PHYSICS

BOOKS - NAVNEET PUBLICATION

LAWS OF MOTION

Examples

1. In which of the following examples can you sense motion?

A. The flight of a bird

B. A stationary train

C. Leaves flying through air

D. A stone lying on a hill

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2. How will you explain presence and absence of motion?

A stone lying on a hill

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3. How will you explain presence and absence of motion?

A stone lying on a hill

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4. How will you explain presence and absence of motion?

Leaves flying through air

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5. How will you explain presence and absence of motion?

A stone lying on a hill

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6. You are travelling in a bus. Is the person sitting next to you in motion?

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7. What do you take into consideration to decide if an object is moving or not?

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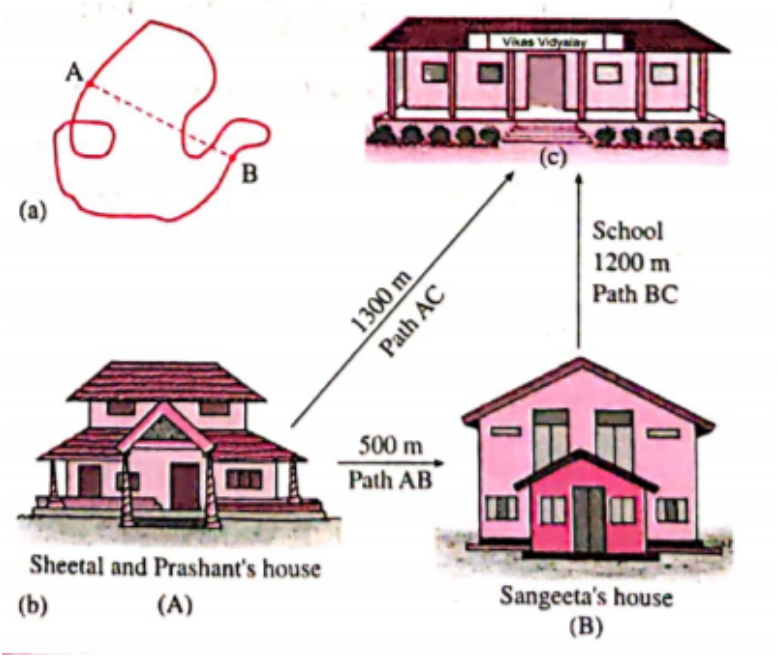
8. Measure the distance between points A and B in different ways as shown in figure



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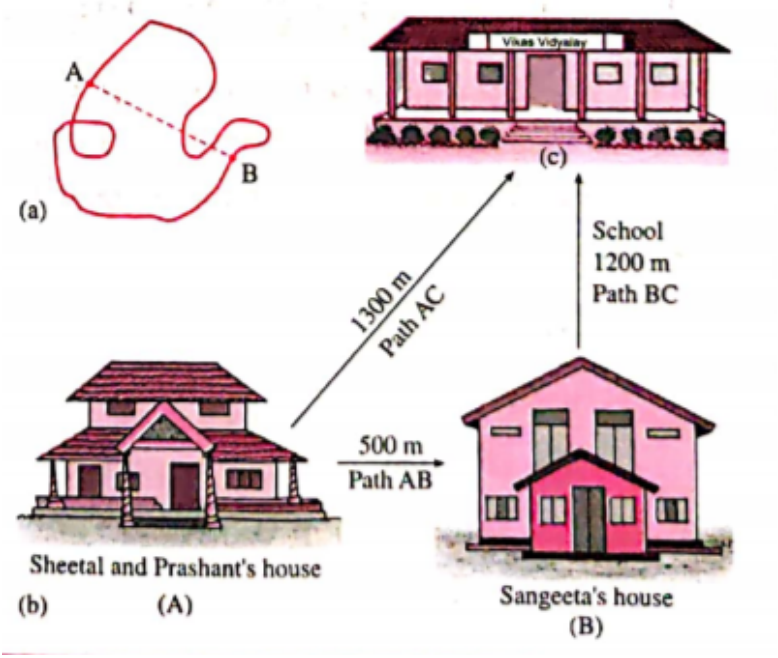
9. Measure the distance along the dotted line.

Which distance is correct according to you

and why?



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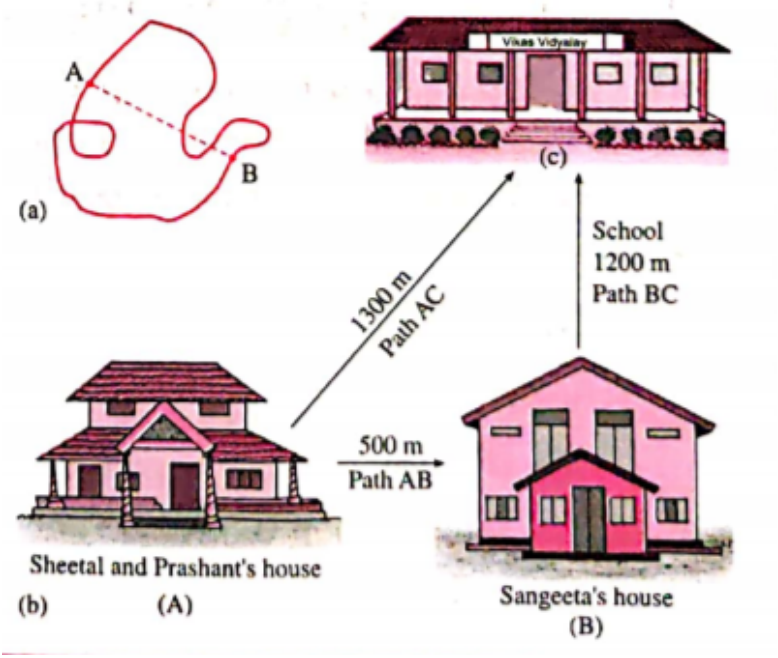
10. Sheetal first went ot her friend Sangeets's house on her way to school. Prashant went

straight from home to school. Both are walking with the same speed.

Who will take less time to reach the school and why?



