



PHYSICS

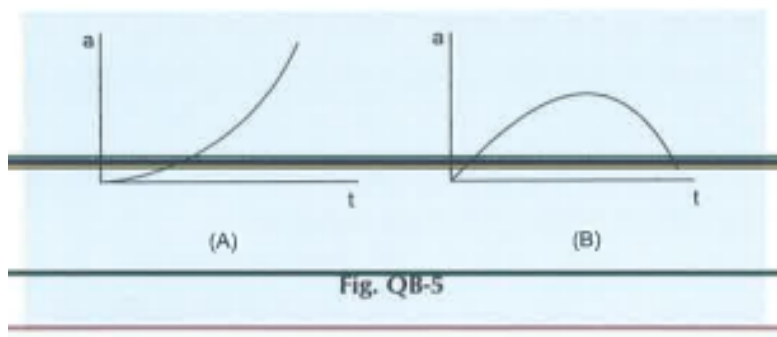
BOOKS - HC VERMA

QUESTION BANK

Question Bank

1. Two particles, A and B, move along the same straight line. At $t=0$, their velocities are zero. Look at their acceleration-time graphs and say

whether the statements given below are true or false



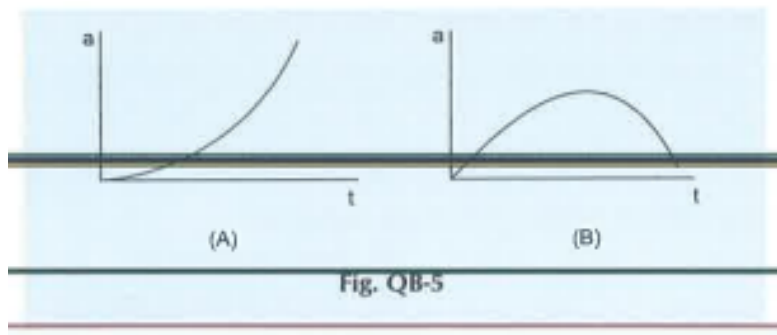
The velocity of each particle is continuously increasing.



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2. Two particles, A and B, move along the same straight line. At $t=0$, their velocities are zero.

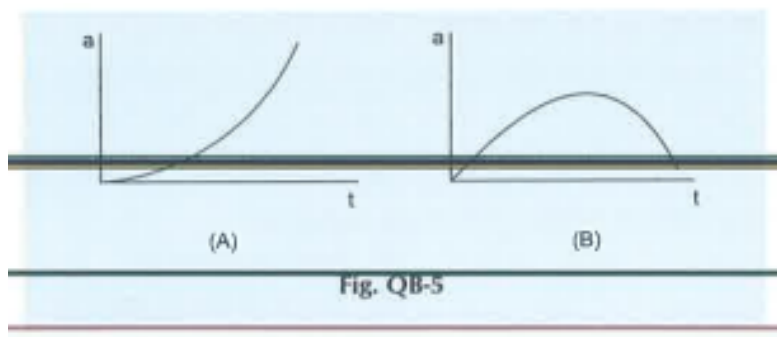
Look at their acceleration-time graphs and say whether the statements given below are true or false



The velocity of each particle is continuously decreasing.

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3. Two particles, A and B, move along the same straight line. At $t=0$, their velocities are zero. Look at their acceleration-time graphs and say whether the statements given below are true or false

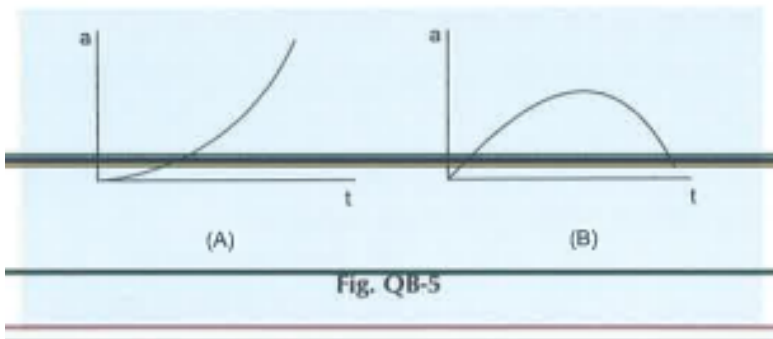


The velocity of A increases continuously, but that of B decreases continuously.



