2 A rubber ball of mass 0.30 kg is positioned directly above a basketball of mass 0.50 kg as shown in Fig. 2.1
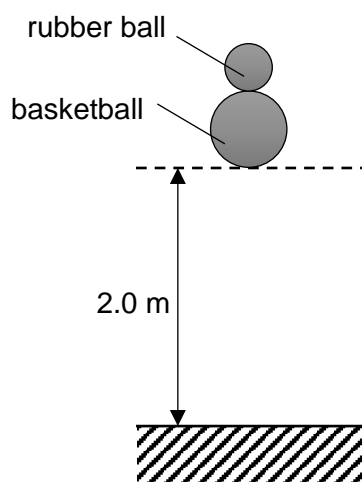

Fig. 2.1

The balls are released from a height of 2.0 m from the ground. Assume air resistance is negligible.

(a) (i) State the *principle of conservation of momentum*.

....

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....

.... [1]

(ii) Explain why the principle of conservation of momentum is not applicable to the system of stacked balls.

....

....

....

....

.... [1]

(b) Determine the speed of the stacked balls just before they hit the ground.

speed = ……………………………… m s^{-1} [1]

(c) The collision between the balls and ground is elastic. At the instant the basketball loses contact with the rubber ball, it moves with a speed of 3.2 m s^{-1}. The rubber ball is observed to move off at a higher speed than the basketball.

Using energy considerations, calculate the speed of the rubber ball as it loses contact with the basketball.

speed = ……………………………… m s^{-1} [2]

[Total: 5]