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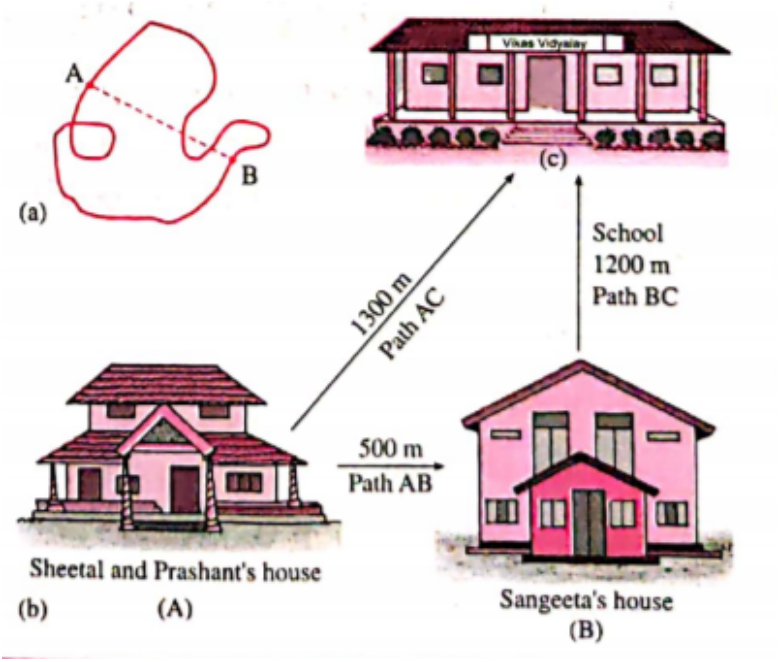
11. Sheetal first went ot her friend Sangeets's house on her way to school. Prashant went straight from home to school. Both are walking with the same speed. In the above examples, is there a difference between the actual distance and the distance travelled? What is it?



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12. What are vectors and scalers?

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13. Which of the quantities distance, speed , velocity, time and displacement are scalars and which are vectors?

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14. Take a plastic boat and make a hole at this rear end. Inflate a balloon and fix it on the hole in the boat. Release the boat in water. What happens to the boat as the air in the balloon escapes slowly? Why?

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Exercise

1. Complete the sentences and explain them:

The minimum distance between the start and

finish points of the motion of an object is called the ..... of the object.

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2. Complete the sentences and explain them:

Deceleration is ..... acceleration.

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3. Complete the sentences and explain them:

When an object is in uniform circular motion,

its _..... changes at every point

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4. Complete the sentences and explain them:

During collision ..... remains constant.

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5. Complete the sentences and explain them:

The working of a rocket depends on Newton's ..... law of motion.

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6. Complete the sentences and explain them:

The SI unit of deceleration is..... .

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7. Complete the sentences and explain them:

The CGS unit of momentum is .....

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8. Complete the sentences and explain them:

The SI unit of force is the .....

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9. Complete the sentences and explain them:

Force = Rate of change of .....

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10. Complete the sentences and explain them:

..... = $mass \times velocity$.

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11. Complete the sentences and explain them:

1 newton =..... dynes.

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12. Choose the correct alternative and write it along with its alloted alphabet:

Newton's ..... law of motion is called the law of inertia.

A. first

B. second

C. third

D. none of the above

Answer: A

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13. Choose the correct alternative and write it along with its alloted alphabet:

Momentum =..... (in the usual notation)

A. $\frac{1}{2}mv^2$

B. mgh

C. mass times velocity

D. mass times speed

Answer: C

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14. Choose the correct alternative and write it along with its alloted alphabet:

Force =..... (in the usual notation).

A. mv

B. $\frac{m}{a}$

C. $weight * a$

D. $mass * a$

Answer: D

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15. Choose the correct alternative and write it along with its alloted alphabet:

Action and reaction .....

A. are equal in magnitude and have the same direction

B. cancel each other

C. are equal in magnitude and opposite in direction

D. are unequal in magnitude and have different directions

Answer: C

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16. State whether the following statements are True or False.

Momentum is a scalar quantit

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17. State whether the following statements are True or False.

F or $ce = mass \times velocity$

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18. State whether the following statements are True or False.

Change in momentum occurs in the direction of force.

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19. State whether the following statements are True or False.

$1dyne = 1g \times \frac{1cm}{s^2}$

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20. State whether the following statements are True or False.

$1N = 1kg \times 1\frac{m}{s^2}$

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21. Find the odd one out and give reason:

Speed, distance, mass, velocity

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22. Find the odd one out and give reason:

Momentum, acceleration, force, time.

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23. Complete the following table:

(1)	u(m/s)	a(m/s^2)	t(second)	$v = u + at$ (m/s)
(i)	2	4	3	–
(ii)	–	5	2	20

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24. Complete the following table:

(2)	u(m/s)	a(m/s^2)	t(second)	$s = ut + \frac{1}{2}at^2$(m)
(i)	5	12	3	–
(ii)	7	–	4	92

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25. Complete the following table:

(3)	u(m/s)	a(m/s^2)	s(m)	$v^2 = u^2 + 2as$(m/s)^2
(i)	4	3	–	$(8)^2$
(ii)	–	5	8.4	$(10)^2$

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26. Match the first column with appropriate entries in the second and third columns and remake the table:

No.	Column I	Column II	Column III
(1)	Negative acceleration	The velocity of the object remains constant	A car, initially at rest reaches a velocity of 50 km/h in 10 seconds
(2)	Positive acceleration	The velocity of the object decreases	A vehicle is moving with a velocity of 25 m/s
(3)	Zero acceleration	The velocity of the object increases	A vehicle moving with the velocity of 10 m/s, stops after 5 seconds

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27. Match the following :

(1) Column A	Column B
(1) Velocity	(a) kg·m/s
(2) Acceleration	(b) N
	(c) m/s
	(d) m/s^2

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28. Match the following :

(2) Column A	Column B
(1) Force equation	(a) Newton's third law of motion
(2) Rate of change of momentum	(b) Newton's second law of motion
	(c) Newton's first law of motion
	(d) $F = ma$

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29. Answer the following questions:

When is a body said to be in motion ?

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30. Answer the following questions:

When is a body said to be at rest ?

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31. Answer the following questions:

Give one example in which motion is visible.

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32. Answer the following questions:

Give one example in which we are unable to perceive motion.

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33. Answer the following questions:

What is meant by (i) distance (ii) displacement in relation to the motion of a body between two given points?

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34. Distinguish between:

Distance and Displacement:

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35. Answer the following questions:

Give one example of a physical quantity which does not have direction.

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36. Answer the following questions:

What is speed?

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37. Answer the following questions:

Define speed . State its SI and CGSunits.

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38. Answer the following questions:

What is average speed?

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39. Answer the following questions:

What is velocity ?

Watch Video Solution

40. Answer the following questions:

Define velotcity . State its SI and CGS units.

Watch Video Solution

41. Answer the following questions:

When is the magnitude of velocity equal to the speed?

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42. Answer the following questions:

When is the speed of a body greater than the magnitude of the velocity of the body?

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43. Answer the following questions:

What are the different ways in which the velocity of a body can be changed? Give one examples in each case.

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44. Answer the following questions:

Give one examples of a physical quantity which has magnitude and direction.

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45. Answer the following questions:

What is velocity ?

Watch Video Solution

46. Answer the following questions:

What is meant by uniform motion? Give one example.

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47. Answer the following questions:

What is meant by non uniform motion? Given one example.

Watch Video Solution

48. Answer the following questions:

What is accelerated motion?

Watch Video Solution

49. Answer the following questions:

Define acceleration.

