

5 Two workmen are employed on a building project, as shown in Fig. 5.1.

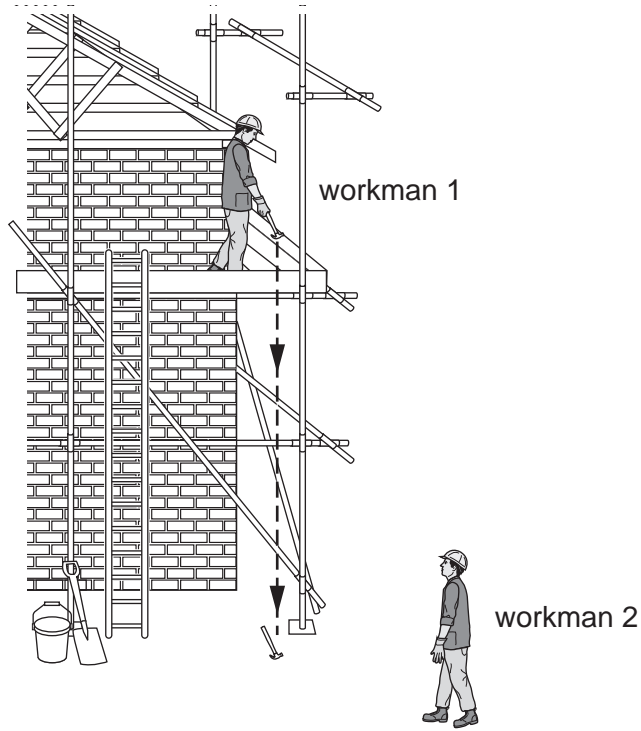


Fig. 5.1

- (a) Workman 1 drops a hammer, which falls to the ground. The hammer has a mass of 2.0kg, and is dropped from a height of 4.8m above the ground.
- (i) Calculate the change in gravitational potential energy of the hammer when it is dropped.

change in gravitational potential energy =[2]

- (ii) Describe the energy changes from the time the hammer leaves the hand of workman 1 until it is at rest on the ground.

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.....[2]

(b) Workman 2 picks up the hammer and takes it back up the ladder to workman 1.

He climbs the first 3.0 m in 5.0 s. His total weight, including the hammer, is 520 N.

(i) Calculate the useful power which his legs are producing.

power =[2]

(ii) In fact his body is only 12% efficient when climbing the ladder.

Calculate the rate at which energy stored in his body is being used.

rate =[1]

[Total: 7]