(a) i) It can be used to distinguish between alpha and beta decay as it allows us to see the difference once the unstable isotope has decayed through natural (nuclear) radioactivity (transmutation) as they become stable.

ii) 218.00897 - 213.99981 = 4.00916

~~4.00260~~ 4.00916

4.00260 - 4.00916 = -0.00656

(b) $\frac{1}{\lambda} = R\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$

i) $\lambda = \frac{h}{mv}$ $\quad \frac{0.2}{1} = \frac{6.626 \times 10^{-34}}{1.675 \times 10^{-27} \times V}$

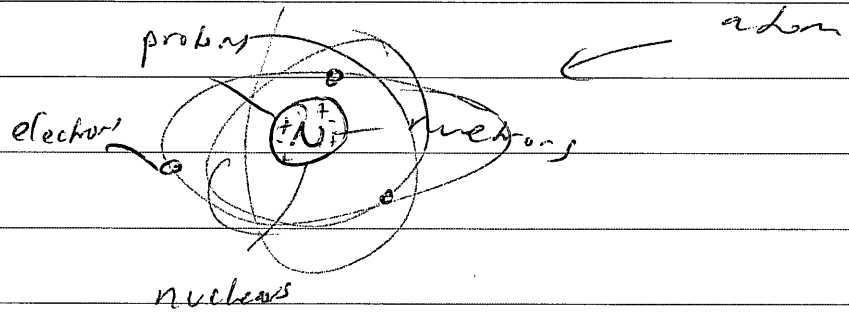
$3.35 \times 10^{-24} V = 6.626 \times 10^{-34}$

3.35×10^{-27} $\quad 3.35 \times 10^{-27}$

The speed $= 1.9779 \times 10^{-7}$

ii) This is because the beam is heavy and will determine the structure of materials as it interacts with them. So the neutrons can hit the structures and we can observe them once they've been hit with this beam.

(c) The spectroscope allowed for us to see the model of atom ~~[redacted]~~ which was described by Bohr. It is important in the development as it provided evidence of Bohr's description of the atom, which was:



If you require more space to answer parts (a), (b) and (c) of the question, you may ask for an extra writing booklet.

If you have used an extra writing booklet for parts (a), (b) and (c) of the question, tick here. ☐

(d) i) Their conclusion of the electrons scattering lead to their idea of diffraction. They obtained the electrons to have diffracted and scattered.

ii) The significance of this experiment to the Rutherford – Bohr model of the atom was that it helped in the production and idea of the model of the atom, which had a nucleus with protons, and electrons orbiting them in integer shells (n 1, 2, 3...)

(e) One advance was the knowledge of particles having momentum and therefore mass. This allowed for the understanding of the atomic nucleus.