Watch Video Solution

50. Answer the following questions:

What is accelerated motion?

Watch Video Solution

51. Answer the following questions:

When is a body said to have uniform acceleration? Give one examples.

Watch Video Solution

52. Answer the following questions:

State the formula for acceleration. Hence, obtain the SI and CGS units of acceleration.

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53. Answer the following questions:

When is a body said to have nonuniform acceleration? Give one example.

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54. Answer the following questions:

When is the acceleration (i) positive (2) negative (iii) zero ? Give one example in each case.

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55. Answer the following questions:

What is retardation or deacceleration?

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56. Answer the following questions:

What is negative acceleration called ?

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57. Answer the following questions:

What is a distance-time graph? What are its uses?

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58. Answer the following questions:

The following table shown the distance covered by a car in fixed time intervals. Draw a graph of distance against time taking 'time'

along the X-axis and 'distance' along the Y-axis.

Time (seconds)	Distance (metres)
0	0
10	15
20	30
30	45
40	60
50	75
60	90
70	105

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59. Answer the following questions:

The following table shows the distances covered by a bus in equal time intervals. Draw

a graph of distance against time taking the time along the X-axis and distance along Y-axis. Does the graph show a direct proportionality between distance and time?

Time (seconds)	Distance (metres)
0	0
5	7
10	12
15	20
20	30
25	41
30	50
35	58

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60. Answer the following questions:

A train is moving with a uniform velocity of 60km/hour for 5 hours. The velocity-time graph for this uniform motion show in figure.

i. With the help of the graph, how will you determine the distance covered by the train

between 2 and 4 hours

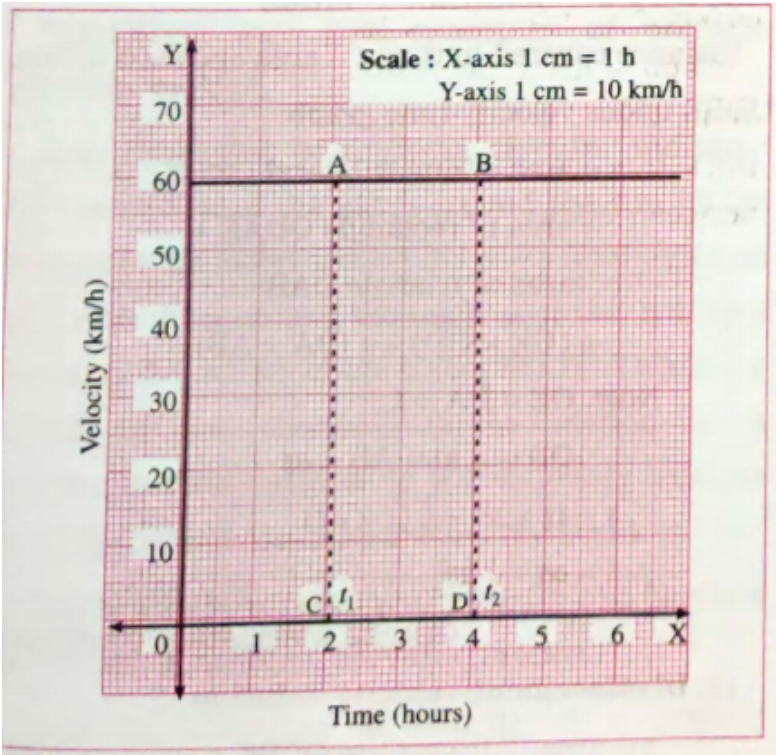

Fig. 1.4 : Velocity-time graph for uniform velocity

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61. Answer the following questions:

A train is moving with a uniform velocity of 60km/hout for 5 hours. The velocity-time graph for this uniform motion show in figure.

Is there a relation between the distance covered by the train between 2 and 4 hours and the area of a particular quadrangle in the

graph? What is the acceleration of the train?

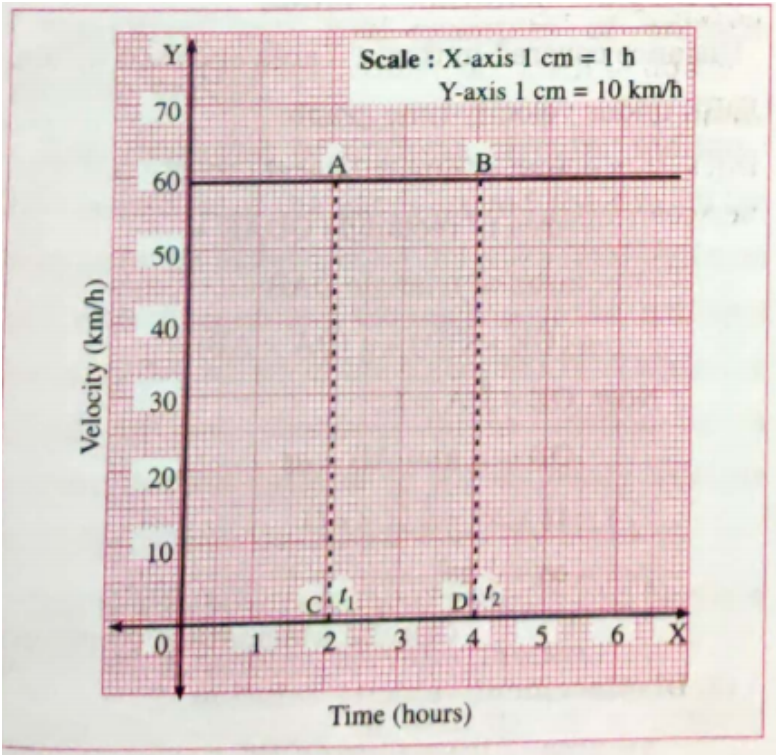

Fig. 1.4 : Velocity-time graph for uniform velocity

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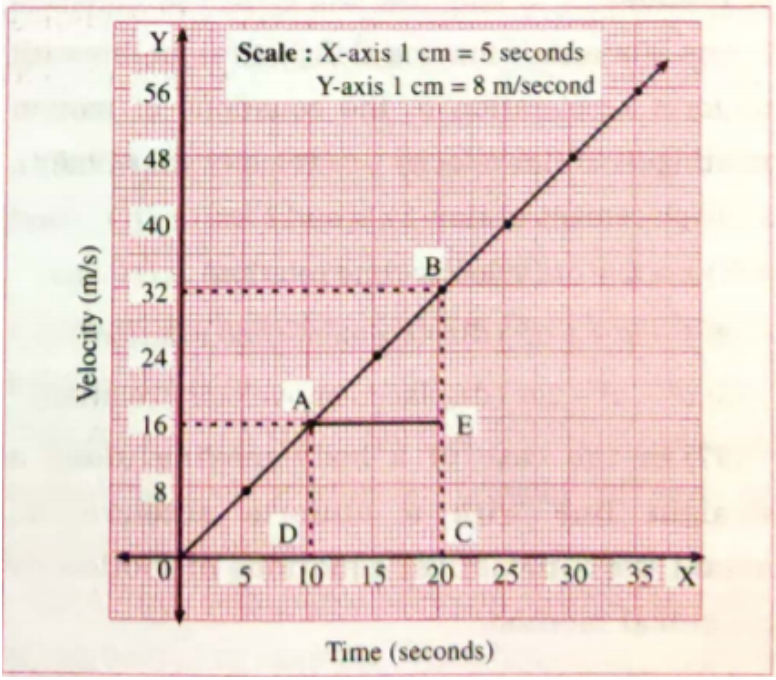
62. Answer the following questions:

The changes in the velocity of a car in specific time intervals are given in the following table.The velocty-time graph in figure shows that,

The velocity changes by equal amounts in equal time intervals. Thus, this is uniformly accelerated motion. How much does the velocity change in every 5 seconds?

