Question 10 (8 marks)
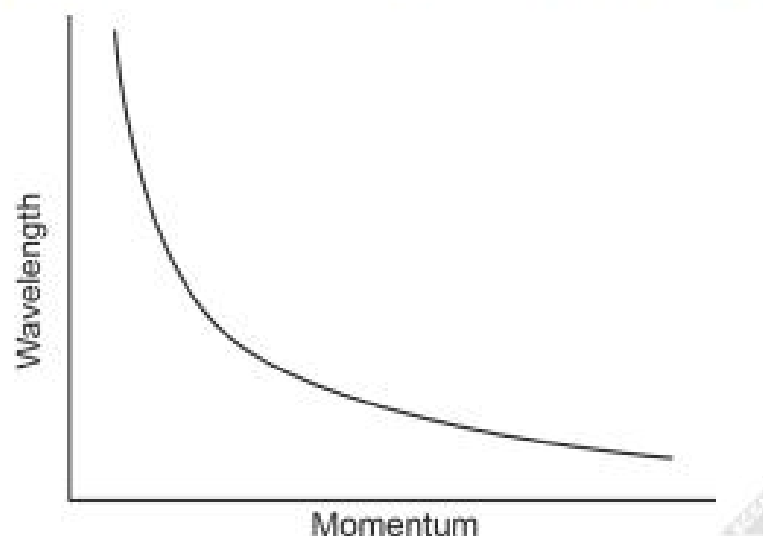
If we plot the de Broglie wavelength of a subatomic particle against its momentum, we get the graph shown below. This applies to velocities less than 5% of the speed of light.

(a) Give a possible relationship between wavelength and momentum based upon the shape of the graph. (1 mark)

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(b) Describe how the data used to generate the graph could be reorganised to produce a straight-line graph. (2 marks)

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(c) What would the gradient of the straight-line from part (b) represent? (1 mark)

(d) Ignoring relativistic effects, calculate the momentum of a particle with a wavelength of 2.50×10^2 nm. (4 marks)

_____ Unit: _____