- 1
  - a-b
    - In Paper
  - c
    - Attraction up to around 3fm, but repulsion from 0-0.5fm. This force prevents the proton and neutron moving closer or further apart.
  - d
    - In Paper
- 2
  - In Paper
- 3
  - In Paper
- 4
  - a
    - The water is optically more dense than the air outside, meaning that at some critical angle the laser beam will be totally internally reflected.
  - b-c
    - In Paper
  - d
    - Part X is the core, which propigates the light by total internal reflection, while absorbing as little as possible.
    - Part Y is the cladding, which protects the core from damage and interference between fibres in the cable. This is also a clean boundary for total internal reflection, and is more optically dense than the core.
    - There are two dispersion problems in fibres, material and modal. both cause pulse broadening. Material dispersion is due to different wavelengths having different speeds, because of different refractive indexes within the core. A way to prevent this is using monochromatic light.
    - Modal dispersion is that different paths have different lengths so effective time along fibre differs. A method of solving this is by narrowing the core.
  - e
    - Light may encounter impurities at different positions, sizes, and even different amounts.
  - f

        - Transverse waves have oscillations perpendicular to propigation of energy transfer, while longitudinal waves have them parallel.
- 5
    - a
        - In Paper
    - b
        - A couple is defined as two equal forces acting in opposite directions, which means this suggestion is incorrect as the forces are in the same direction.
    - c
        - In Paper
    - d
        - Readings would be the same as total weight is the same
- 6
    - a
        - An antiparticle is a particle with equal rest mass, but opposite charge.
    - b-c
        - In Paper
    - d
        - Energy levels are discrete, meaning they are exact. photons are produced when an electron moves to a lower energy level.