Find the distance covered by the car in the time interval 10 seconds to 20 seconds.

Time (seconds)	Velocity (m/s)
0	0
5	8
10	16
15	24
20	32
25	40
30	48
35	56



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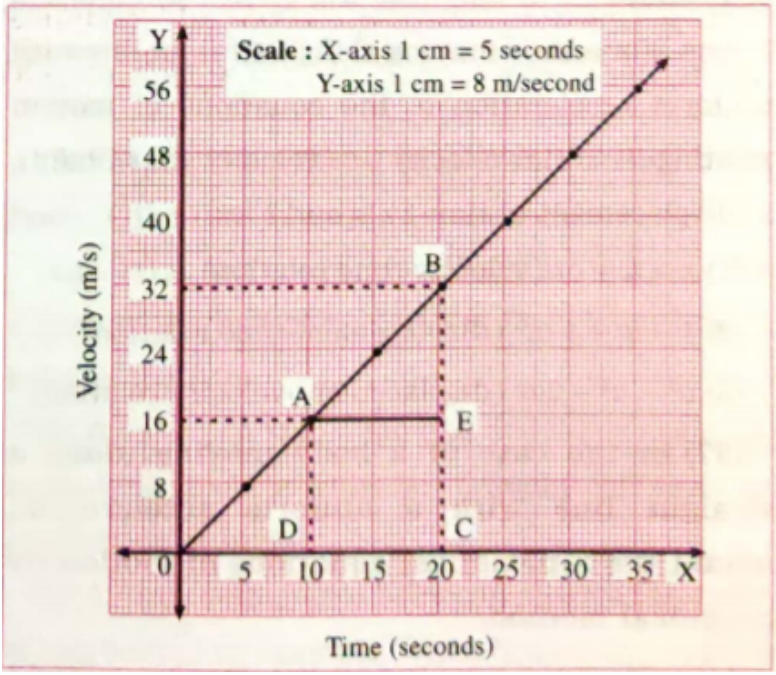
63. Answer the following questions:

The changes in the velocity of a car in specific time intervals are given in the following table. Explain For all uniformly accelerated motions, the velocity-time graph is a straight line.

Time (seconds)	Velocity (m/s)
0	0
5	8
10	16
15	24
20	32
25	40
30	48
35	56



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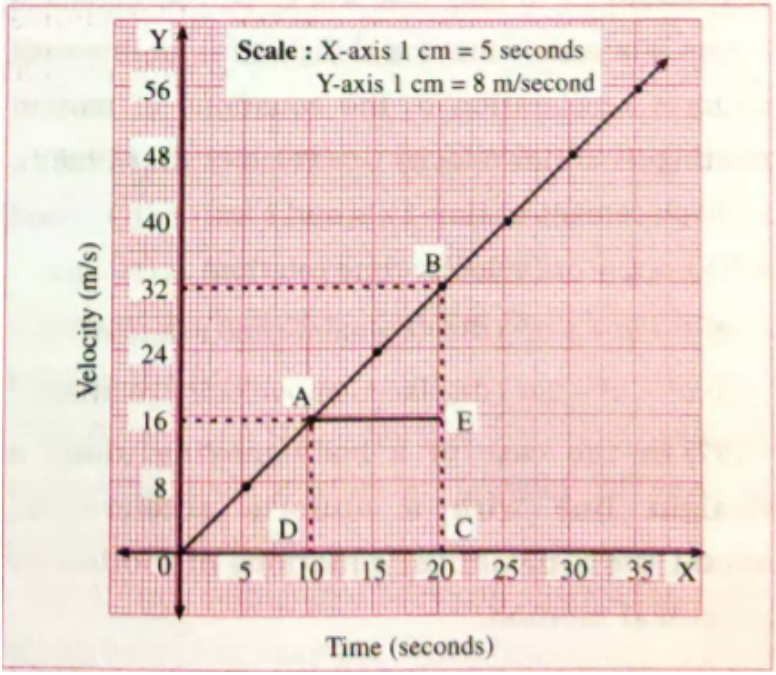
64. Answer the following questions:

The changes in the velocity of a car in specific time intervals are given in the following table.

The velocty-time graph in figure shows that,

For nonuniformly accelerated motions, the velocity-time graph may have any shape depending on how the acceleration changes with time.Explain.

Time (seconds)	Velocity (m/s)
0	0
5	8
10	16
15	24
20	32
25	40
30	48
35	56



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65. Answer the following questions:

For a body moving along a straight line with a uniform acceleration, write the equations of motion.

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66. Answer the following questions:

In the case of a body moving along a straight line with a uniform acceleration, obtain the

kinematical equations of motion by graphical method.

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67. Answer the following questions:

What is uniform circular motion?

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68. Answer the following questions:

Define unifrom circular motion.

State the formula for the magnitude of velocity (speed) of a particle performing unifrom circular motion.

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69. Answer the following questions:

State any five examples of uniform circular motion.

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70. What is the direction of velocity of a particle performing uniform circular motion?

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71. Answer the following questions:

State Newton's first law of motion. Why is it called the law of inertia?

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72. What are the effects of a force acting on an object?

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73. Answer the following questions:

Give any two examples of force in each case:

Lifts

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74. Answer the following questions:

Give any two examples of force in each case:

Pushes

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75. Answer the following questions:

Give any two examples of force in each case:

Pulls

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76. Answer the following questions:

Give any two examples of force in each case:

attracts

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77. Answer the following questions:

Give any two examples of force in each case:

Changes the shape of the object.

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78. Answer the following questions:

Give one example in which force is not visible.

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79. Answer the following questions:

Give one example of visible effect of force.

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80. Answer the following questions:

Define force.

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81. Answer the following questions:

Explain the statement: Force is an interaction between two objects.

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82. Answer the following questions:

Force has magnitufe as well as direction.

