

7 One of the isotopes of uranium is uranium-238 ( $^{238}_{92}\text{U}$ ).

- (a) State what is meant by *isotopes*.

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.....  
.....

[2]

- (b) For a nucleus of uranium-238, state

- (i) the number of protons,

number = ..... [1]

- (ii) the number of neutrons.

number = ..... [1]

- (c) A uranium-238 nucleus has a radius of  $8.9 \times 10^{-15}\text{ m}$ .

Calculate, for a uranium-238 nucleus,

- (i) its mass,

mass = ..... kg [2]

- (ii) its mean density.

density = .....  $\text{kg m}^{-3}$  [2]

- (d) The density of a lump of uranium is  $1.9 \times 10^4 \text{ kg m}^{-3}$ .  
Using your answer to (c)(ii), suggest what can be inferred about the structure of the atom.

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..... [2]

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