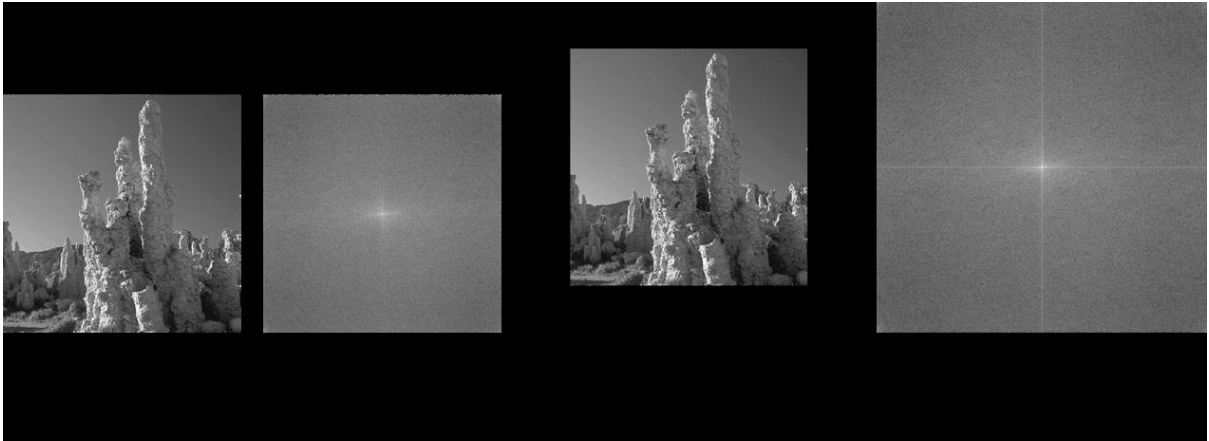


## 1.1 Fourier Transform (10%)



The Fourier spectrum (Fourier Representation) in Fig.(b) corresponds to the original image Fig.(a) and the Fourier spectrum in Fig.(d) was obtained after the image Fig.(a) was padded with zeros (Shown in the Fig.(c)).

a) Explain the significant increase in signal strength along the vertical and horizontal axes of Fig.(d) compared with Fig.(b).

Ans: The significant increase in signal strength along those axes, is due to the padding of zeros in Fig.(c). The paddings of zero are surrounding the Fig.(a). There is a great intensity change between the edge region of Fig.(a) and black region (zero intensity). The great change is located at horizontal edges and vertical edges of Fig.(a). Hence, the signal (intensity change) strength is increased on horizontal and vertical axes in Fig.(d).

b) Explain the significant increase in signal strength in the low frequency region of Fig.(d) compared with Fig.(b).

Ans: The significant increase in signal strength in the low frequency region, is due to padding of zeros in Fig.(c). The region of zero padding in Fig.(c) is a zero intensity area, The intensity change of area is zero, the intensity change of Fig.(c) is smaller than that of Fig.(a). Hence, the signal (intensity change) strength is increased in the low frequency region.