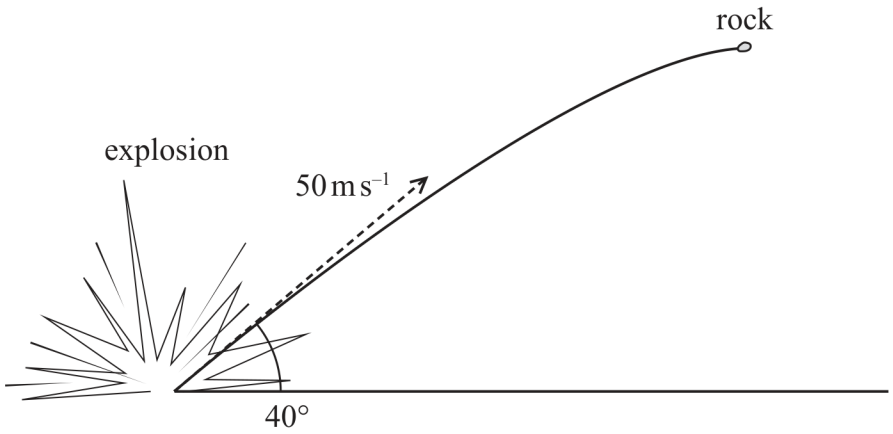
16 An explosion projects a rock into the air with a speed of $50\,m\,s^{-1}$ at an angle to the horizontal of 40°.



(a) Show that the rock would reach its maximum height about 3 s after the explosion.

(3)

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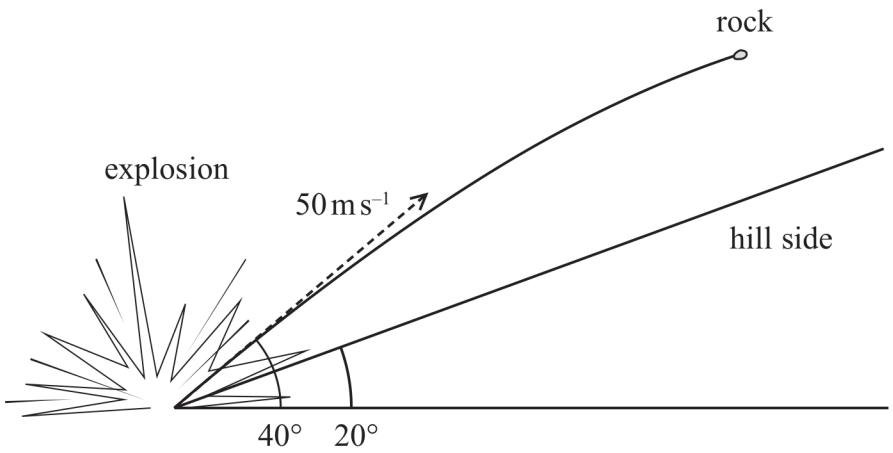
(b) The rock moves in the direction of a hill. The side of the hill is at 20° to the horizontal, as shown.



After a certain distance, the rock lands on the side of the hill.

Deduce whether the rock hits the ground before it reaches its maximum possible height.

(6)

(Total for Question 16 = 9 marks)