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4. Two particles, A and B, move along the same straight line. At $t=0$, their velocities are zero. Look at their acceleration-time graphs and say whether the statements given below are true or false



Both particles are moving in the same direction .



5. Two particles, A and B, move along the same straight line. At $t=0$, their velocities are zero. Look at their acceleration-time graphs and say whether the statements given below are true or false

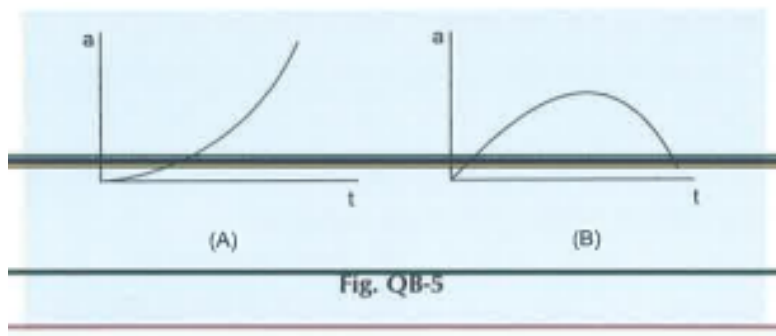


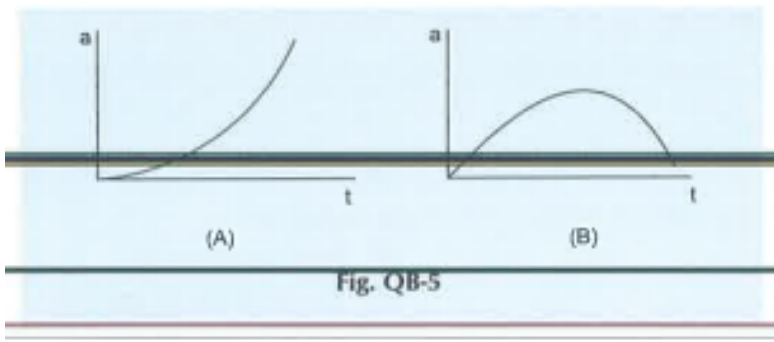
Fig. QB-5

The velocity of B first increases and then decreases.



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6. Two particles, A and B, move along the same straight line. At $t=0$, their velocities are zero. Look at their acceleration-time graphs and say whether the statements given below are true or false



One can apply $x = \frac{1}{2}at^2$ for A, but not for B.

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7. Which statement is correct ?

- A. The earth moves and the sun is at rest.
- B. The sun moves and the earth is at rest.

C. The sun moves with respect to the earth
and the earth moves with respect to the
sun.

D. Both the sun and the earth are at rest.

Answer: C



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8. Two trains are moving at speeds 80 km/h
and 100 km/h on parallel tracks in the same

direction. From this information, one can say that

A. the separation between the trains must be increasing

B. the separation between the trains must be decreasing

C. the separation between the trains remains the same

D. the separation between the trains must be changing

Answer: D



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9. A particle is moving along a straight line.

A. If the acceleration of the particle is more than that of another object, the particle is moving faster.

B. If the acceleration is positive, the speed must be increasing.

C. If the acceleration and the velocity have the same sign, the speed must be increasing.

D. If the acceleration is zero, the velocity is constant but the speed may be changing.

Answer: C



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10. The distance-time graph of a particle moving along a curved path is a straight line .

A. The speed of the particle is constant.

B. The velocity of the particle is constant.

C. The acceleration of the particle is zero.

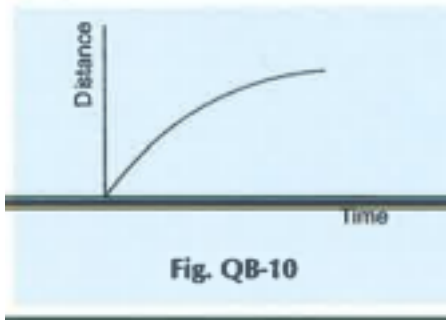
D. The displacement -time graph is a straight line.

