**Position Time Graphs**

How can we describe the motion of each of the following graphs?

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

**The Importance of Slope** - the slope of the line on a position-time graph is equal to the velocity of the object.

**Velocity-Time Graphs**

Describe the motion of the following Velocity Time Graphs







# The Importance of Slope - the slope of the line is equal to the acceleration of the velocity-time

#  graph.

**The Area Between the Velocity Line and the Axes**

For velocity- time graphs, the *area* bound by the line and the axes represents the **displacement**.

|  |  |
| --- | --- |
| The shaded area is representative of the displacement during from 0 seconds to 6 seconds. Calculate the displacement. |  |
| The shaded area is representative of the displacement during from 0 seconds to 4 seconds. Calculate the displacement. |  |
| The shaded area is representative of the displacement during from 2 seconds to 5 seconds. This area takes on the shape of a trapezoid. Calculate the displacement during this time. |  |

Let’s break down this graph to find the total displacement over 20 seconds:

**Graph Conversion Practice**

1. For the provided $v$-$t$ graph, draw the corresponding $d$-$t$ and $a$-$t$ graphs.







**Graph Conversion Practice**

1. For the provided $v$-$t$ graph, draw the corresponding $d$-$t$ and $a$-$t$ graphs.







Answer the questions on this page using the graph below.

36

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 24 |  |  |  |  |  |
| Velocity (m/s) [S]12 |  |  |  |  |  |
| 0 |  |  |  |  |  |
| -12 |  |  |  |  |  |

30

10

25

15

5

0

20

Time (s)

Questions

1. What was the truck’s velocity at 5 s, 15 s, 25 s, 30 s?
2. What was the displacement of the truck in the interval 0 to 5 s?
3. What was the displacement of the truck in the interval 10 to 20 s?
4. What was the displacement of the truck in the interval 25to 30 s?
5. What was the distance of the entire trip?
6. What was the average **speed** for the whole trip?
7. What was the **displacement** for the whole trip?
8. What was the average **velocity** for the whole trip?
9. In which interval was the acceleration the greatest?
10. During which time intervals is the truck
11. speeding up?
12. slowing down?
13. traveling South
14. traveling North

Answers: (0) 6 m/s [S], 24 m/s [S], 0, 12 m/s [N], (1) 30 m[S], (2) 210 m[S], 3. 45 m [N], 4. 390 m, 5. 13 m/s, 6. 300 m [S], 10.0 m/s[S], 8. 20 – 27.5 s, 9. a) 5 - 10s, 10 - 15s, 25 – 27.5s , b) 20 - 25s , c) 0 – 25 s , d) 25 - 30 s