PHYSICS

BOOKS - MBD

MOTION

Example

1. An object has moved through a distance. Can it have zero displacement ? If yes, support your answer with an example.

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2. A farmer moves along the boundary of a square field of side 10m in 40 s. What will be the magnitude of displacement of the farmer at the end of 2 minutes 20 seconds?

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3. Which of the following is true for displacement ?

(i) it cannot be zero

(ii) Its magnitude is greater than the distance travelled by the object

(iii) Its magnitude is less than or equal to distance travelled by the object.

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4. Distinguish between speed and velocity.

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5. Under what condition(s) is the magnitude of average velocity of an object is equal to its average speed ?

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6. What does the odometer of an automobile measure ?

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7. What does the path of an object look like when it is in uniform motion ?

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8. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station ? The signal travels at a speed of light that is $3 \times 10^8 ms^{-1}$.

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9. When will you say a body is in : uniform acceleration ?

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10. When will you say a body is in : non-uniform acceleration ?

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11. A bus decrease its speed from $80kmh^{-1}$ to $60kmh^{-1}$ in 5 sec. Find acceleration of the bus.

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12. A train starting from a railway station and moving with uniform acceleration attains a speed $40kmh^{-1}$ in 10 minutes. Find its acceleration.

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13. What is the nature of the distance-time graphs (x - y) for uniform and non uniform motion of an object ?

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14. What can you say about the motion of object whose distance - time graph is a straight line parallel to time axis ?

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15. What can you say about the motion of an object if its speed - time graph is a straight line parallel to time axis ?

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16. What is the quantity which is measured by the area occupied below velocity -time graph ?

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17. A bus starting from rest moves with a uniform acceleration of $0.1ms^{-2}$ for two minutes. Find: the speed acquired.

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18. A bus starting from rest moves with a uniform acceleration of $0.1ms^{-2}$ for two minutes. The distance travelled.

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19. A train is travelling at a speed of $90kmh^{-1}$. Brakes are applied so as to produce a uniform acceleration of $-0.5ms^{-2}$. Find how far the train will move before it is brought to rest?

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20. A trolley, while going down an inclined plane has an acceleration of $2cms^{-2}$ What will be its velocity 3 s after the start?

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21. A racing car has uniform acceleration of $4ms^{-2}$. What distance will it cover in 10 s after start?

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22. A stone is throw in a vertically upward direction with a velocity of $5ms^{-1}$ if the stone during its motion is $10ms^{-2}$ in the downward direction . What will be the height attained by the stone and how much time will it take to reach there ?

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23. Abdul while driving to school, computes the average speed for his trip to be 20 km h^{-1}. On this trip along the same route there os less traffic and average speed is 40 km `h^-(-1) . What is the average speed for Abdul's trip ?

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24. A motorboat starting from rest on a lake accelerates in a straight line at a constant rate of $3.0ms^{-2}$ for 8.0 s . How far does the boat travel during this time?

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25. A driver of a car travelling at $52kmh^{-1}$ applies the brake and accelerates uniformly in opposite direction. The car stop in 5 s. Another driver going at 3 km h^{-1} applied his brakes slowly and stop in 10 s. On the same graph paper plot the speed versus time graph for the two cars. Which of the two cars travelled farther after the brakes were applied ?

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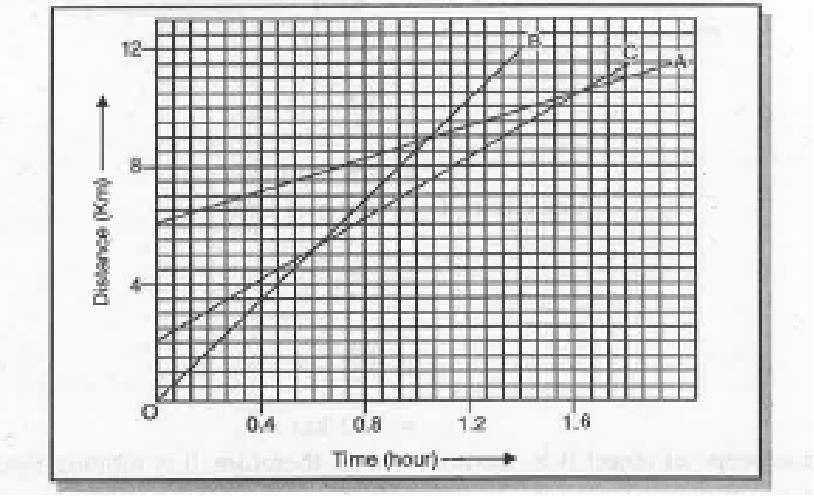
26. Fig 1.11 show the distance - time graphs of three A,B and C. Study the graph and answer the following question : Which of the three is travelling the fastest ?



