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**2.** A particle $P$ moves along the $x$-axis. At time $t$ seconds, the acceleration of $P$ is $a\,\text{m s}^{-2}$ in the positive $x$ direction, where

$$a = 8 - 6t \quad t \geqslant 0$$

When $t = 0$, $P$ is at the origin $O$ and is moving with speed $3\,\text{m s}^{-1}$ in the positive $x$ direction.

Find

(i) the distance of $P$ from $O$ at the instant when $P$ is instantaneously at rest,

(ii) the total distance travelled by $P$ in the interval $0 \leqslant t \leqslant 4$

**(10)**

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**Question 2 continued**

**(Total 10 marks)**

**Q2**