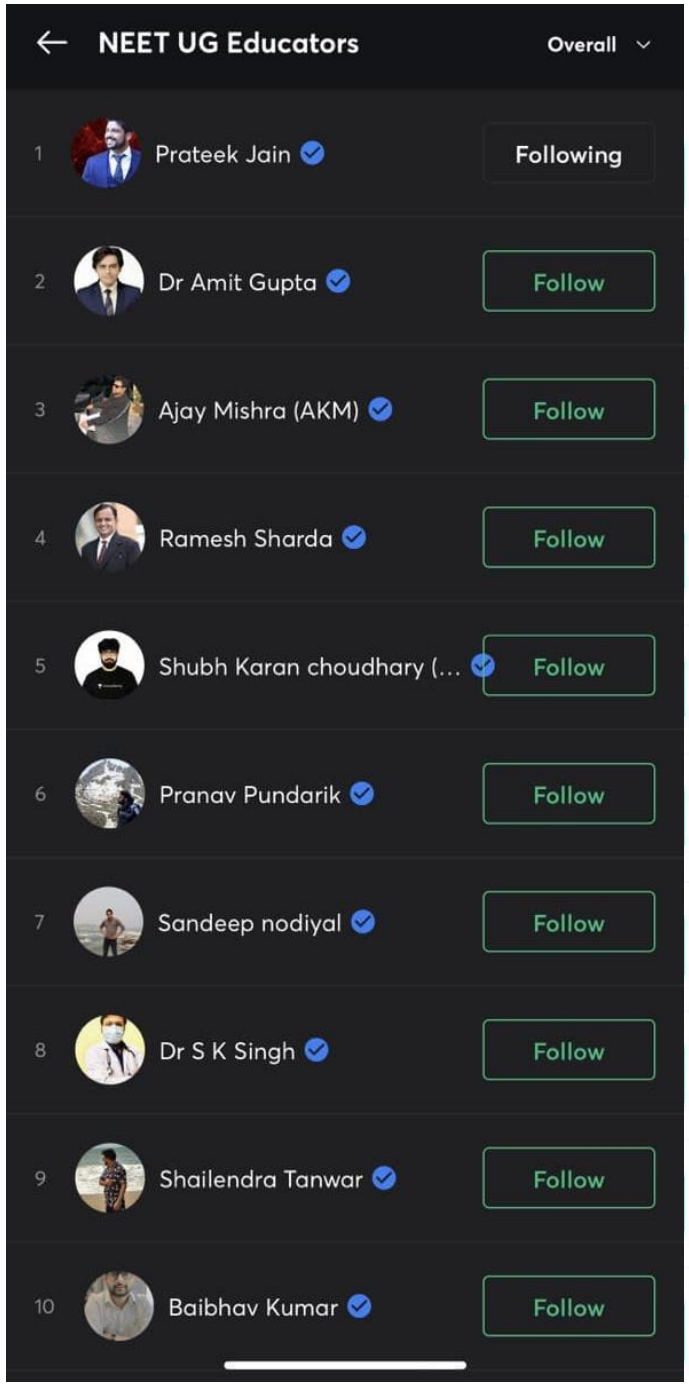
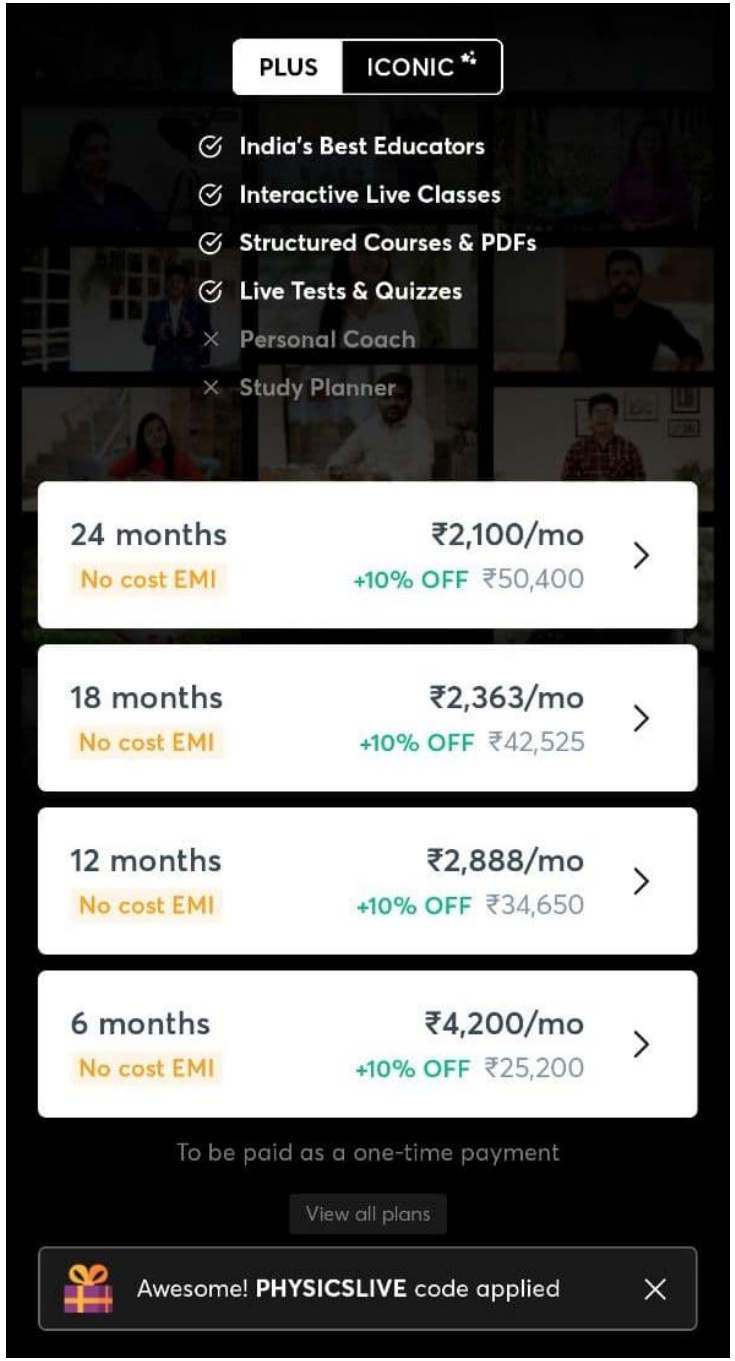
SIR PRATEEK JAIN

