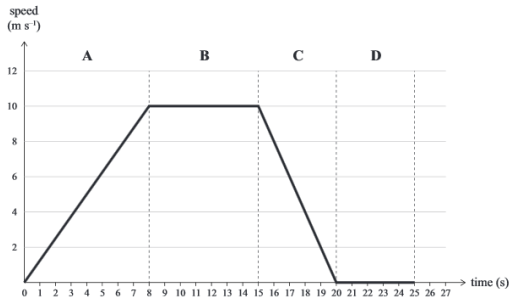
Science 1.1 AS 90940 Demonstrate understanding of aspects of mechanics

Writing Excellence answers to **Interpreting motion-time graphs** questions

Interpreting motion-time graphs QUESTION
Question: Describe the motion of the runner through sections A, B, C, and D. Your answers should include descriptions AND any relevant Calculations $v=d/t$ v = velocity (ms^{-1}) d = distance (m) t = time (s) $a_{ave}=\Delta v/\Delta t$ a = acceleration (ms^{-2}) v = velocity (ms^{-1}) t = time (s) A runner's speed is recorded for 25 seconds and graphed below. 

ANSWER	
1. state the type of graph used (distance-time or speed-time graph)	This graph is a **speed-time** graph
2. starting with section **A** describe the type of motion (stationary, constant speed or acceleration)	Section **A** shows **acceleration** - the runner is accelerating
3. state the starting speed and final speed, as well as total time taken (use correct units)	Accelerating at a constant rate from 0 m s^{-1} to 10 m s^{-1} in 8 seconds.
4. calculate the motion in section A using either v = Δd/Δt or a = Δv/Δt Show working and use correct units	a = Δv/Δt a = 10 m s^{-1} / 8 seconds. **a = 1.25 m s^{-2}**
5. next with section **B** describe the type of motion (stationary, constant speed or acceleration)	Section **B** shows **constant speed** - the runner is travelling at a constant speed
6. state the starting speed and final speed, as well as total time taken (use correct units) – calculation not needed for stationary	Constant speed of 10 m s^{-1} for 7 seconds. Δv = 0 m s^{-1} **So a = 0 m s^{-2}**
7. next with section **C** describe the type of motion (stationary, constant speed or acceleration)	Section **C** shows **deceleration** (negative acceleration)
8. state the starting speed and final speed, as well as total time taken (use correct units)	Decelerating from 10 m s^{-1} to 0 m s^{-1} at a constant rate for 5 seconds.
9. calculate the motion in section A using either v = Δd/Δt or a = Δv/Δt Show working and use correct units (make sure to use a – sign if acceleration negative)	a = Δv/Δt Δv = 0 m s^{-1} - 10 m s^{-1} Δt = 20s-15s a = -10 m s^{-1} / 5 seconds. **a = –2 m s^{-2}**
10. finally with section **D** describe the type of motion (stationary, constant speed or acceleration)	Section **D** shows the runner is **Stationary**
11. state the starting speed and final speed, as well as total time taken (use correct units)	(constant speed of 0 m s^{-1}) for 5 seconds.

NOTE: The white column is how your answer would appear on your test paper so make sure you **write out complete sentences**. The grey area is just to help you structure your answer and would not appear in the question.