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83. Answer the following questions:

Force is a vector quantity. Explain.

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84. Answer the following questions:

What happens when a force is applied at right angles to the direction of motion if a body.

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85. Answer the following questions:

Explain the term balanced forces.

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86. Answer the following questions:

Explain the term unbalanced force.

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87. Answer the following questions:

What will happen if the force is removed

completely when an object acquires a certain speed?

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88. Answer the following questions:

What is inertia?

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89. Answer the following questions:

Which of the following has more inertia? A

ten-rupee coin and a one-rupee coin.

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90. Answer the following questions:

What are the three types of interia?

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91. Answer the following questions:

What is inertia of rest ?

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92. Answer the following questions:

Define inertia of rest. Give two examples of inertia of rest.

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93. Answer the following questions:

What is inertia of motion?

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94. Answer the following questions:

Define inertia of motion. Give two examples of inertia of motion.

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95. Answer the following questions:

What is inertia of direction?

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96. Answer the following questions:

Define inertia of direction. Give two examples of inertia of direction.

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97. Answer the following questions:

why do we fall sideways when we are sitting in a bus and it takes a sharp turn?

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98. Answer the following questions:

What happens when you shake a wet piece of cloth? Explain your observation.

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99. Answer the following questions:

If brakes are suddenly applied to a moving car, the passengers in the car are pushed in the forward direction. Explain why.

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100. Answer the following questions:

We experience a backward push when the bus starts at once. Explain why.

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101. Answer the following questions:

A person alighting from a moving train is likely to fall in the direction of motion of the train. Explain why.

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102. Answer the following questions:

Define momentum. State its SI and CGS units.

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103. Answer the following questions:

When a bullet is fried from a gun, it pierces through a wooden plank, but the same bullet when thrown with hand hardly scratches it. Explain why.

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104. Answer the following questions:

Children play cricket with a tennis ball easily but are afraid of playinf with a cork ball. Why?

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105. Answer the following questions:

Stat Newton's second law of motion.

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106. Answer the following questions:

Show that Newton's first law of motion can be obtained from Newton's second law of motion.

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107. Answer the following questions:

Obtain the force equation.

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108. Answer the following questions:

Show that Newton's first law of motion can be obtained from Newton's second law of motion.

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109. Answer the following questions:

Deduce Newton's first law of motion from the force equation.

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110. Answer the following questions:

What is meant by a unit force?

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111. Answer the following questions:

State the SI and CGS units of force. Define them.

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112. Answer the following questions:

Obtain the relation between the newton and the dyne.

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113. Answer the following questions:

what do you understand by interaction forces?

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114. Answer the following questions:

What do you understand by the forces of action and reaction.

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115. Answer the following questions:

Explain : Force always occur in pairs or an isolated single force does not exist in the universe.

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116. Answer the following questions:

State Newton's third law of motion.

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117. Answer the following questions:

Give four examples of Newton's third law of motion.

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118. Answer the following questions:

When a scooter and a truck collide, the scooter is thrown away. Explain why.

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119. Answer the following questions:

Explain the principle on which the launching of a rocket is based.

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120. State and prove the law of conservation of linear momentum.

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121. State and prove the law of conservation of linear momentum.

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122. Answer the following questions:

Give two examples illustrating the law of conservation of momentum.

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123. Answer the following questions:

When a bullet is fired from a gun, the gun recoils. Explain why.

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124. Answer the following questions:

Why is the stock of a gun made heavy?

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125. Answer the following questions:

Take 5 examples from your surroundings and give explanation based on Newton's law of motion.

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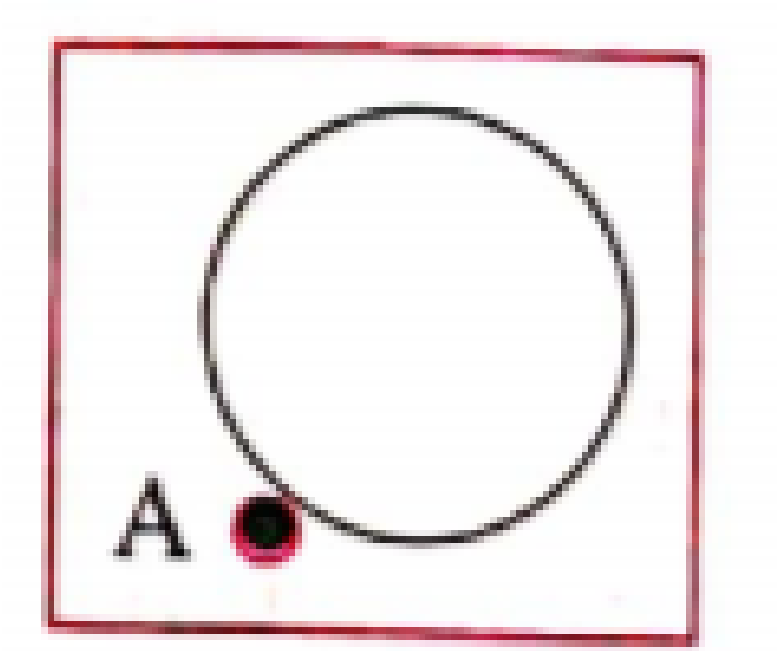
126. Use your brain power:



Every morning, Swaralee walks round the edge of a circular field having a radius of 100 m. As shown in Figure, if she starts from the point A and takes one round, how much distance has she walked and what is her displacement?

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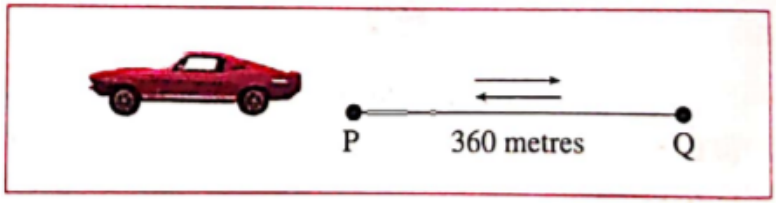
127. Use your brain power:



If a car, starting from point P, goes to point Q and then returns to point P (see Figure), how much distance has it travelled and what is its displacement?

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128. Use your brain power:

Effect of speed and direction on velocity.

Sachin is travelling on a motorbike. Explain what will happen in the following events during sachin's ride see figure.

What will be effect on the velocity of the motorcycle if its speed increase or decreases.

but its direction remains unchanged?

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129. Use your brain power:

Effect of speed and direction on velocity.

Sachin is travelling on a motorbike. Explain what will happen in the following events during sachin's ride see figure.

In case of a turning on the road, will the motorcycle, keeping its speed constant, what will be the effect on the velocity?

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130. Use your brain power:

Amar, Akbar and Anthony are travelling in different cars with different velocities. The distance covered by them during different time intervals are given in the following table. What is the time interval between the noting's of distances made by Amar, Akbar and

Anthony?

