Answer Sheet Example Exam, test 2

Question 1
a   False, straight lines remain straight lines and parallel lines remain parallel.
b   True,   it takes into account the imperfections of the lens through the psf.
c   True,   erosion can remove pixels that once removed can not be gotten back.
d   False, the process referred to is labelling and annotation.
e   False, Bernsen threshold is a local adaptive method and is determined for a window.
f   True,   the chamfer distance uses a 4-3 metric and scales this after completion.
g   True,   top hat is an opening with structuring element S, that is subtracted from the original.
h   True,   Moments are centralized and normalized; from all moments features are derived
i   True,   ASM is a trained model that needs training examples, it need many examples.
j   True,   the minima are the locations the water flows, local maxima required for the sheds.

Question 2
a   It is a difference operator that strengthens the transitions in the image. If the environment is smooth, the difference is small. Where abrupt changes occur the difference will be large and a difference operator will show that from its kernel output.
b   Gaussian smoothing directly in the 1st derivative of x and y; result is used for the magnitude of the gradient. Application of the 2nd derivative of the Gaussian (Laplacian of Gaussian) to find the zero crossings. Thresholding of Magnitude of the Gradient and multiplication with the zero-crossings gives a result.
c   Dilate original with structuring element S; Erode original with structuring element S; Subtract the results; this is known as the morphological gradient.

Question 3
a   draw according to slide 23, lecture 12; from starting point given, and point indicated – any point will do here. The answer sheets just gives one.
b   weights for even Chaincodes (Ne), for uneven Chaincodes (No), changes in direction (Nc) thus 20, 21,26 results in L=0,98*20+1,406*21-0,091*26=46,76
c   this will be simply: L = Ne+sqrt(2)*No; thus L=20+sqrt(2)*21=46,69
d   this can be accomplished by adding 1 to each chaincode mod 8, so that everything is in [0-7]

Question 4
a   NN of x=1,4:1; y=1,4:1; therefore f(1,4;1,4) = 2
        NN of x=2.7: 3; y=2,4:2; therefore f(2,7;2,4)= 5
b   now use the BI schema f (1,4;1,4) = (1-0,4)(1-0,4)*2 +
                                        (1-0,4)*0,4*3 +
                                        0,4*(1-0,4)*3 +
                                        0,4*0,4*4 =
                                0,36*2+0,24*3+0,24*3+0,16*4 = 2,8; thus 3

        Similar computation for other coordinate pair