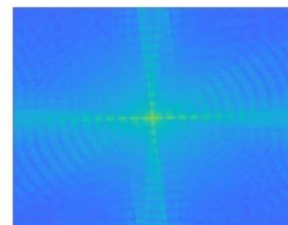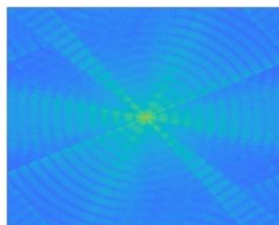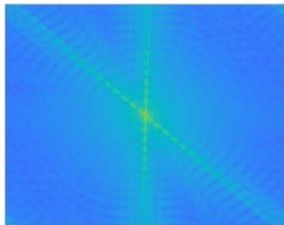# COMS20011 – Data-Driven Computer Science

Problem Sheet MM03

1 – Here are images of three handwritten letters. Their Fourier spaces are randomly shown. Match each image with its own Fourier image.

2 – Similar to the previous question, consider the two images (Sugar and Bricks) on the left. Identify which of the Fourier spaces (FS1 and FS2) on the right belongs to which image and explain briefly why.
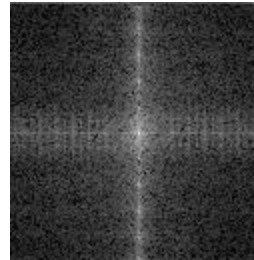

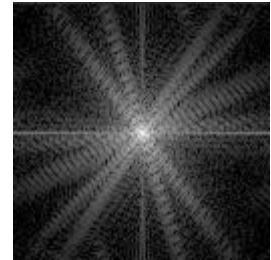3 – The figure below on the left shows an image of a building wall, with its Fourier Space magnitudes shown in the middle. A reconstructed image (inverse FFT image), after some manipulation of the Fourier magnitudes, is shown on the right. How should the Fourier space be manipulated (e.g., what kind of a mask could have been applied to it) to achieve this reconstructed result? Include a sketch to illustrate your answer.
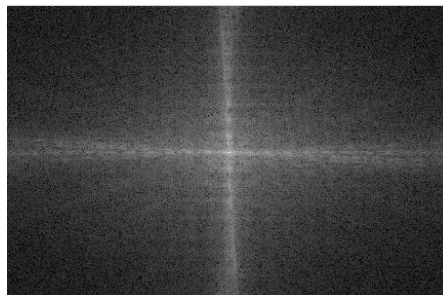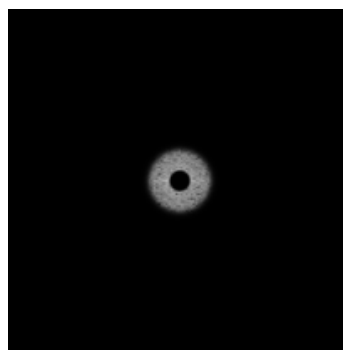
4 – Below is an original image of a clown and its Fourier space after an FFT operation.
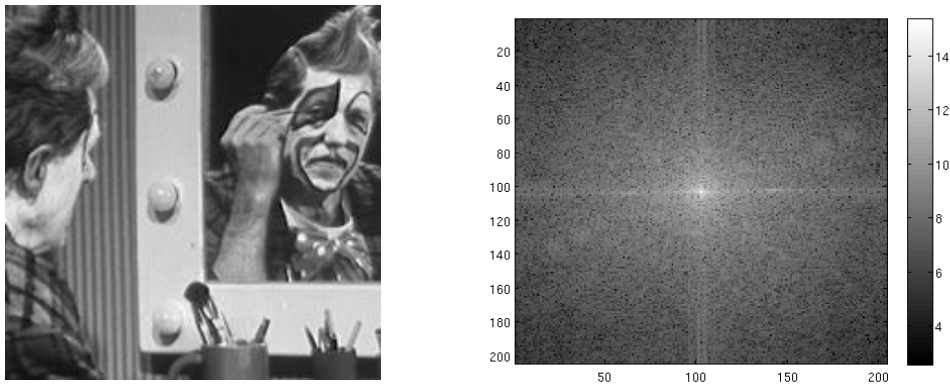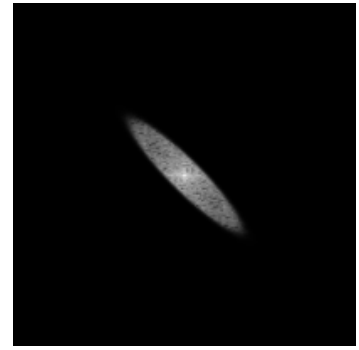

Next, there are three images, labelled (A;B;C), in each case after applying a specific mask to the Clown's Fourier space.
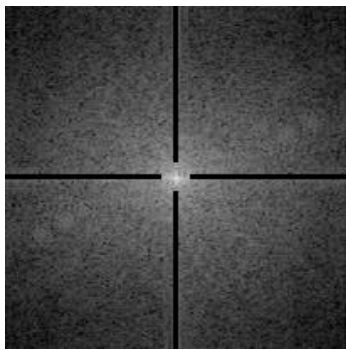
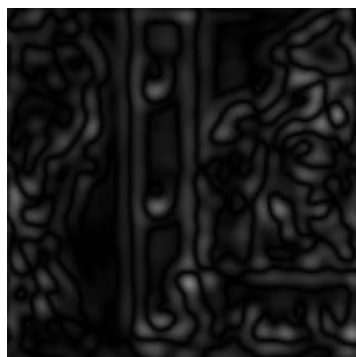| A | B | C |

Below, there are three results, labelled (X;Y;Z) that represent in an arbitrary order, the inverse FFT of the Fourier spaces in (A;B;C) above. Explain which inverse FFT space corresponds to which filtered image.

| X | Y | Z |