Time in the clock	Distance covered by Amar in km	Distance covered by Akbar in km	Distance covered by Anthony in km
5:00	0	0	0
5:30	20	18	14
6:00	40	36	28
6:30	60	42	42
7:00	80	70	56
7:30	100	95	70
8:00	120	120	84

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131. Use your brain power:

Amar, Akbar and Anthony are travelling in different cars with different velocities. The

distance covered by them during different time intervals are given in the following table. Who has covered equal distance in equal time intervals?

Time in the clock	Distance covered by Amar in km	Distance covered by Akbar in km	Distance covered by Anthony in km
5:00	0	0	0
5:30	20	18	14
6:00	40	36	28
6:30	60	42	42
7:00	80	70	56
7:30	100	95	70
8:00	120	120	84

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132. Use your brain power:

Amar, Akbar and Anthony are travelling in different cars with different velocities. The distance covered by them during different time intervals are given in the following table. Are all the distances covered by Akbar in the

fixed time intervals the same?

Time in the clock	Distance covered by Amar in km	Distance covered by Akbar in km	Distance covered by Anthony in km
5:00	0	0	0
5:30	20	18	14
6:00	40	36	28
6:30	60	42	42
7:00	80	70	56
7:30	100	95	70
8:00	120	120	84

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133. Use your brain power:

Amar, Akbar and Anthony are travelling in different cars with different velocities. The

distance covered by them during different time intervals are given in the following table. Considering the distances covered by Amar, Akbar, Anthony in fixed time intervals, what can you say about their speeds?

Time in the clock	Distance covered by Amar in km	Distance covered by Akbar in km	Distance covered by Anthony in km
5:00	0	0	0
5:30	20	18	14
6:00	40	36	28
6:30	60	42	42
7:00	80	70	56
7:30	100	95	70
8:00	120	120	84

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134. Use your brain power:

When an object is at rest in the beginning of its motion, what is its initial velocity?

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135. Use your brain power:

When an object come to rest at the end of its motion, what is its final velocity?

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136. Use your brain power:

Why is there a thick bed of sand for a high jumper to fall on after his jump?

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137. Use your brain power:

While hitting a ball with a bat, the speed of the bat decreases.

How will you explain these with the help of Newton's third law of motion?

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138. Answer the following questions:

When a bullet is fired from a gun, the gun recoils. Explain why.

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139. Use your brain power:

Mechanism of firing of a rocket.

How will you explain these with the help of Newton's third law of motion?

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140. Give scientific reasons:

The velocity of an object at rest is considered to be uniform.

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141. Give scientific reasons:

When an object falls freely to the ground, its acceleration is uniform.

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142. Give scientific reasons:

Even though the magnitudes of action force and reaction force are equal and their directions are opposite, their effects do not get cancelled.

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143. Give scientific reasons:

It is easier to stop a tennis ball as compared

to a cricket ball, when both are travelling with, the same velocity.

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144. Distinguish between:

Distance and Displacement:

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145. Differentiate between

Uniform rectilinear motion and Non-Uniform

rectilinear motion

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146. Complete the following paragraph:

(Words given: chemical reactions, upward, downward, burns, compressed, fuel)

Launching of a rocket is based on Newton's laws of motion. When the ..... in the rocket is ignited, it ..... as a result of ..... and the ..... hot gases are thrown out with a tremendous force in the ..... direction, through a small

opening in the tail of the rocket. At the same time, the escaping gases exert an equal (in magnitude) and opposite (in direction force of reaction on the rocket in the..... direction. As this force is greater than the net downward force (in magnitude) due to gravity and air resistance, the velocity of the rocket increases as it moves upward.

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147. Solve the following examples: (numerical problems)

A person travels a distance of 72 km in 4 hours. Calculate the average speed in $\frac{m}{s}$.

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148. Solve the following examples: (numerical problems)

An object moves 18 m in the first 3 seconds, 22

m in the next 3 seconds and 14 m in the last 3 seconds. What is its average speed?

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149. Solve the following examples: (numerical problems)

A person swims 100 m in the first 40 s, 80 m in the next 40 s and 45 m in the last 20 s. What is the average speed?

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150. Solve the following examples: (numerical problems)

A body moves along a straight line at a velocity of 10 $\frac{m}{s}$ for 10 s and then at a velocity of 15 $\frac{m}{s}$ for 15 s. Find the average velocity of the body.

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151. Solve the following examples: (numerical problems)

A boy runs on a circular track of length 600 m

in 2 minutes and returns to the starting point. Calculate his average speed and average velocity.

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152. Solve the following examples: (numerical problems)

A body moves in a straight line with a uniform acceleration. If the initial velocity of the body is 5 m/s and the velocity after 10 s is 15 m/s, find the acceleration of the body and

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153. Solve the following examples: (numerical problems)

A body moves in a Straight line with a uniform acceleration of 2 $\frac{m}{s^2}$. If the initial velocity of the body is 10 $\frac{m}{s}$, find the velocity of the body after covering 75 m and the time taken by the body to attain this velocity.

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154. Solve the following examples: (numerical problems)

A body of mass 10 kg moves with a velocity of 5 m/s. Find its momentum.

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155. Solve the following examples: (numerical problems)

An object of mass 16 kg moving with an acceleration of 3 m/s^2 ?, Calculate the

applied force. If the same force is applied on an object, of mass 24 kg, how much will be the acceleration ?

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156. Solve the following examples: (numerical problems)

A car of mass 1800 kg moving with a speed of 10 $\frac{m}{s}$ is brought to rest after covering a distance of 50 m. Calculate the force applied to the car.

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157. Solve the following examples: (numerical problems)

A body of mass 5 kg moves in a straight line with an acceleration of 2 m/s^2?. Find the change in the momentum of the body in 2 seconds.

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158. Solve the following examples: (numerical problems)

A bullet having a mass of 10 g and moving with a speed of 1.5 $\frac{m}{s}$ penetrates a thick wooden plank of mass 90 g. The plank was initially at rest. The bullet gets embedded in the plank and both move together. Determine their velocity.

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159. Solve the following examples: (numerical problems)

A shell of mass 10 kg is fired from a gun of mass 600 kg. The gun recoils with a velocity of 6 $\frac{m}{s}$. Find the muzzle velocity of the shell.

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160. Solve the following examples: (numerical problems)

A body of mass 1 kg, moving with a velocity of

4 $\frac{m}{s}$ collides with a body of mass 0.5 kg moving with a velocity of 2 $\frac{m}{s}$. If the velocity of the first body after collision is $\frac{8}{3}\frac{m}{s}$, find the velocity of the second body after collision.

