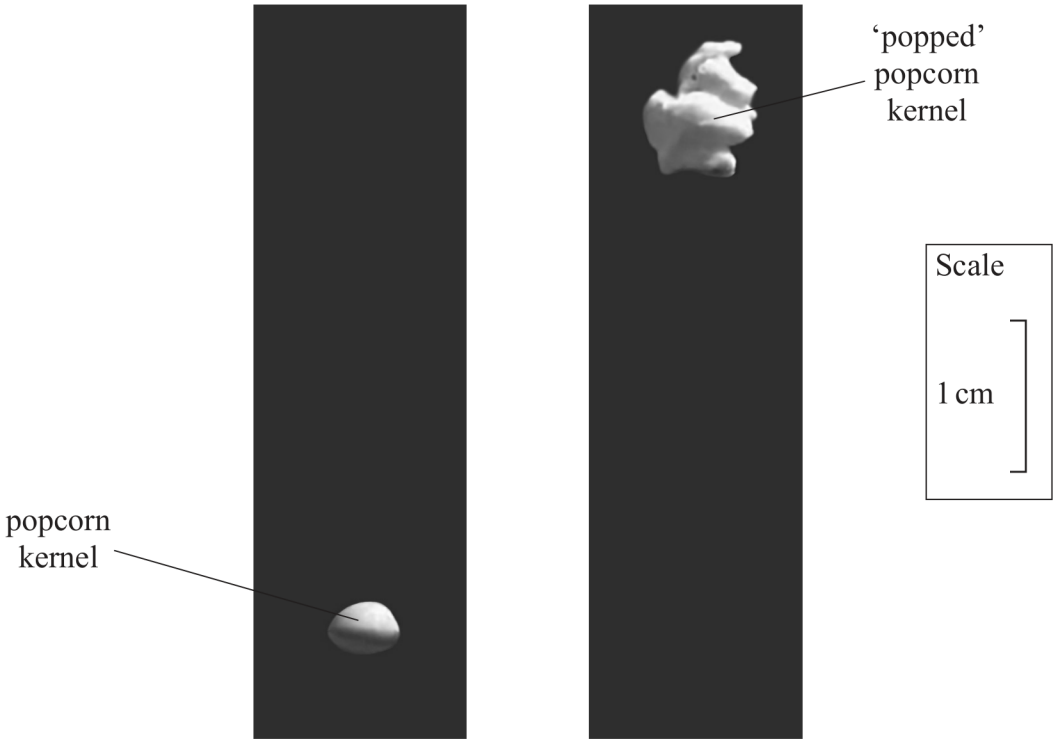
16 Popcorn kernels contain water. When heated, the water turns to steam. The kernel 'pops' and moves upwards.



(a) The photographs above show a popcorn kernel just before popping and at the maximum height after popping. The time between the two photographs was 83 ms.

(i) Determine the maximum height after popping.

(2)

.....

.....

Maximum height = ...

(ii) Calculate the initial speed of the 'popped' popcorn kernel.

(3)

Initial speed = ...

(b) The average water content in a popcorn kernel is 14% of the total mass of the kernel.

A kernel is heated until it pops. Steam is ejected downwards, and the popped kernel moves upwards with an initial speed of $1.5\,m\,s^{-1}$.

Calculate the speed at which the steam is ejected.

total mass of unpopped kernel = 0.11 g

(4)

Speed = ...

(Total for Question 16 = 9 marks)