|  |
| --- |
| **Multi-Stage Constant Acceleration Problems** |
| **(a)** | A particle travels in a straight line from A to B with a constant acceleration of $2 ms^{-2}$. After $3$ seconds the particle reaches B, where it has a velocity of $18 ms^{-1}$. Its acceleration then changes to $1.5 ms^{-2} $and it continues to travel in a straight line from B to C, a distance of $39$ m. Find the initial velocity of the particle, the total distance travelled and the total time taken. |
|  |
| **A to B** | **B to C** | **Working and Answers** |
| $$s=s$$ | $$s=39$$ |  |
| $$u=u$$ | $$u=18$$ |
| $$v=18$$ | $$v=v$$ |
| $$a=2$$ | $$a=1.5$$ |
| $$t=3$$ | $$t=t$$ |
| **(b)** | A particle sets off from A with an initial velocity of $10 ms^{-1}$. It travels in a straight line for $2.5$ seconds with a constant acceleration of $a ms^{-2} $until it reaches B. The acceleration of the particle then changes to $4 ms^{-2}$ and the particle travels a further $240$ m over $6$ seconds, until it reaches point C. Find the acceleration from A to B, and the total distance travelled by the particle. |
|  |
| **A to B** | **B to C** | **Working and Answers** |
| $$s=$$ | $$s=$$ |  |
| $$u=$$ | $$u=$$ |
| $$v=$$ | $$v=$$ |
| $$a=$$ | $$a=$$ |
| $$t=$$ | $$t=$$ |
| **(c)** | A particle travels in a straight from A to C through B, where AB=BC. The particle starts from rest at A and moves with a constant acceleration of $2.5 ms^{-2}$ until it reaches B. The particle then continues in the same direction, decelerating at a constant rate until it reaches C. The time taken from B to C is $5$ seconds and the velocity at C is $12 ms^{-1}$. Find the velocity at B, the total distance travelled and the deceleration from B to C. |
|  |
| **A to B** | **B to C** | **Working and Answers** |
| $$s=$$ | $$s=$$ |  |
| $$u=$$ | $$u=$$ |
| $$v=$$ | $$v=$$ |
| $$a=$$ | $$a=$$ |
| $$t=$$ | $$t=$$ |