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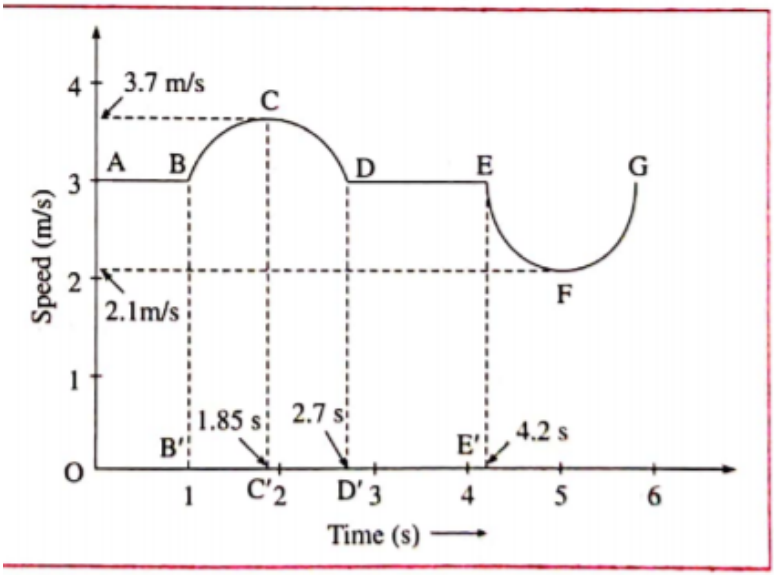
161. Solve the following examples: (numerical problems)

A particle of mass 10^(-10)` kg moves in a straight line. Figure shows how its speed changes with time. Answer the following

questions based on it.



Find the average acceleration of the particle in the time OC'.

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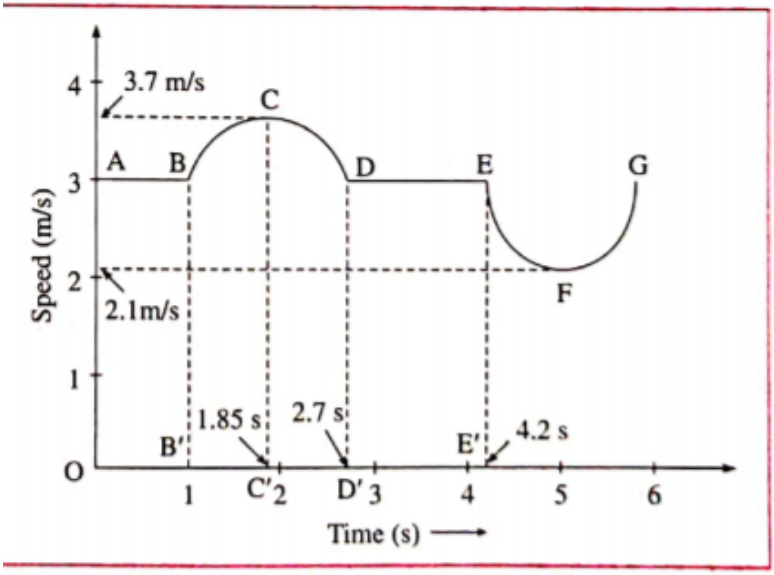
162. Solve the following examples: (numerical problems)

A particle of mass 10^(-10)` kg moves in a straight line. Figure shows how its speed changes with time. Answer the following questions based on it.



Find the average acceleration of the particle in the interval C'D'.

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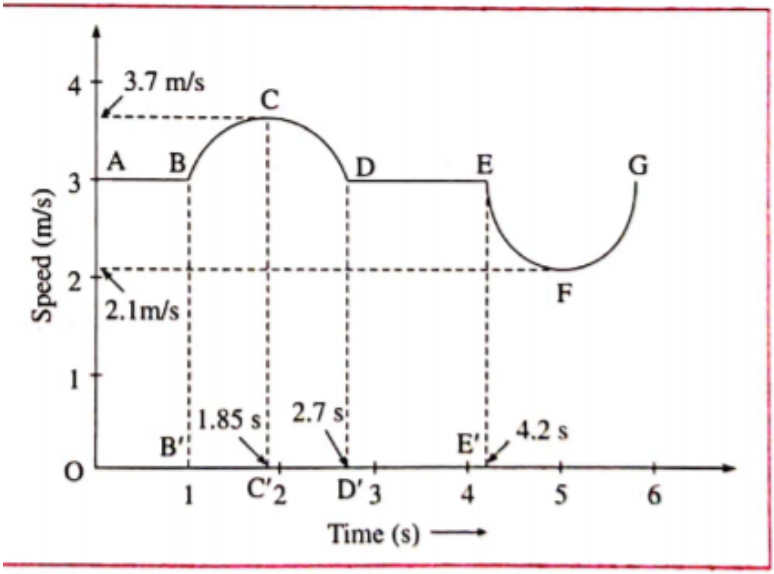
163. Solve the following examples: (numerical problems)

A particle of mass 10^(-10)` kg moves in a straight line. Figure shows how its speed changes with time. Answer the following questions based on it.



Find the momentum of the particle at t=1.85s.

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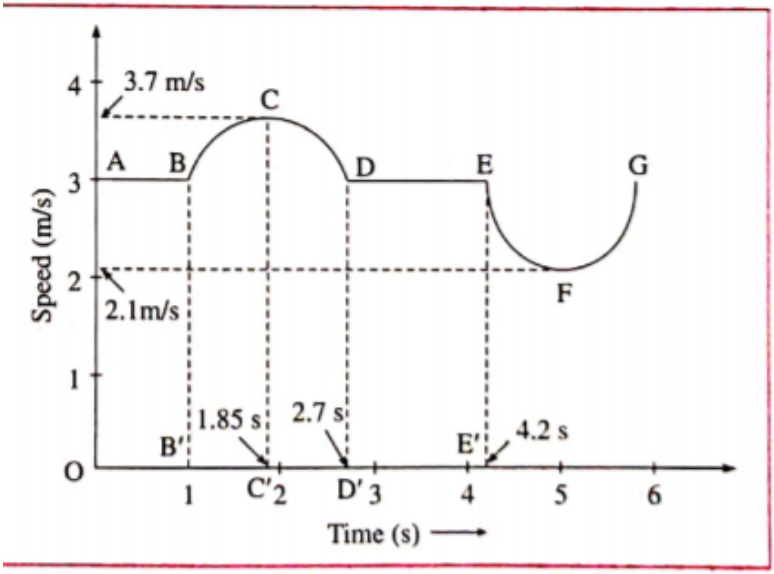
164. Solve the following examples: (numerical problems)

A particle of mass 10^(-10)` kg moves in a

straight line. Figure shows how its speed changes with time. Answer the following questions based on it.



At what point in the graph is the speed of the particle minimun?