. Founder @Physicsaholics
. Top Physics Faculty on Unacademy (IIT JEE & NEET)
. 8+ years of teaching experience in top institutes like FIITJEE (Delhi, Indore) , CP (KOTA) etc.
. Produced multiple Top ranks.
. Research work with HC Verma sir at IIT Kanpur
. Interviewed by International media.



PHYSICSLIVE

Use code PHYSICSLIVE to get 10% OFF on Unacademy PLUS and learn from India's Top Faculties.



SUBSCRIBE

@Physicsaholics

@Physicsaholics_prateek

@NEET_Physics
@IITJEE_Physics

physicsaholics.com

Unacademy

CLICK

Links are also in the description of the video.

For Video Solution of this DPP, Click on below link

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/61

Video Solution on YouTube:- https://youtu.be/diVXzvJsxAk

unacademy

Solution
NEET & AIIMS PYQs

Kinematics (2/3) 1D: (Vertical Motion in 1D, Graphs)

By Physicsaholics Team

PYQs on Following Subtopic:

Vertical motion in one dimension

Q) A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s. The height of the tower is : ($g = 10\ m/s^2$)

NEET 2020

(1) 320 m

(2) 300 m

(3) 360 m

(4) 340 m

Ans. 2

From a building two balls A and B are thrown such that A is thrown upwards and B downwards (both vertically with the same speed). If v_A and v_B are their respective velocities on reaching the ground, then **[2002]**

(a) $v_B > v_A$ (b) $v_A = v_B$ (c) $v_A > v_B$ **AIIMS**

(d) their velocities depend on their masses.

Ans. b

A boy standing at the top of a tower of 20 m height drops a stone. Assuming, $g = 10\ \text{ms}^{-2}$, the velocity with which it hits the ground is

(a) 20 m/s
(b) 40 m/s
(c) 5 m/s
(d) 10 m/s

[CBSE AIPMT 2011]

Ans. a

Two bodies A (of mass 1 kg) and B (of mass 3 kg) are dropped from heights of 16 m and 25 m, respectively. The ratio of the time taken by them to reach the ground is

[CBSE AIPMT 2006]

(a) –5/4 (b) 12/5 (c) 5/12 (d) 4/5

Ans. d

A man throws balls with the same speed vertically upwards one after the other at an interval of 2 s. What should be the speed of the throw so that more than two balls are in the sky at any time? (Take $g = 9.8\ m/s^2$)

[CBSE AIPMT 2003]

(a) Any speed less than 19.6 m/s
(b) Only with speed 19.6 m/s
(c) More than 19.6 m/s
(d) At least 9.8 m/s

Ans. c

If a ball is thrown vertically upwards with speed u, the distance covered during the last t sec of its ascent is [CBSE AIPMT 2003]

(a) $ut - \frac{1}{2}gt^2$ (b) $(u + gt)t$ (c) ut (d) $\frac{1}{2}gt^2$

Ans. d

A stone is thrown vertically upwards. When stone is at a height half of its maximum height, its speed is 10 m/s, then the maximum height attained by the stone is ($g = 10\ m/s^2$) *[CBSE AIPMT 2001]*

(a) 8 m (b) 10 m (c) 15 m (d) 20 m

Ans. b

If a ball is thrown vertically upwards with a velocity of 40 m/s, then velocity of the ball after 2s will be ($g = 10\ m/s^2$)

[CBSE AIPMT 1996]

(a) 15 m/s
(b) 20 m/s
(c) 25 m/s
(d) 28 m/s

Ans. b

The water drops fall at regular intervals from a tap 5 m above the ground. The third drop is leaving the tap at an instant when the first drop touches the ground. How far above the ground is the second drop at that instant ? (Take $g = 10\ m/s^2$)

[CBSE AIPMT 1995]

(a) 1.25 m (b) 2.50 m (c) 3.75 m (d) 5.00 m

Ans. c

A body is thrown vertically upwards from the ground. It reaches a maximum height of 20 m in 5 s. After what time it will reach the ground from its maximum height position ? *[CBSE AIPMT 1995]*

(a) 2.5 s (b) 5 s (c) 10 s (d) 25 s

wrong.

