Design Exercise 5 - Vertical curve design

Question 5a
A 6% up-grade followed by a 2.5% down-grade is to be connected by a crest vertical curve on a high speed road of 90 km/h, so that a stopping sight distance of 190 m is provided. Use an eye height of 1.1 m and an object height of 0.2 m. Calculate the length of the vertical curve required.

Question 5b
From the above values calculate the length of the vertical curve if an object height of 0.65 m is used (e.g. tail light).

Question 5c
An up-grade of 1% is followed by an up-grade of 6% on an alignment with a design speed of 100 km/h. SSD is 179 m.

Calculate the length of curve required to satisfy minimum comfort criteria for 0.05 g.

Does this curve length satisfy headlight criteria?