

**1. Define Image.**

An Image may be defined as a two dimensional function  $f(x,y)$  where  $x$  &  $y$  are spatial (plane) coordinates, and the amplitude of  $f$  at any pair of coordinates  $(x,y)$  is called intensity or gray level of the image at that point. When  $x,y$  and the amplitude values of  $f$  are all finite, discrete quantities we call the image as Digital Image.

**2. Define Image Sampling.**

Digitization of spatial coordinates  $(x,y)$  is called Image Sampling. To be suitable for computer processing, an image function  $f(x,y)$  must be digitized both spatially and in magnitude.

**3. Define Quantization.**

Digitizing the amplitude values is called Quantization. Quality of digital image is determined to a large degree by the number of samples and discrete gray levels used in sampling and quantization.

**4. Define digital image.**

A digital image is an image  $f(x,y)$ , that has been discretized both in spatial coordinates and brightness.

**5. What is meant by pixel?**

A digital image is composed of a finite number of elements, each of which has a particular location of value. These elements are referred to as pixels or image elements or picture elements or pels elements.

**6. Write the M X N digital image in compact matrix form?**

$$f(x,y) = f(0,0) \ f(0,1) \ \dots\dots\dots f(0,N-1)$$

$$\begin{bmatrix} f(1,0) \ f(1,1) \ \dots\dots\dots f(1,N-1) \\ \cdot \\ \cdot \\ \cdot \\ \cdot \\ f(M-1) \ f(M-1,1) \ \dots\dots\dots f(M-1,N-1) \end{bmatrix}$$

**7. Write the expression to find the number of bits to store a digital image?**

The number of bits required to store a digital image is

$$b = M \times N \times k$$

When  $M=N$ , this equation becomes

$$b = N^2 k$$

**8. What do you meant by Gray level?**

Gray level refers to a scalar measure of intensity, that ranges from black to grays and finally to white.

**10. What is Dynamic Range?**

The range of values spanned by the gray scale is called dynamic range of an image. Image will have high contrast, if the dynamic range is high, and image will have dull washed out gray look if the dynamic range is low.

**11. Define Brightness.**

Brightness of an object is the perceived luminance of the surround. Two objects with different surroundings would have identical luminance but different brightness.

**12. Define Resolutions.**

Resolution is defined as the smallest number of discernible detail in an image. Spatial resolution is the smallest discernible detail in an image and gray level resolution refers to the smallest discernible change in gray level.

**13. List the steps involved in digital image processing.**

The steps involved in digital image processing are,  
Image Acquisition.  
Preprocessing.  
Segmentation.  
Representation and description.  
Recognition and interpretation.

**14. What is recognition and interpretation?**

Recognition is a process that assigns a label to an object based on the information provided by its descriptors. Interpretation means assigning to a recognized object.

**15. Specify the elements of DIP system.**

The elements of DIP system are,  
Image acquisition.  
Storage.  
Processing.  
Communication.  
Display.

**16. List the categories of digital storage.**

The categories of digital storage are,  
Short term storage for use during processing.  
Online storage for relatively fast recall.  
Archival storage for frequent access.

**17. What do you mean by Zooming of digital images?**

Zooming may be viewed as over sampling. It involves the creation of new pixel locations and the assignment of gray levels to those new locations.

**18. What do you mean by shrinking of digital images?**

Shrinking may be viewed as under sampling. To shrink an image by one half, we delete every row and column. To reduce possible aliasing effect, it is a good idea to blur an image slightly before shrinking it.

**19. Define the term Radiance.**

Radiance is the total amount of energy that flows from the light source, and it is usually measured in watts (w).

**20. Define the term Luminance.**

Luminance measured in lumens (lm), gives a measure of the amount of energy an observer perceives from a light source.

**Reference:**

1. <https://www.scribd.com/doc/45572795/Digital-Image-Processing-Question-Answer-Bank>
2. Digital Image Processing 3rd ed. - R. Gonzalez, R. Woods