Ans. b

A stone released with zero velocity from the top of a tower, reaches the ground in 4 s. The height of the tower is ($g = 10\ m/s^2$)

[CBSE AIPMT 1995]

(a) 20 m (b) 40 m (c) 80 m (d) 160 m

Ans. c

A body dropped from top of a tower fall through 40 m during the last two seconds of its fall. The height of tower is ($g = 10\ m/s^2$)

[CBSE AIPMT 1991]

(a) 60 m (b) 45 m (c) 80 m (d) 50 m

Ans. b

What will be the ratio of the distance moved by a freely falling body from rest in 4th and 5th second of journey? *[CBSE AIPMT 1989]*

(a) 4 : 5 (b) 7 : 9 (c) 16 : 25 (d) 1 : 1

Ans. b

A rocket is fired vertically from the ground with a resultant vertical acceleration of $10\ m\ s^{-2}$. The fuel is finished in 1 min and it continues to move up. What is the maximum height reached?

(a) 42.3 km (b) 48.4 km **AIIMS**

(c) 36.4 km (d) 25.6 km *(2018)*

Ans. c

A particle is thrown vertically up with an initial velocity 9 m/s from the surface of Earth (take $g = 10\ m/s^2$). The time (in s) taken by the particle to reach a height of 4 m from the surface second time (in seconds) is

(a) 1.3 (b) 1.2

(c) 1.1 (d) 1.0

AIIMS

(2018)

Ans. d

A particle is thrown vertically upwards. Its velocity at half of the height is 10 m/s, then the maximum height attained by it will be : ($g = 10\ m/s^2$)

(a) 10 m (b) 20 m ***[1999]***

(c) 15 m (d) 25 m **AIIMS**

Ans . a

A body is released from the top of the tower H metre high. It takes t second to reach the ground. Where is the body after t/2 second of release ?

(a) at 3H/4 metre from the ground *[2000]*

(b) at H/2 metre from the ground

(c) at H/6 metre from the ground

(d) at H/4 metre from the ground

AIIMS

Ans. a

A particle is thrown vertically upwards with a velocity of 40 ms^{-1}. The ratio of its accelerations after 1s and 2s of its motion is *[2009]*

(a) 2 (b) 9.8

(c) 1 (d) 4.9

AIIMS

Ans. c

A body is thrown vertically upwards with a velocity of 19.6 ms^{-1}. The position of the body after 4 s will be

AIIMS ***[2009]***

(a) at the highest point

(b) at the mid-point of the line joining the starting point and the highest point

(c) at the starting point

(d) none of the above

Ans. c

Two bodies begin a free fall from the same height at a time interval of N s. If vertical separation between the two bodies is 1 after n second from the start of the first body, then n is equal to

AIIMS *[2016]*

(a) $\sqrt{nN}$

(b) $\frac{l}{gN}$

(c) $\frac{l}{gN}+\frac{N}{2}$

(d) $\frac{1}{gN}-\frac{N}{4}$

Ans. c

From a balloon moving upwards with a velocity of 12 ms^{-1}, a packet is released when it is at a height of 65 m from the ground. The time taken by it to reach the ground is ($g = 10\ ms^{-2}$)

(a) 5 s (b) 8 s **AIIMS** ***[2017]***

(c) 4 s (d) 7 s

Ans. a

Assertion : Two balls of different masses are thrown vertically upward with same speed. They will pass through their point of projection in the downward direction with the same speed.

Reason : The maximum height and downward velocity attained at the point of projection are independent of the mass of the ball. ***[2013]***

AIIMS

Ans. a

Assertion : If a body is thrown upwards, the distance covered by it in the last second of upward motion is about 5 m irrespective of its initial speed

Reason : The distance covered in the last second of upward motion is equal to that covered in the first second of downward motion when the particle is dropped.

AIIMS ***[2000]***

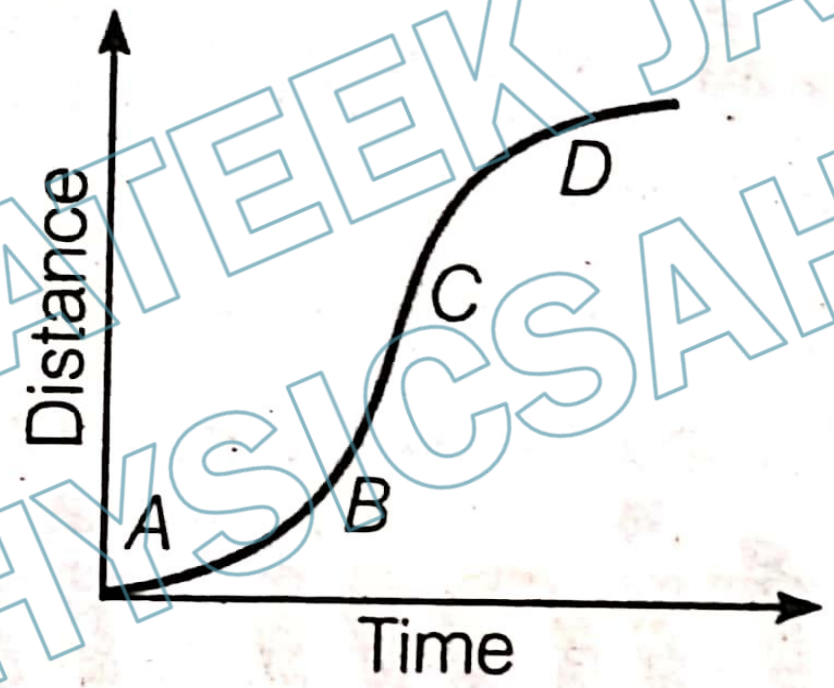
Ans. a

PYQs on Following Subtopic:

Graphs of Uniformly retarded motion

A particle shows distance-time curve as given in this figure. The maximum instantaneous velocity of the particle is around the point

