

Ans 1. a.
Sigma = 1



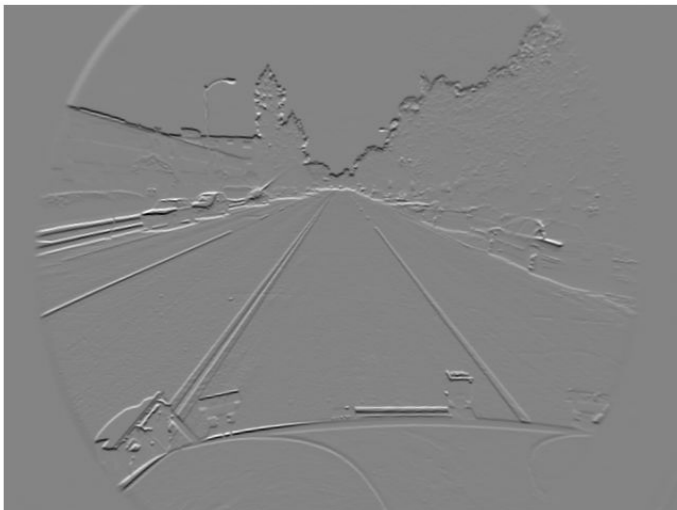
Sigma = 3



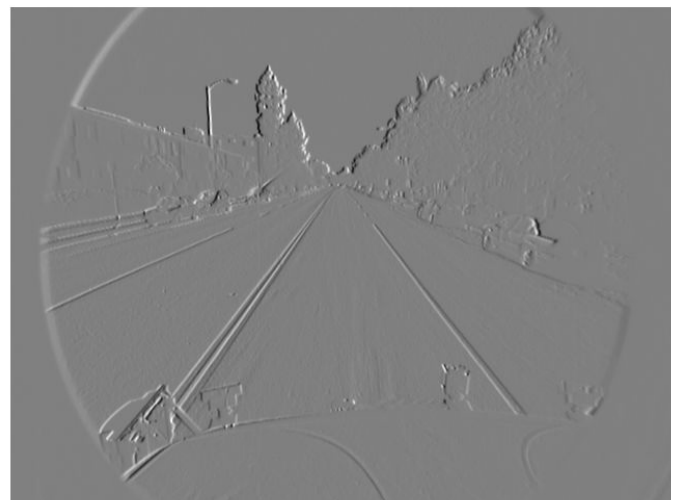
Sigma = 7



Ans 1. b. Kernel size : 3 x 3



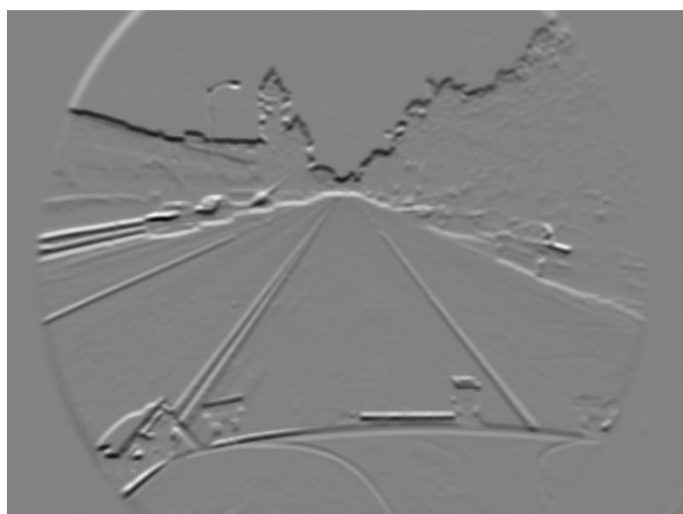
Gradient X



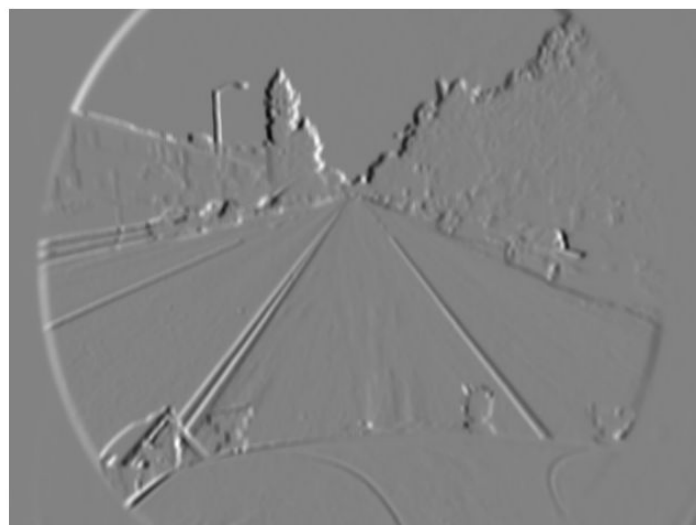
Gradient Y



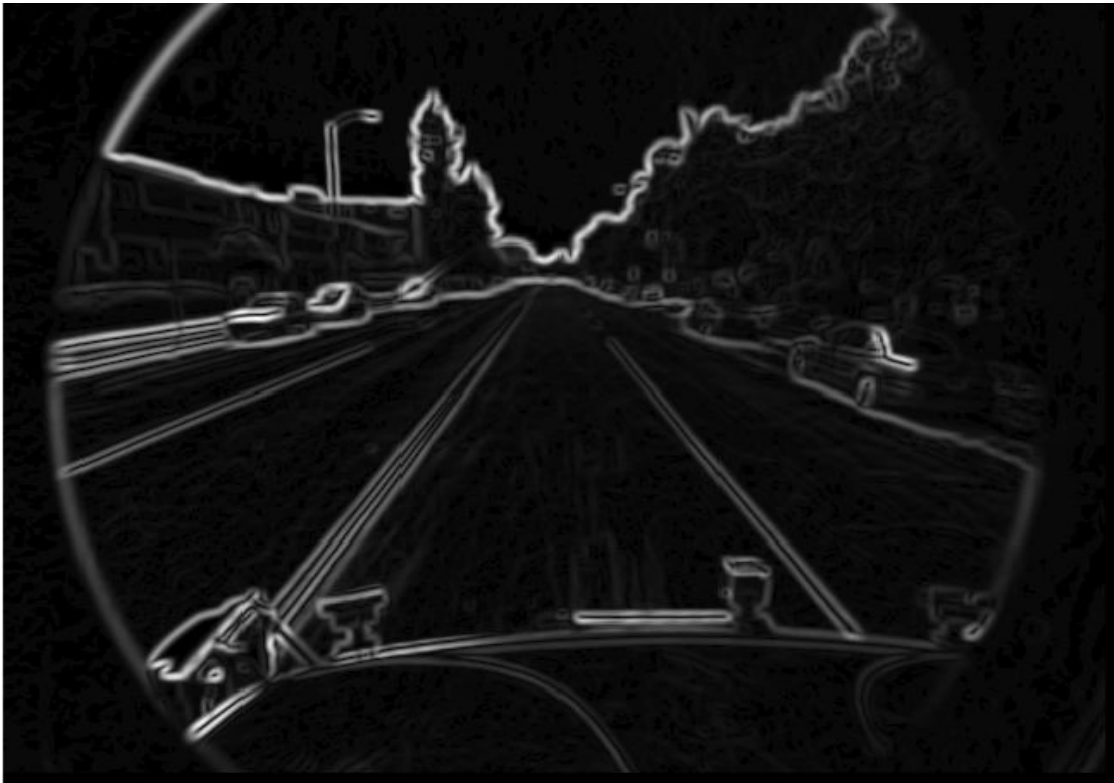
Kernel size : 7 x 7



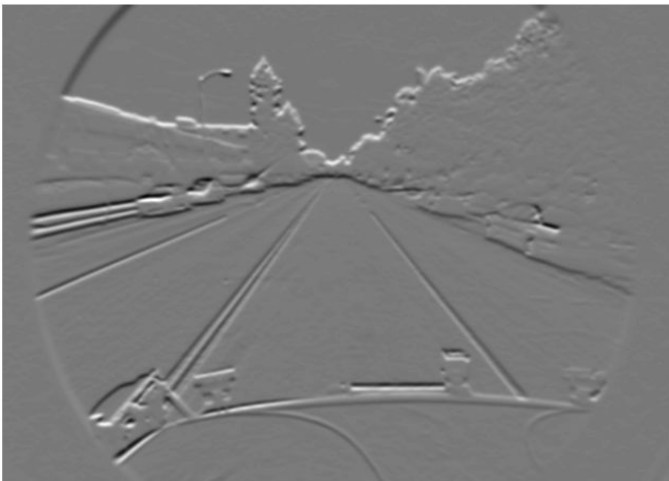
Gradient X



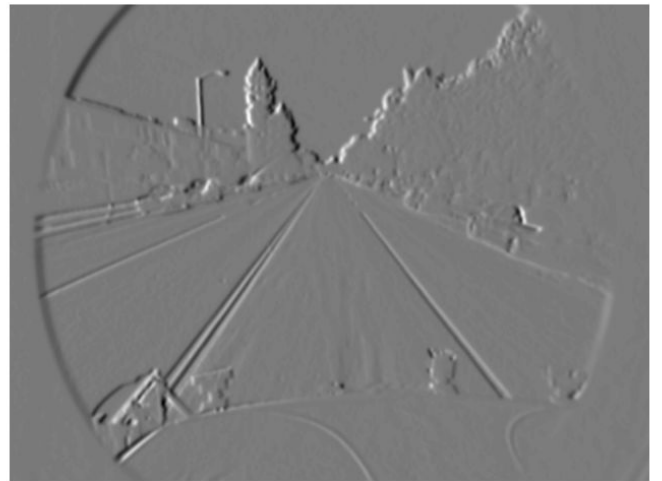
Gradient Y