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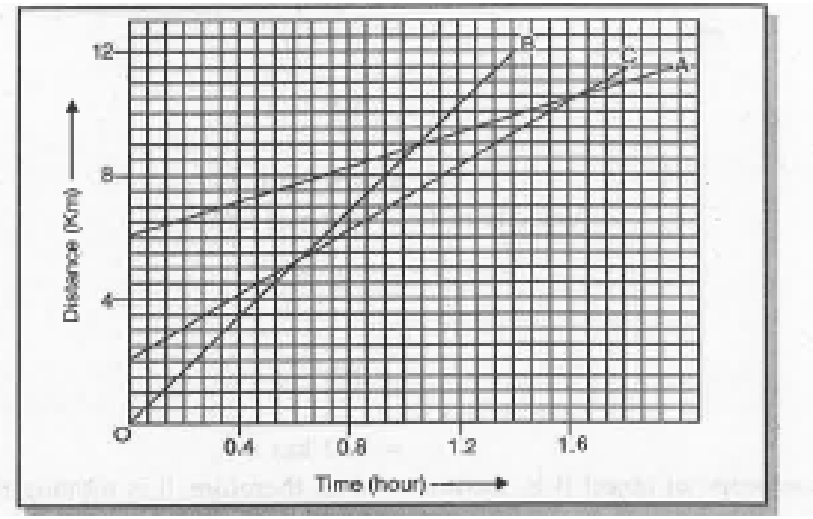
27. Fig 1.11 show the distance - time graphs of three A,B and C. Study the graph and answer the following question : Are all three ever meet at the

same point on the road ?



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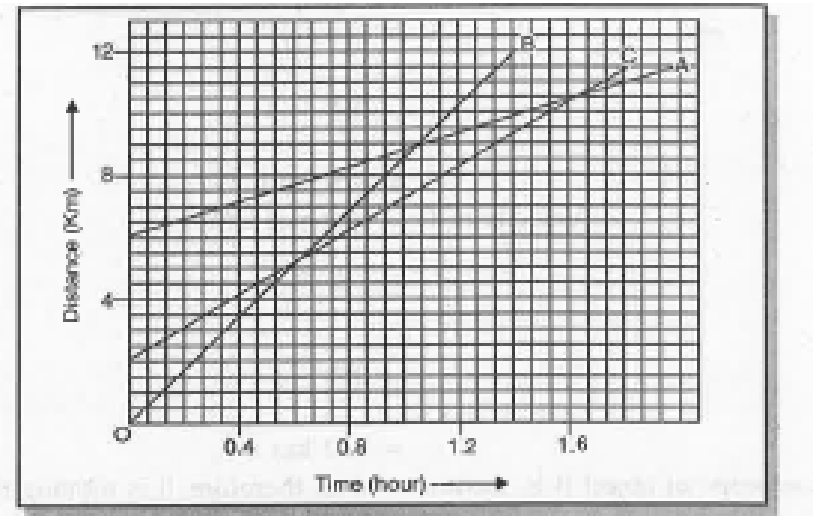
28. Fig 1.11 show the distance - time graphs of three A,B and C. Study the graph and answer the following question : How far has C travelled when B

passes A ?



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29. Fig 1.11 show the distance - time graphs of three A,B and C. Study the graph and answer the following question : How far has B travelled by the time it passes C ?

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30. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of $10ms^{-2}$, with what velocity it will strike the

ground ? After What time will it strike the ground ?

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31. Speed - time graph for a car is show in the fig 1.13: Find how far the car travelled in first 4 s. Shade the area on the graph that represents the distance travelled by car during this period. https://d10lpgp6xz60nq.cloudfront.net/physics_images/MBD_KHO_SCI_IX_C08_

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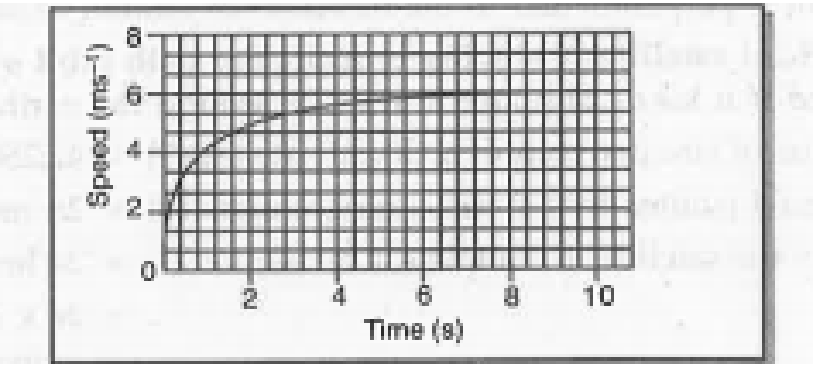
32. Speed - time graph for a car is show in the fig 1.13:Which part of the graph represents uniform motion of the car ?



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33. State which of the following situations are possible and give an example for each of these.an object with a constant acceleration but with zero velocity.

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34. State which of the following situations are possible and give an example for each of these.an object moving in a certain direction with an acceleration in the perpendicular direction.

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35. An artificial satellite is moving in a circular path orbit of radius 42,250 km. Calculate its speed if it takes 24 hours to revolve around the earth.

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36. Derive mathematically the equations of motion.

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37. For uniform accelerated motion, draw by graphical method establish the following equations of motion : v = u + at

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38. For uniform accelerated motion, draw by graphical method establish the following equations of motion: $S = ut + \frac{1}{2}at^2$.

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39. For uniform accelerated motion, draw by graphical method establish the following equations of motion:$v^2 = u^2 + 2aS$

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40. Draw velocity-time graph for a body moving with uniform velocity. Hence show that the area under the velocity-time graph gives the distance travelled by the body in a given time interval.

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41. What is meant by Angular velocity ? How is it related to linear velocity ? Derive the relation

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42. Define rest and motion. Give one example for each.

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43. Show that rest and motion are relative terms.

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44. Give some points of differences between distance and displacement.

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45. Can an object be at rest as well as in motion at the same time ?

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46. Give two differences between distance and displacement.

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47. What is meant by uniform motion ? Give an example.

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48. Define the term velocity. What is its SI unit ? Is it a scalar or vector quantity ?

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49. A police car running on a highway with a speed of $30km/h$ fires on the vehicle of thiefs running in the same direction at a speed of$192km/h$. If the velocity of the bullet is $150m/s$then with what velocity the bullet will hit the thiefs ?

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50. A train 50 m long travels on a plain and level track and reached a post in 5 secs. Find (i) speed of the train (ii) the time train will take to cross 450 m long bridge.

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51. A cheetah is the fastest land animal and can achieve a peak velocity of $100km/h$ upto distances less than 500 m. If a cheetah spots his prey at a distance of 100 m. What is the minimum time it will take to get its prey, if the average velocity attained by it is$90km/h$.

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52. A car travels a certain distance with a speed of $50km/h$ and returns with a speed of $40km/h$. Calculate the average speed for the whole journey.

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53. On a 100km track, a train travels the first 30 km at a uniform speed of $30kmh^{-1}$. How fast must the train travel the next 70 km so as to averge the next `40km h^(-1) for entire trip.

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54. On a 100km track, a train travels the first 30 km at a uniform speed of $30kmh^{-1}$. How fast must the train travel the next 70 km so as to averge the next `40km h^(-1) for entire trip.

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55. A railway train 50 m long passes over a bridge 250 m long with uniform velocity of $10ms^{-1}$. How long will it take to completely pass over the bridge ?

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56. The graph shown in Fig. indicates the position of body at different positions. Calculate the speed of the body as it moves from (i) A to B, (ii) B to C and (iii) C to D.

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57. What is motion ?

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58. What is displacement of object ?

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59. Which device shows the speed of vehicles ?

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60. What is uniform motion ?

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61. Give two examples of non-uniform motion.

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62. Define speed.

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63. What is the SI unit of speed ?

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64. How is average speed obtained ?

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65. What is velocity ?

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66. What is acceleration ?

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67. What is the SI unit of acceleration ?

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68. A cricket player tosses the ball upward and again catches it. What is the total displacement ?

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69. Is displacement a scalar or vector quantity ?

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70. What would be acceleration of a body if its velocity-time graph is line parallel to the time axis ?

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71. A body is moving along the boundary of a square plot of land with constant speed. Does its velocity remain unchanged ?

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72. What will be the position-time graph of a city bus standing at rest at a depot ?

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73. What is the nature of the distance time graph for an object moving uniformly along a straight long road ?

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74. Does the speedometer of a car measure its average speed ?

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