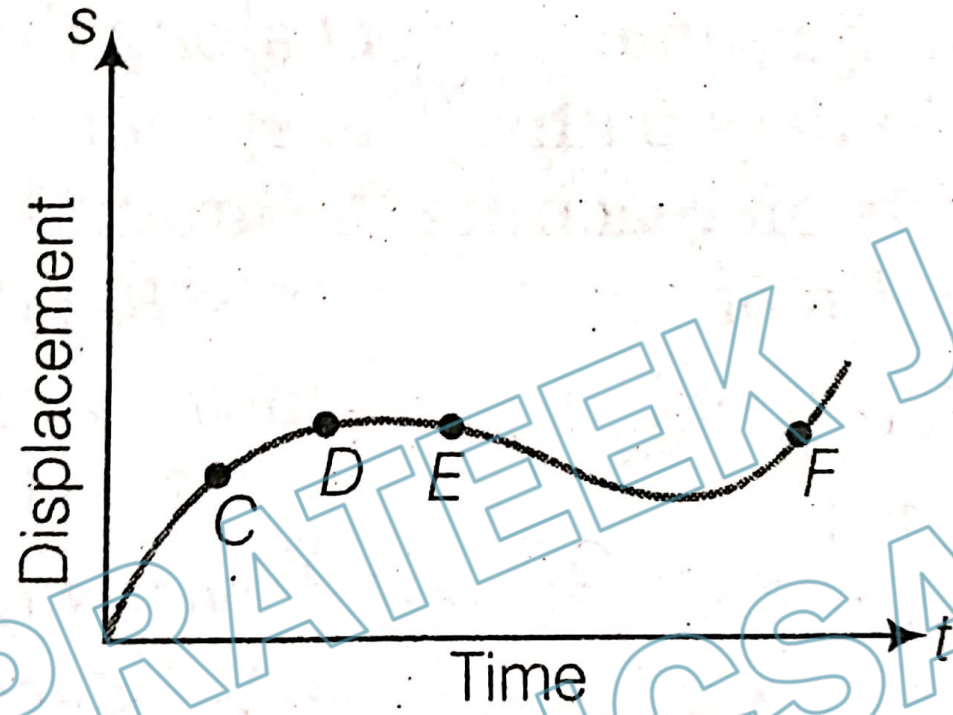
[CBSE AIPMT 2008]



(a) *B* (b) *C* (c) *D* (d) *A*

Ans. b

The displacement-time graph of moving particle is shown below.



The instantaneous velocity of the particle is negative at the point *[CBSE AIPMT 1994]*

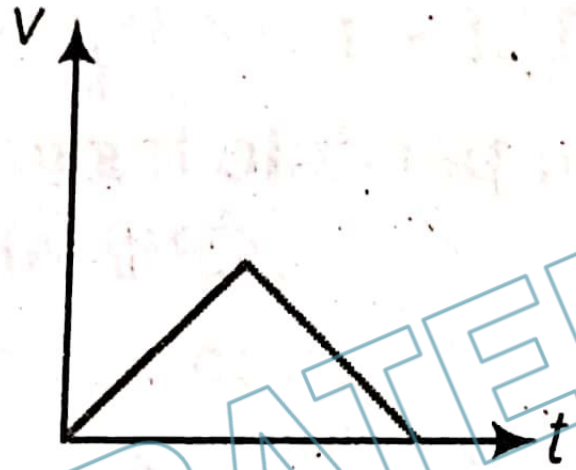
(a) *D*
(b) *F*
(c) *C*
(d) *E*

Ans. d

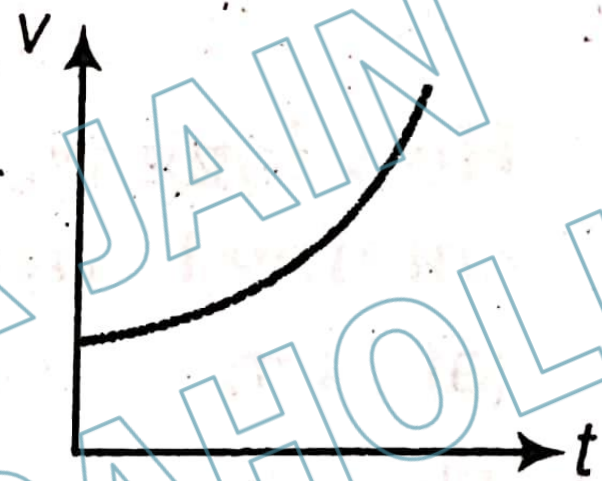
Which of the following curves does not represent motion in one dimension?

[CBSE AIPMT 1992]

(a)

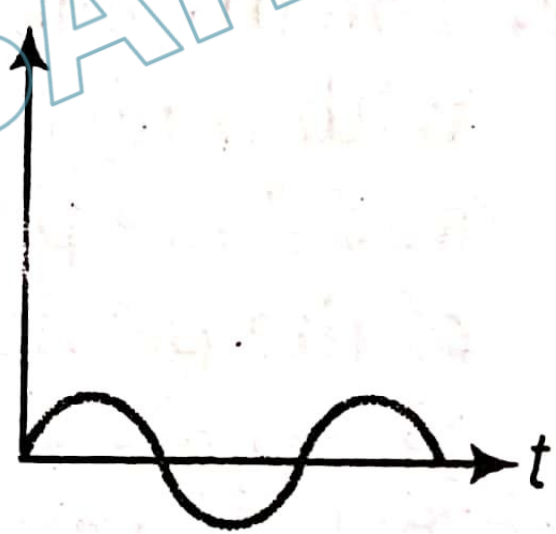


(b)



(c)

(d)



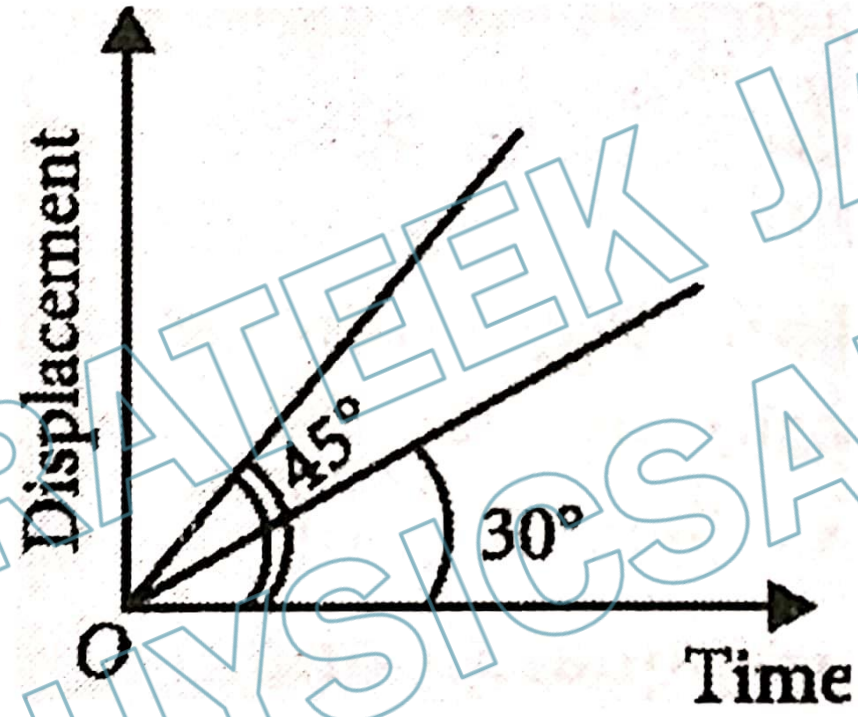
Ans. c

A particle starting from the origin $(0,0)$ moves in a straight line in the (x, y) plane. Its co-ordinates at a later time are $(\sqrt{3}, 3)$. The path of the particle makes with the x-axis an angle of *[CBSE AIPMT 2007]*

(a) 30° (c) 45° (c) 60° (d) 0°

Ans. c

The displacement-time graphs of two moving particles make angles of 30° and 45° with the time axis. The ratio of their velocities is



(a) $\sqrt{3}:2$

(b) 1 : 1

(c) 1 : 2

(d) $1:\sqrt{3}$

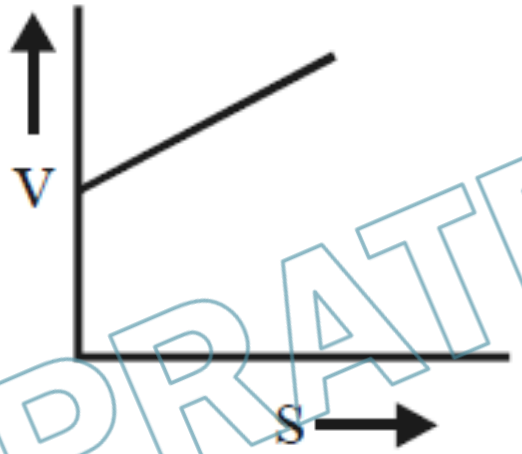
AIIMS

(2018)

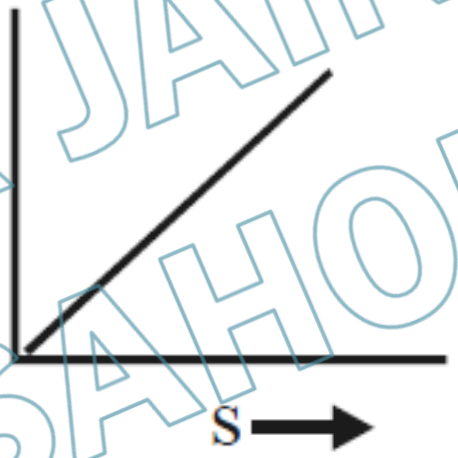
Ans. d

A body starting from rest moves along straight line with a constant acceleration. The variation of speed (v) with distance (s) is represented by the graph : *[2003]*

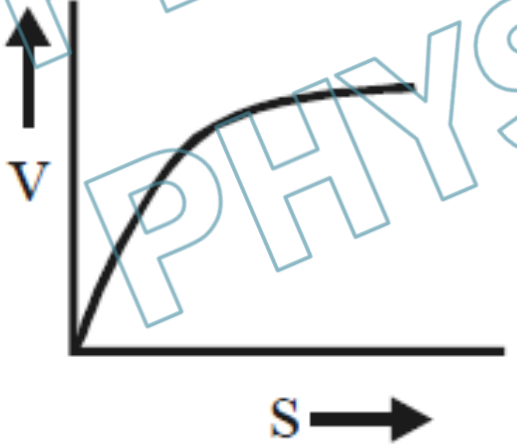
(a)



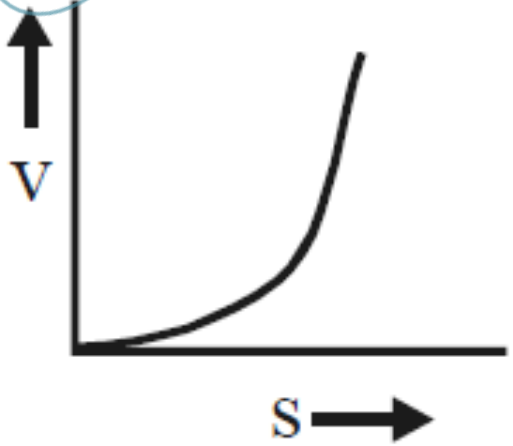
(b)



(c)



(d)

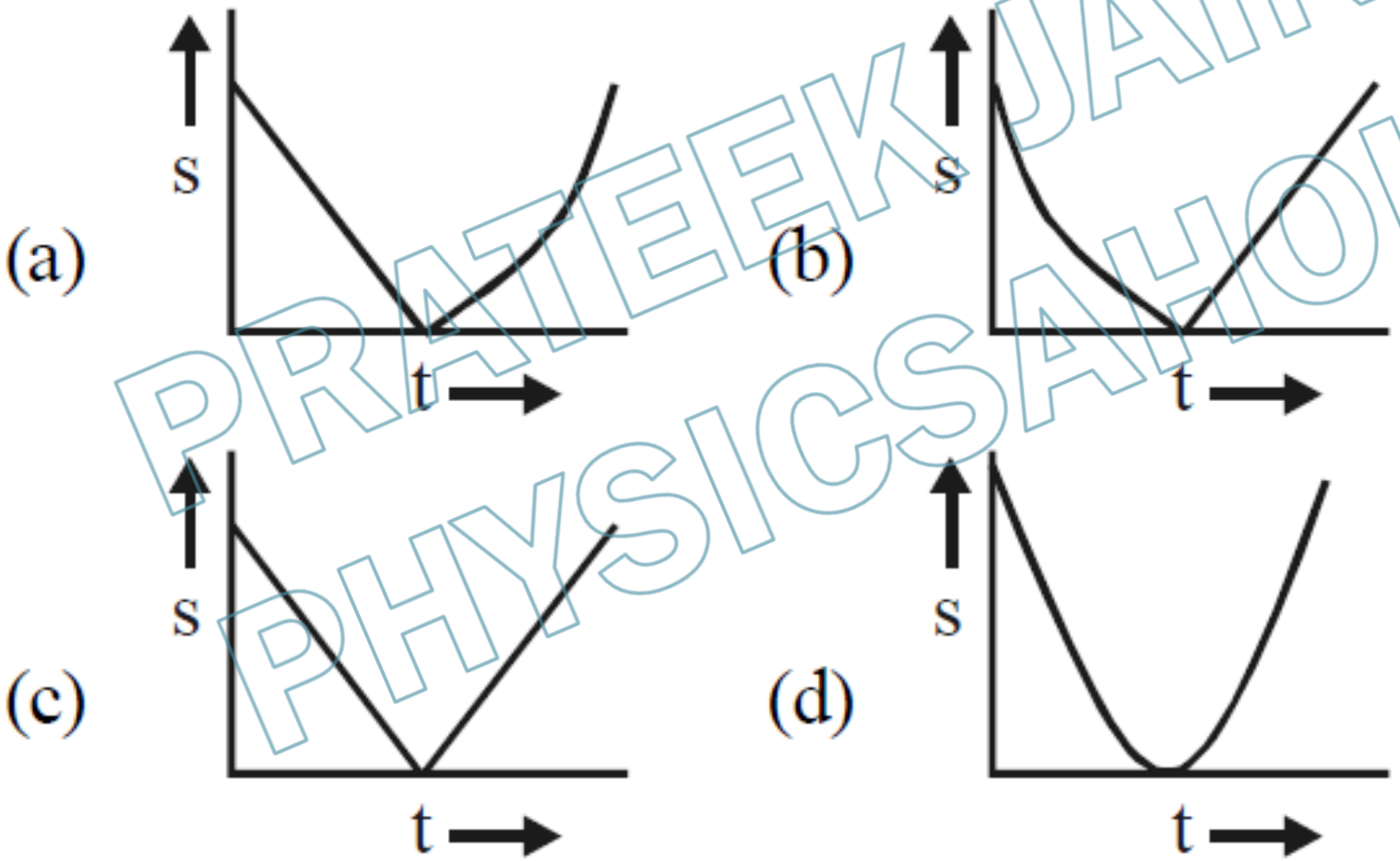


AIIMS

Ans. c

A ball is thrown vertically upwards. Which of the following plots represents the speed-time graph of the ball during its flight if the air resistance is not ignored? *[2003]*

(wrong)



AIIMS

Ans. d

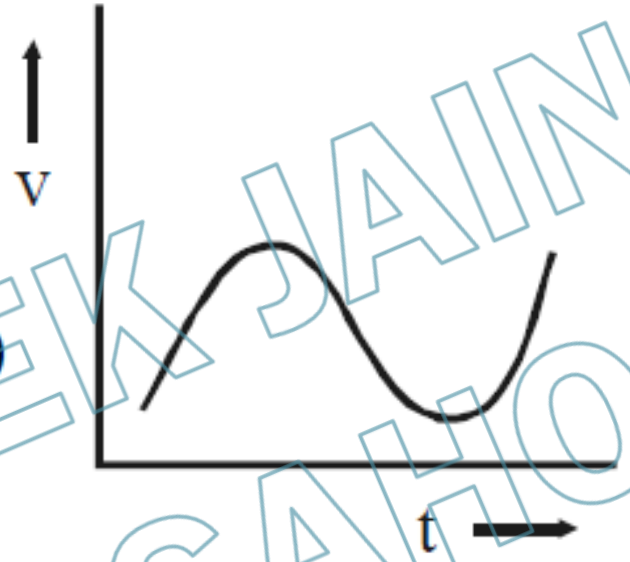
(If air resistance is considered
Constant ⇒ Ans (c)
otherwise ⇒ all are any.

Which of the following velocity-time graphs shows a realistic situation for a body in motion?

[2004, 2007]

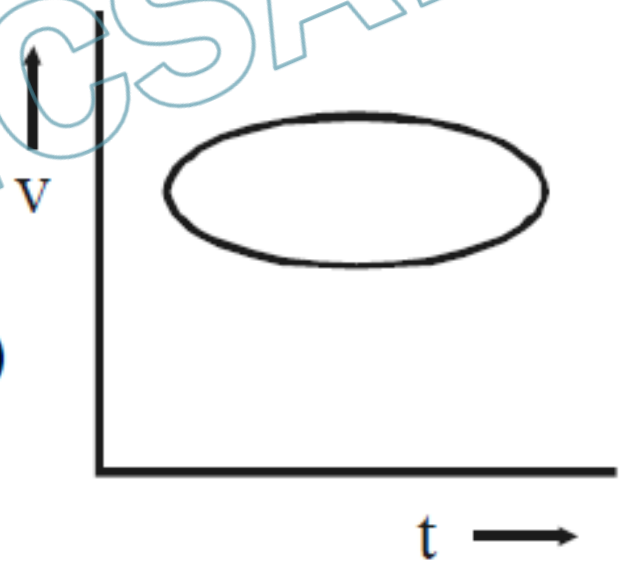
(a)

(b)



(c)

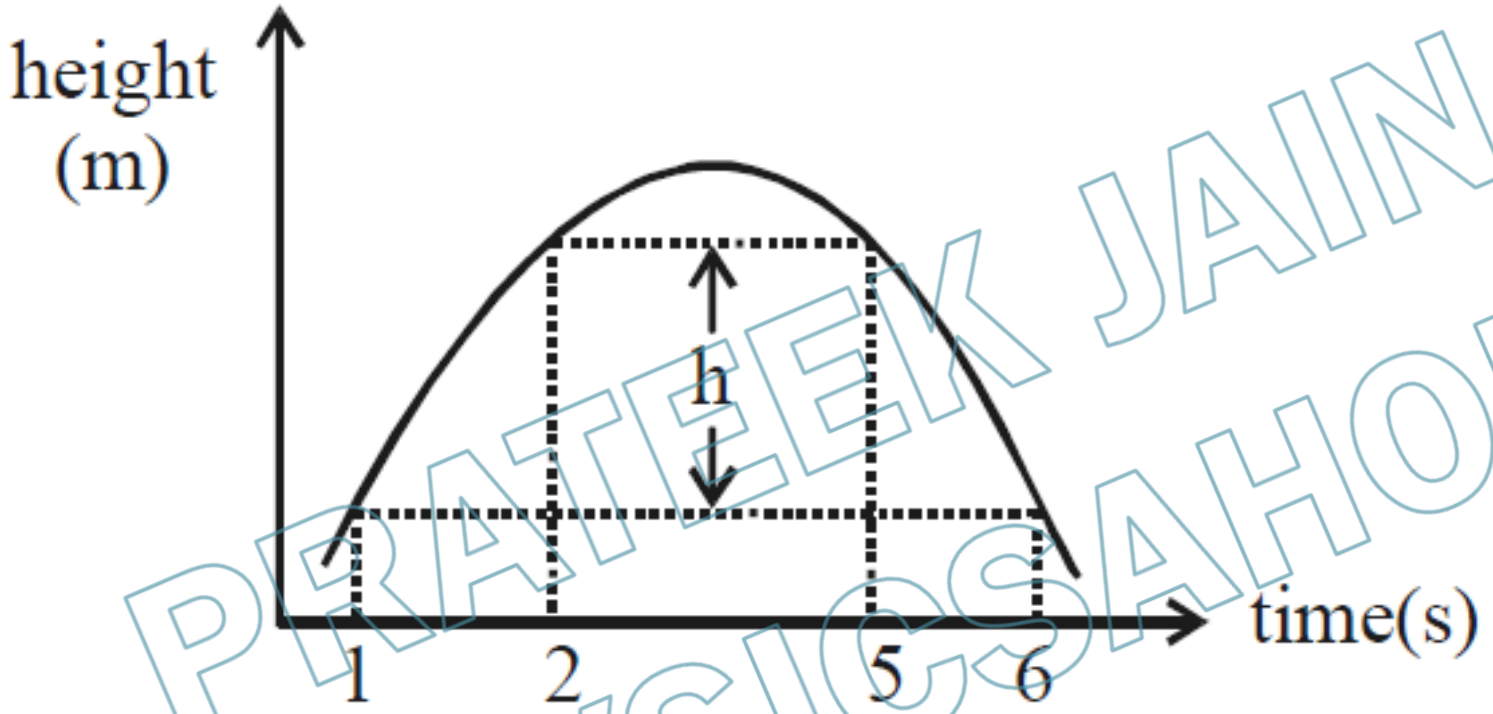
(d)



AIIMS

Ans. b

A ball is thrown upwards. Its height varies with time as follows :



AIIMS

If the acceleration due to gravity is 7.5 m/s^2, then the height h is : ***[2011]***

