

- 1

- a

- The strong interaction is the cause of keeping together hadrons, it has a range of 3fm, and is repulsive below 0.5fm.

- b

- In alpha decay, nucleon number is unchanged, while in beta decay a neutron turns into a proton (contains nucleons) and 2 leptons (does not contribute to baryon number), so baryon number stays unchanged.

- c

- In Paper

- d

- Strangeness is not conserved

- e

- Results must be independently confirmed, and many skills are necessary to prove a result.

- 2

- a

- In Paper

- b

- The acceleration in Fig.1 is constant, while in Fig.2 the acceleration will change, starting at a greatest value and gradually decrease to 0.

- c

- The loss of GPE is the same, so the gain in KE will remain unchanged.

- d

- The rain initially only has vertical momentum, and so when the rain hits the truck, the rain's vertical momentum will decrease, and the truck's horizontal momentum will remain unchanged.

- 3

- a
 - In Paper
- b
 - The energy is used to raise an electron to a higher level, for this action an exact amount of energy is needed.
When a free electron collides, the free electron can give an exact amount to the excited electron, while carrying the excess off, while the photon cannot carry excess off, so must need the exact amount
- c
 - In Paper
- d
 - In Paper
- 4
 - a
 - resultant force = 0
 - $\sum \text{anticlockwise moments} = \sum \text{clockwise moments}$
 - b
 - Where weight can be considered to act
 - c
 - It must be below A so that there is not a turning affect, as A is a pivot.
 - d-e
 - In Paper
- 5
 - In Paper
- 6
 - a
 - In Paper
 - b
 - The pd across lamp E is 0V, therefore there is no current in E, and so there is no affect on other lamps.
 - c
 - In Paper

- 7
 - a
 - A central white fringe, with fringes either side showing a continuous spectra
 - b
 - In Paper
 - c
 - For decreasing slit separation, the fringe spacing will increase, which causes the uncertainty in measuring the fringe spacings to decrease. This will in turn decrease uncertainty in wavelength calculations.
 - For decreasing screen distance, the uncertainty in measuring D would increase, and fringe separation would also decrease, causing a higher uncertainty. As both are required in calculating λ , uncertainty in wavelength calcs will increase.
- 8-34
 - In Paper