Q45. Explain the need for image transforms in digital image processing?

(or)

What is the need of image transform? List out various transform used in image processing.

Oct./Nov.-17, Set-1, Q2(b)

(or)

What is the need for image transform? Explain.

Nov.-16, Set-2, Q1(a)

Ans:

Need: Image transform is comprehensively used to characterize images mathematically for understanding and designing image processing procedures. Basically, transforms are mathematical tools used for processing and analyzing images and determining acceptable solutions to the problems. The main purpose of image transform in digital image processing is to enable,

1. Mathematical convenience and
2. To extract more information.

1. **Mathematical Convenience:** According to mathematical convenience every action in time domain has an impact on the simple multiplication operation in the frequency domain. i.e., convolution in time domain ↔ multiplication in frequency domain.

2. **To Extract More Information:** A transform is a mathematical tool which enables us to extract more relevant information from the signal.

For instance, consider a person x on the left hand side of the prism and person y on the right hand side of the prism as shown in figure (1),

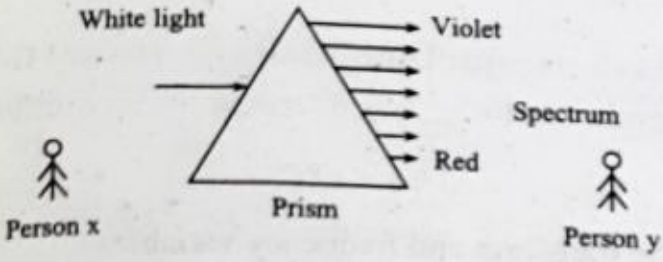

Figure (1)

From the figure, person x observes only white light whereas person y observes a combination of seven colours along with the white light. It is obvious that person y receives/ gets more information when compared to person x by using a prism.

Thus, the person x is in the time domain whereas, person y is in the frequency domain as illustrated in figure (2),

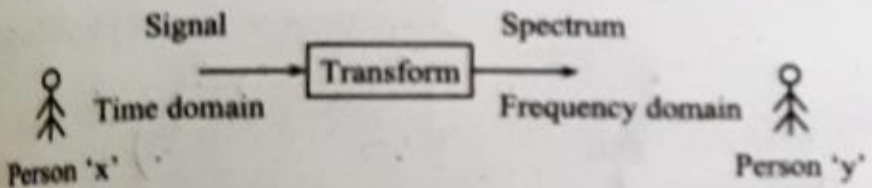

Figure (2)

Transforms alter the representation of a signal by projecting it onto a set of basis functions but, do not alter/ change the information introduced or present in the signal.