A car is travelling at a steady speed of 90 km h−1 when an emergency occurs. The driver carries out a panic-braking stop, locking all the wheels (no ABS!).

1. Derive expressions for the deceleration under the following conditions:
   1. if the car is ascending a slope of angle *Q* from the horizontal
   2. if it is on a horizontal road surface
   3. if it is descending the slope.
2. Assuming that the weather is dry, the slope is designated as 10% and the mass of the car, *M*, is 950 kg, determine for the three cases described in part (a) the decelerations and the time taken for the car to come to rest.