2. A particle P of mass 0.5 kg is moving with velocity $(5\mathbf{i} + 3\mathbf{j})\,\text{m s}^{-1}$

The particle receives an impulse $(-2\mathbf{i} + \lambda\mathbf{j})\,\text{N s}$, where λ is a constant.

Immediately after receiving the impulse, the velocity of P is $(x\mathbf{i} + y\mathbf{j})\,\text{m s}^{-1}$

The kinetic energy gained by P as a result of receiving the impulse is 22 J.

Find the possible values of λ.

(7)

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Question 2 continued

(Total for Question 2 is 7 marks)