Answer: A



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11. Look at the given distance -time graph of an object .



- A. The speed of the object is increasing continuously.
- B. The speed of the object is decreasing continuously.
- C. The speed of the object is constant.

D. The acceleration of the object is zero.

Answer: D



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12. A particle moves along a straight line. Its velocity and speed are denoted by v_1 and v_2 .

The quantity $\frac{v_1}{v_2}$

A. must be equal to 1

B. must be equal to -1

C. can be any positive number

D. must be either +1 or -1

Answer: D



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13. Three forces act on a particle and keep it at rest. It is possible to have

A. all the forces acting eastwards

B. two forces acting eastwards and one acting northwards

C. one force acting eastwards, one westwards and one southwards

D. One force acting eastwards and two forces westwards

Answer: D



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14. Which of the following is a contact force ?

A. frictional force

B. Gravitational force

C. Magnetic force

D. Electric repulsion force

Answer: A



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15. Normal force always acts

A. in the vertically upward direction

B. in the vertically downward direction

C. perpendicular to the surface of contact

D. parallel to the surfaces of contact

Answer: C



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16. A heavy ball is dropped from a height on a pile of sand. After falling on the pile, the ball moves some distance in the sand and then stops. During its motion in the sand, the force F_w on the ball due to its weight and the force F_s due to sand

- A. are equal in magnitude
- B. are in the same direction
- C. are such that $F_w > F_s$
- D. are such that $F_w < F_s$

Answer: D



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17. Consider a cylindrical rod immersed in water in a vertical position. The force by the

water on the rod is

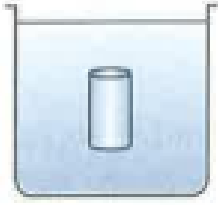


Fig. QB-11

- A. downwards everywhere
- B. upwards everywhere
- C. downwards on the top surface, upwards
on the bottom surface

D. upwards on the top surface, downwards
on the bottom surface

Answer: C



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18. To open the door of a room, you push on the handle, and to close it you pull on the handle. The work done you you on the handle is

A. positive in both cases

B. negative in both cases

C. positive while opening the door but
negative while closing it

D. positive while closing the door but
negative while opening it

Answer: A



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19. A sound wave is generated due to a vibrating tuning fork. The separation between a layer of maximum compression and the next layer of normal density is

A. λ

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

C. $\frac{3\lambda}{4}$

D. $\frac{\lambda}{4}$

Answer: D



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20. The amplitude of density variation corresponding to a sound wave is 1 "milligram/metre"³. The maximum difference in the density between different layers of air will be

A. $1mg/m^3$

B. $2mg/m^3$

C. $\frac{1}{2}mg/m^3$

D. $\frac{1}{4}mg/m^3$

Answer: B



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21. Mark the statement True (T) or False (F): The magnitude of the velocity of an object is equal to its speed at that instant.



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22. Mark the statement True (T) or False (F): The magnitude of the speed of an object is

equal to its velocity at that instant.



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23. Mark the statement True (T) or False (F): The velocity of a particle at an instant is -4 m/s. The particle must be moving along a straight line.



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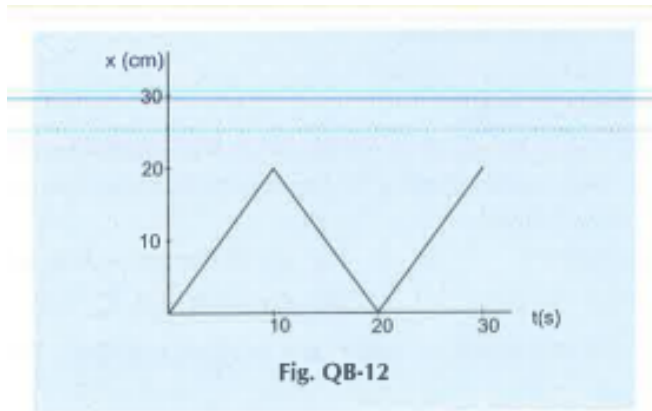
24. Mark the statement True (T) or False (F): The velocity of a particle at an instant is 4 m/s. The particle must be moving along a straight line.



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25. Mark the statement True (T) or False (F): The position -time graph of a particle moving along a straight line is as shown in the figure.

Its speed is constant.



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26. Mark the statement True (T) or False (F): A particle moves along a straight line. Its speed and velocity are both given by $+3$ m/s at an

instant. The particle is moving the positive direction of the line .



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27. If the acceleration of an object is not zero, its speed must be changing .



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28. If the acceleration of an object is zero for a period, it cannot change its direction of

motion during this period.



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29. Accelerations of two objects are $2.0m/s^2$ and $4.0m/s^2$ at an instant. It is possible that their speeds are equal at this instant.



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30. When a force acts on a body, its speed necessarily changes.



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31. Forces can only be applied by living bodies.



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32. When you hold a bucket of water, you apply an upward force on the bucket, which is equal to the combined weight of the bucket and the water.



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33. In action-reaction pair forces, action force acts before the reaction force.



View Text Solution

34. Equal forces acting on two different bodies always produce the same acceleration.



View Text Solution

35. When a steel rod is immersed in water, the force exerted by the water on the rod is equal to the weight of the rod.



View Text Solution

36. When a plastic rod floats in water, the force exerted by the water on the rod is equal to the weight of the rod.



View Text Solution

37. When a plastic rod is completely immersed in water, the force exerted by the water on the rod is equal to the weight of the rod.



View Text Solution

38. According to the principle of conservation of energy, if the kinetic energy of an object is decreased by 50%, its potential energy will be increased by 50%.



View Text Solution

39. A stone hits a glass plate, which breaks. When this happens, the density of the air around the plate changes.



View Text Solution

40. The pitch of sound is measured in hertz.



View Text Solution

41. A 2-kHz sound will spread less around the edges of a cardboard as compared to a 1-kHz sound.



View Text Solution

42. A louder sound bends more more around the edges than a less-loud sound of the same frequency.



View Text Solution

43. The allowed limit of arsenic in drinking water is 0.00005 grams per litre. Convert this into SI unit.



View Text Solution

44. The radius of a hydrogen atom is $5.3 \times 10^{-11} m$. Convert this into a unit with a standard prefix before metre so that the numerical value is between 1 and 1000.



View Text Solution

45. Convert 1 yard into metres.



View Text Solution

46. Convert 100 square yards into square metres.



View Text Solution

47. Delhi and Chicago are almost diametrically opposite on the earth. If someone travels from

Chicago to Delhi, what will be the magnitude of his displacement ?



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48. In the hare and tortoise race, the tortoise ran at a uniform speed of 10 cm/s and reached the finishing line in 72 minutes. The hare ran at 1 m/s for the first 6 minutes and then slept for 65 minutes. He then ran at 1 m/s to reach the finishing line. When the hare went to sleep,

what was the position of the tortoise ? What was the position of the hare at that time ?



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49. In the hare and tortoise race, the tortoise ran at a uniform speed of 10 cm/s and reached the finishing line in 72 minutes. The hare ran at 1 m/s for the first 6 minutes and then slept for 65 minutes. He then ran at 1 m/s to reach the finishing line. After how much time after the start did the tortoise cross the hare ?



50. The velocity of a particle moving along a straight line varies with time as shown in the Figure. Find the total distance covered and the total displacement between 0 and 20 seconds.

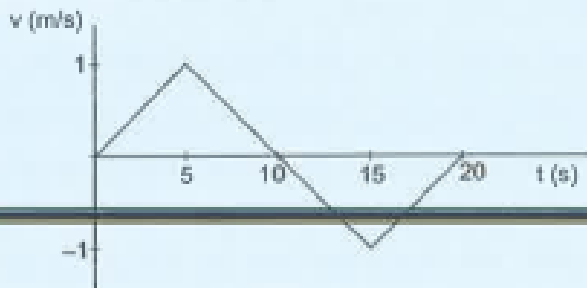


Fig. Q8-13



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51. The length of the outer edge of a cubical vessel is 10 cm and the length of its inner edge is 9.8 cm. If it is immersed in water just up to its full height without allowing water to enter the vessel. How much volume of water will it displace ?



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