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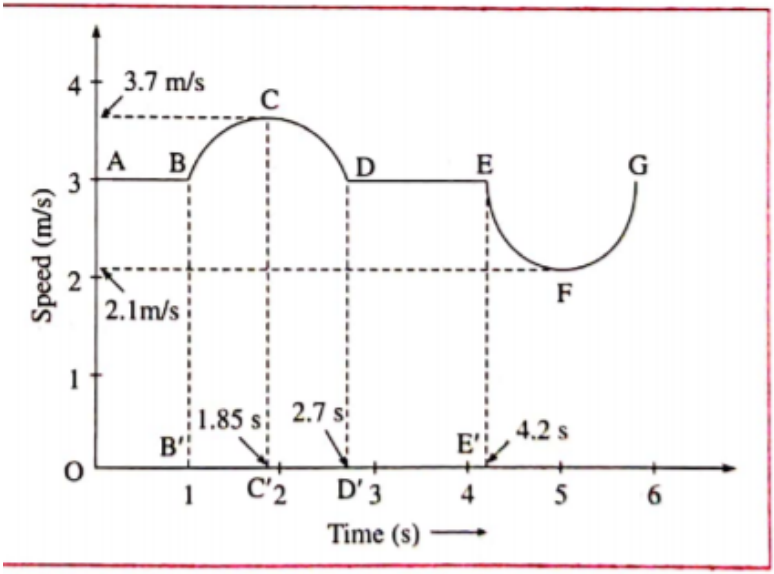
165. Solve the following examples: (numerical problems)

A particle of mass 10^(-10)` kg moves in a straight line. Figure shows how its speed changes with time. Answer the following questions based on it.



Find the average force acting on the particle in the time interval B'C'.

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166. A body covers 10 m in the first 5 s and 20 m in the next 5 s. Find its average speed.

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167. A body moves with a velocity of 10 $\frac{m}{s}$ for 10 s and then with a velocity of 20 $\frac{m}{s}$ in the

same direction for 40 s. Find its average velocity.

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168. A body moves from A to B at a speed of 10 m/s and back to A along the same path at a speed of 20 m/s. Find its average speed and average velocity for the journey.

[Hint : If s is the distance covered by the body between A and B, average speed = $\frac{2s}{t_1 + t_2} = \frac{2s}{\left(\frac{s}{v_1}\right) + \left(\frac{s}{v_2}\right)} = \frac{2v_1 v_2}{v_1 + v_2}$

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169. A body moves with a uniform speed along the circumference of a circle of radius 7 m, If it completes one revolution in 11 s, find its speed.

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170. The speed of a car is $60 \frac{km}{hour}$. Find the distance covered by the car in 10 minutes,

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171. A car takes 20 minutes to cover a distance of 94 km. Find its speed in $\frac{m}{s}$.

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172. The velocity of a car increases from 15 $\frac{km}{h}$ to 33 $\frac{km}{h}$ in 20 s. Find its acceleration.

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173. The velocity of a car decreases from 43 $\frac{km}{h}$ to 25 $\frac{km}{h}$ in 10 s. Find its retardation.

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174. A body moves with a uniform acceleration and its initial velocity is 5 $\frac{m}{s}$. After 10 seconds, its velocity becomes 25 $\frac{m}{s}$. Find the acceleration of the body.

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175. A body moves with a uniform acceleration of $0.5m/s^2$. If its initial velocity is 20 m/s, find its velocity after 6 seconds.

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176. A body moves with a uniform acceleration of 2 m/s^2. If its initial velocity is 10 m/s, after how many seconds, will its velocity become 40 m/s ?

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177. A body moves with a uniform acceleration of $3m/s^2$ After 10 seconds, its velocity becomes 50 m/s. Find the initial velocity of the body.

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178. A body starts from rest and moves with a uniform acceleration of $4m/s^2$?. Calculate the displacement of the body in 10 seconds.

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179. A body starts from rest and moves with an acceleration of $2m/s^2$. Find the distance covered by the body in the 10th second of its motion.

[[Hint : Distance covered in the 10th second = distance covered in 10 s — distance covered in 9 s]

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180. The initial velocity of a body is 10 m/s. If it is moving with a uniform acceleration of $3m/s^2$ in the direction of motion, calculate the distance covered by the body in 20 seconds.

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181. Brakes are applied to a train moving with a velocity of 20 m/s. If the train comes to a halt after 10 seconds, calculate the acceleration of

the train. Find the distance covered by the train after the brakes are applied.

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182. A car starts from rest and moves with a uniform acceleration of 1 m/s^2? for 10 seconds. It then moves with a uniform velocity for 30 seconds. The brakes are then applied and the car is brought to rest in 10 seconds. Find the total distance covered by the car.

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183. A body starting with an initial velocity of 5 m/s, moves with a uniform acceleration of $2m/s^2$. After some time it attains a velocity of 13 m/s. Find the distance covered by the body during this period.

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184. A body starting with an initial velocity of 4 m/s, moves with a uniform acceleration of $0.5m/s^2$. After some time its velocity becomes

6 m/s. Calculate the time taken by the body to attain this velocity and the distance covered by it during this time interval.

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185. In a certain time interval, the velocity of a car reduces from 72 km/h to 36 km/h. If the car covers a distance of 150 m during this time interval, find the retardation of the car.

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186. A car starts from rest and moves with a uniform acceleration of $2m/s^2$. What will be its velocity after it covers a distance of 49 m? How much time will it take to cover the distance of 49 m?

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187. Solve the following examples: (numerical problems)

A body of mass 10 kg moves with a velocity of 5 m/s. Find its momentum.

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188. If the momentum of a body of mass 10 kg is 20 kg m/s, find its velocity.

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189. A force of 20 N acts on a body at rest. What will be its momentum after 10 seconds?

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190. A body of mass 5 kg moves with an acceleration of $4\frac{m}{s^2}$ in a straight line. What will be the change in its momentum in 2 seconds?

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191. Calculate the force required to produce an | acceleration of $0.2\frac{m}{s^2}$ in a body of mass 10 kg.

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192. A certain force acts on a body at rest. If after 10 seconds the body moves with a velocity of 20 $\frac{m}{s}$ and if its mass is 3 kg, find the magnitude of the force acting on the body.

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193. A body of mass 20 kg is initially at rest. A force of 10 N is applied to the body. Find the velocity of the body after 10 seconds and the

distance covered by it in the ten seconds on application of the force.

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194. A body of mass 1 kg moves with an initial velocity of $15\frac{m}{s}$. If its velocity changes to 25 $\frac{m}{s}$ in 5 seconds, find the force acting on the body.

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195. A shell of mass 6 kg is fired from a gun of mass 600 kg. If the recoil velocity of the gun is 3 $\frac{m}{s}$, find the muzzle velocity of the shell.

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196. A body of mass 2 kg collides with a body of mass 1 kg. Their initial velocities are 6 $\frac{m}{s}$ and 4 $\frac{m}{s}$ respectively. If the velocity of the first body after collision is : $\frac{14}{3}\frac{m}{s}$, find the velocity of the second body after collision.

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