

**Question 4****(3 marks)**

According to the Big Bang theory, the strong nuclear force separated from the electromagnetic and weak forces around  $10^{-36}$  s after the expansion of the universe began.

Explain how this separation enabled the formation of hadrons.

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**Question 5****(4 marks)**

Arianna is swinging her keys attached to a string in a vertical circle of radius 37.0 cm. The keys have a mass of  $1.20 \times 10^2$  g.

Calculate the maximum tension in the string if the maximum speed the keys reach is  $4.65 \text{ m s}^{-1}$ .

