1. An atom of radon has:
   - the symbol Ra
   - 140 neutrons
   - 88 protons

   (a) Write this in the form ${}^{A}_{Z}X$.
   (b) Which of these numbers differs between isotopes of radon?
   (c) An atom of radon can undergo ionisation. State what happens

2. Copy and complete this equation so that it is balanced.

$$^{14}_{6}C \rightarrow \_\_\_\_N + {}^{0}_{-1}e$$

3. Copy and complete this table.

particle name and symbol	antiparticle name and symbol	particle charge	antiparticle charge	particle mass
proton, p		+1		
	anti-up quark, $\bar{u}$		$-\frac{2}{3}$	

4. A photon has a frequency of 5×10^{20} Hz.
   (a) Calculate the energy of this photon. Give your answer in joules
   (b) Convert your answer to eV and use a suitable prefix.

5. The strong nuclear force is one of the fundamental forces.
   (a) Describe how the strong nuclear force acts within an atom.
   (b) State the exchange particle responsible for the strong nuclear fo

6. (a) State the class of particle that is composed of three quarks.
   (b) Name the two classes of hadrons.
   (c) Copy and complete these sentences.

   A _____ *can decay into an electron.*
   A _____ *can decay into a pion.*

7. Name **two** types of lepton.

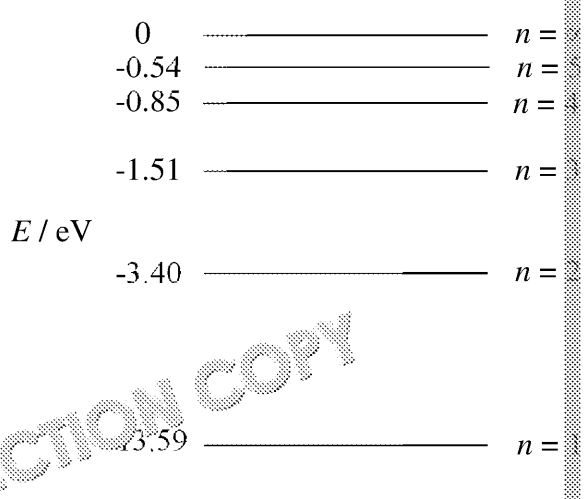
8. (a) In particle physics, what quantity has the symbol *s*?
   (b) Give an example of an interaction where this quantity is **not** co

9. Name **two** types of particle emitted from the nucleus when a down qu

10. Photoelectrons can be emitted when electromagnetic radiation is in
    (a) State **two** observations from the photoelectric effect that give e
    nature of electromagnetic radiation.
    (b) Calculate the threshold frequency for a m. a. whose work func

11. (a) Calcula momentum of an electron with wavelength 10^{-11} m
    (b) n a single beam of electrons pass through a thin piece of g
    luorescent screen. Explain how this shows that electrons

12. The diagram shows the energy levels in an atom.



An on ves from level $n = 1$ to level $n = 3$.
(a) the name given to this type of change.
(b) (i) Calculate the energy required for this change. Give your a
(ii) Calculate the frequency of the photon emitted when the ele
$n = 3$ to level $n = 1$.

Preview of Questions Ends Here