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**1.** Two particles, $P$ and $Q$, have masses $3m$ and $2m$ respectively. The particles are connected by a light inextensible string. Initially $P$ and $Q$ are at rest on a smooth horizontal plane with the string slack.

Particle $P$ is then projected along the plane directly away from $Q$ with speed $4u$. At the same instant, particle $Q$ is projected along the plane in the opposite direction with speed $3u$.

Find

(a) the common speed of the particles immediately after the string becomes taut,

**(3)**

(b) the magnitude of the impulse exerted on $Q$ at the instant when the string becomes taut.

**(3)**

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**Question 1 continued**

**Q1**

**(Total 6 marks)**