(a) 10m (b) 15m

(c) 20m (d) 25m

Ans. b

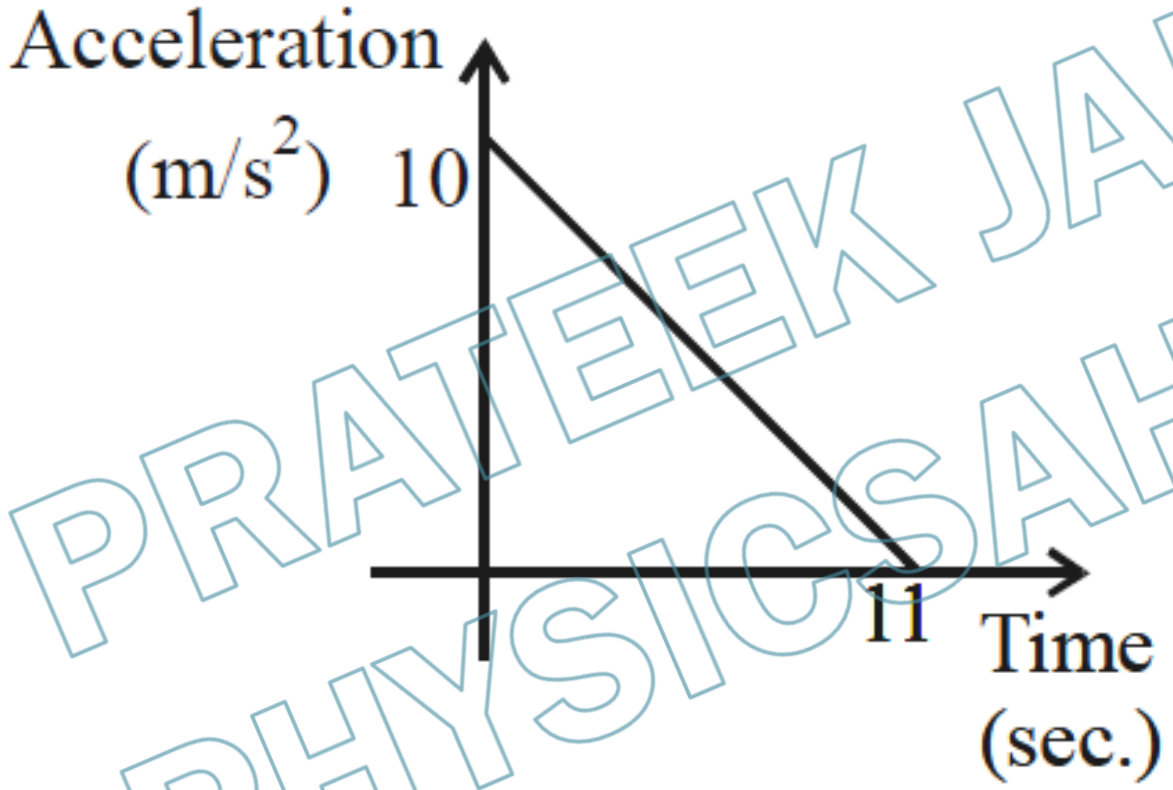
A body released from a great height falls freely towards the earth. Another body is released from the same height exactly a second later. Then the separation between two bodies, 2 s after the release of the second body is nearly

NEET 2019

(a) 15 m (b) 20 m (c) 25 m (d) 30 m

Ans. c

A body starts from rest at time t = 0, the acceleration time graph is shown in the figure. The maximum velocity attained by the body will be *[2014]*



(a) 110 m/s
(b) 55 m/s
(c) 650 m/s
(d) 550 m/s

Ans. b

Assertion : Velocity-time graph for an object in uniform motion along a straight path is a straight line parallel to the time axis.

Reason : In uniform motion of an object velocity increases as the square of time elapsed.

AIIMS *[2015]*

Ans. c

A car accelerates from rest at a constant rate α for some time, after which it decelerates at a constant rate β and comes to rest. If the total time elapsed is t, then the maximum velocity acquired by the car is

[CBSE AIPMT 1994]

(a) $\left(\frac{\alpha^2+\beta^2}{\alpha\beta}\right)t$

(b) $\left(\frac{\alpha^2-\beta^2}{\alpha\beta}\right)t$

(c) $\frac{(\alpha+\beta)t}{\alpha\beta}$

(d) $\left(\frac{\alpha\beta t}{\alpha+\beta}\right)$

Ans. d

12. A car, starting from rest, accelerates at the rate f through a distance S, then continues at constant speed for time t and then decelerates at the rate $\frac{f}{2}$ to come to rest. If the total distance traversed is 15 S, then **[2005]**

(a) $S = \frac{1}{6} ft^2$ (b) $S = ft$

(c) $S = \frac{1}{4} ft^2$ (d) $S = \frac{1}{72} ft^2$

Ans. d

A body starts from rest and travels a distance S with uniform acceleration, then moves uniformly a distance $2S$ and finally comes to rest after moving further $5S$ under uniform retardation. The ratio of the average velocity to maximum velocity is

AIIMS

(a) $\frac{2}{5}$ (b) $\frac{3}{5}$ (c) $\frac{4}{7}$ (d) $\frac{5}{7}$

(2018)

Ans. c

For Video Solution of this DPP, Click on below link

Video Solution on Website:- https://physicsaholics.com/home/courseDetails/61

Video Solution on YouTube:- https://youtu.be/diVXzvJsxAk

SUBSCRIBE

@Physicsaholics

@Physicsaholics_prateek

@NEET_Physics
@IITJEE_Physics

physicsaholics.com

Unacademy

CLICK

Links are also in the description of the video.

Chalo Niklo