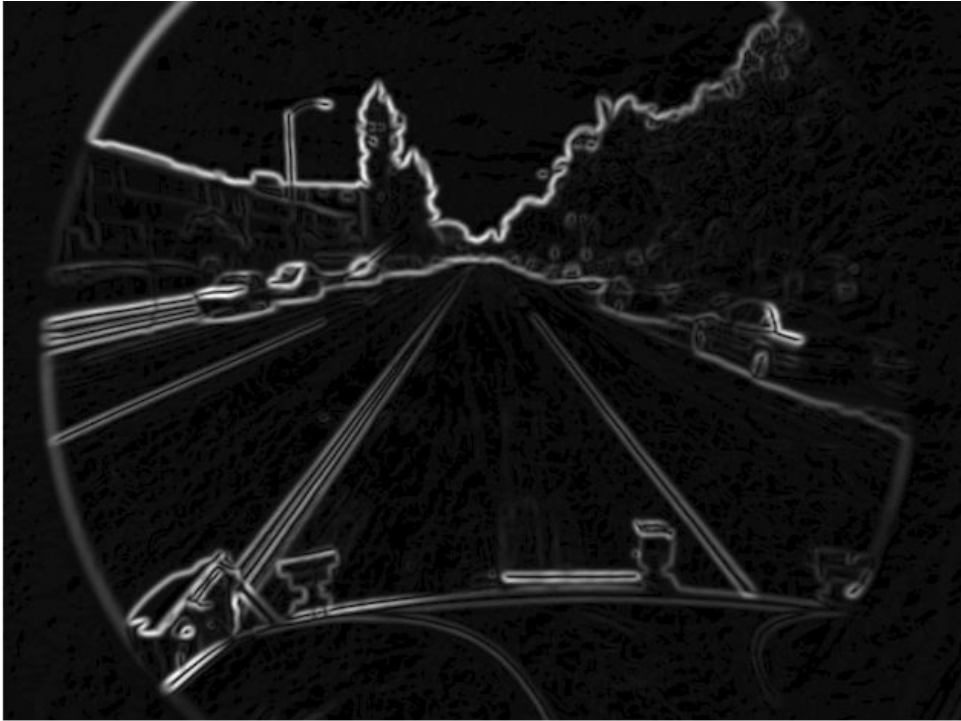
Kernel size : 11 x 11



Gradient X



Gradient Y



Ans 1.c

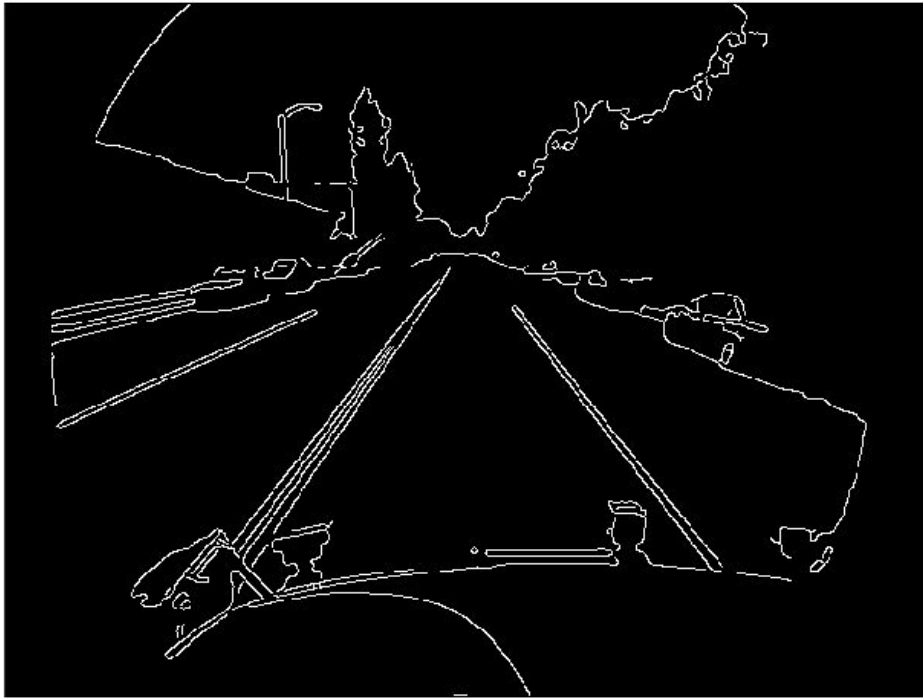
Gaussian of size 11x11 with sigma 1 is used. Also, the blurred image is scaled 1/10th to the original image.



Ans 2.a. I applied gaussian filter and image sharpening to the image. Then, the entire image is binarized by using adaptive thresholding. This method internally uses Otsu's method.



Ans 2.b Low threshold = 0.05 and high threshold = 0.25
Increasing low threshold increased clutter and noise. Increasing high threshold caused some important edges to disappear. Above parameters balance clutter vs important edges.



Ans 2.c.

Parameters for canny: Low threshold = 0, High threshold = 0.25

Parameters for hough: Max peaks = 25, Threshold to be considered a peak = $0.5 * \text{max peak}$



Ans 3. Parameters : Spatial = 10 Colors = 12 Minimum region = 200

Segmented Image:

